SC

Seat No. :_____ No. of Printed Pages: 2

[30 7A15]

# SARDAR PATEL UNIVERSITY

## B. Sc. (Biochemistry) – Fifth Semester Examination (CBCS)

**Tuesday, 7th November 2017**

**10:00 a.m. to 1:00 p.m.**

**US05CBCH01: Molecular Biology - I**

**Total Marks: 70**

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

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**Q. 1 Choose the most appropriate answer from the four alternatives given:** [10]

i. **Which of the following has no permanent location?**

(a) Oncogenes (b) Mobile genes (c) Pseudo genes (d) t - RNA genes

ii. **Histones are small _____proteins.**

(a) Acidic (b) Basic (c) Neutral (d) None of the above

iii. **The shape of human mitochondrial DNA is_____.**

(a) Single stranded linear (b) Supercoiled

(c) Circular (d) Double stranded linear

iv. **_____enzyme is responsible for 5' → 3' exonuclease activity?**

(a) DNA polymerase I (b) DNA polymerase II

(c) DNA polymerase III (d) DNA polymerase IV

v. **DNA replicates during_____ phase of cell cycle.**

(a) G0 (b) G1 (c) G2 (d) S

vi. **_____is the DNA sequence to which RNA polymerase binds to initiate transcription.**

(a) Enhancer (b) Operator (c) Promoter (d) Repressor

vii. **Which of the following introns are largest one?**

(a) Group I (b) Group II (c) Group III (d) Both (a) and (b)

viii. **Wobble hypothesis state that _____.**

(a) Single t-RNA can decode more than one codon for m-RNA

(b) Single t-RNA can decode more than one codon for r-RNA

(c) Single t-RNA can decode more than one codon for 28s r-RNA

(d) Single m-RNA can decode more than one codon for t-RNA

ix. **_____is not a nonsense codon.**

(a) AUG (b) UAG (c) UGA (d) UAA

x. **Which of the following is an example of ribozyme?**

(a) RNA polymerase (b) Peptidyl transferase (c) Aminoacyl transferase (d) RNAse H

**P.T.O.**

**Q.2** **Answer any TEN from the following:** **[20]**

i. What are minichromosomes?

ii. Define the terms Gene and genome.

iii. "DNA is considered as big boss of our body" Justify.

iv. What are replisomes?

v. What are the proteins needed to initiate replication at origin of *E. coli*?

vi. Write functions of topoisomerases.

vii. Define the terms Introns and exons.

viii. What are polycistronic and monocistronic m-RNA?

ix. Write differences between group-I and group-II introns splicing.

x. Justify that "ribosomes are complex molecular machine".

xi. "Transfer RNA acts as an adapter for protein synthesis" – Explain.

xii. Enlist characteristics of genetic codes.

**Q.3 (a)** Explain the concept of gene. **[4]**

**(b)** Describe salient features of eukaryotic genomes. **[6]**

**OR**

**Q.3 (a)** "Chromatin is chemically compound proteins"- Explain. **[4]**

**(b)** Justify that "Nucleosome is a organization unit of chromatin". **[6]**

**Q.4 (a)** Write a note on Okazaki fragments. **[5]**

**(b)** Explain D - Loop mode of replication. **[5]**

**OR**

**Q.4 (a)** Describe Meselson-Stahl experiment. **[5]**

**(b)** Explain termination of DNA replication. **[5]**

**Q.5 (a)** Explain the splicing of m-RNA. **[5]**

**(b)** Explain the mechanism of elongation of transcription in eukaryotes. **[5]**

**OR**

**Q.5 (a)** Describe reverse transcription. **[5]**

**(b)** Describe generation of 5' cap in eukaryotic m-RNA. **[5]**

**Q.6** Explain the inhibitors of proteins synthesis in detail. **[10]**

**OR**

**Q.6** Explain the process of initiation of proteins synthesis in detail. **[10]**

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[40/A18]

# SARDAR PATEL UNIVERSITY

## T.Y.BSc 5TH SEMESTER EXAMINATION NOVEMBER 2017

## BIOCHEMISTRY: USO5CBCH02

## Title: ENZYMOLOGY

**Date: 9/11/17; Thursday** **Time: 10:00 AM TO 1:00 PM** **TOTAL MARKS: 70**

**Q.1 Select proper option from following MCQ.** **[10]**

1. D- amino oxidase acts only on D- amino acid is the example of _____ specificity.
   a) Stereochemical b) Dual c) Linkage d) Group
2. Co-enzymes are required for following group of enzymes except_____.
   a) Decarboxylase b) Dehydrogenase
   c) Hydrolases d) Transaminase
3. _____ of the following is not an activator for any enzyme.
   a) $Mn^{++}$ b) $Mg^{++}$ c) $CN^-$ d) $Cl^-$
4. Enzyme bound to chromatin is _____.
   a) Nucleosite triphosphatase b) Malate dehydrogenase
   c) Arginase d) Topoisomerase
5. Enzyme located in inner membrane of mitochondria is _____.
   a) RNA polymerase b) Hexokinase
   c) Protein kinase d) Collagenase
6. Which of the following method is based on change in solubility?
   a) Decrease in dielectric constant b) Isoelectric focusing
   c) Iron exchange chromatography d) Ultra filtration
7. Which of the following is the feature of competitive inhibition?
   a) Km is not changed b) Km is increased
   c) Km is decreased d) $V_{max}$ is reduced
8. What is feature of allosteric inhibition?
   a) Km is not changed b) It is partially reversible
   c) It is not reversible d) Km is changed
9. _____enzyme is elevated in both obstructive jaundice and bone disease.
   a) SGOT b) SGPT c) Alkaline phosphatase d) Nucleotidase
10. All the enzymes are associated with myocardium except _____.
    a) SGOT b) LDH c) MB-CPK d) MM-CPK

**Q.2 Answer the following in short (Any ten)** **[20]**

1. Write two examples of co-enzymes involved in oxido-reductases.
2. List the factors affecting enzyme reaction?

3. Define activators and inhibitors.
4. List enzymes involved in lipid metabolism.
5. Enlist the enzymes involved in nucleic acid synthesis.
6. How Change in pH is useful for isolation of enzyme.
7. What are the features of non-competitive inhibition?
8. Define zero-order and first-order reaction.
9. Write example for random mechanism.
10. Write the role of saccharomyces species in wine making and brewing.
11. Write enzymatic method for the estimation of blood glucose.
12. Write enzymatic reaction which is used for measurements of uric acid.

**Q.3 Write short note on:**

**a.** Unit activity of enzyme. **[5]**
**b.** Enzyme specificity. **[5]**

**OR**

**a.** Metaloenzymes. **[5]**
**b.** Co-factors. **[5]**

**Q.4 Write short note on:**

**a.** Ultra centrifugation. **[5]**
**b.** Ion exchange chromatography. **[5]**

**OR**

**a.** Electrophoresis. **[5]**
**b.** Gel filtration. **[5]**

**Q.5** Explain in detail about uncompetitive inhibition. **[10]**

**OR**

**Q.5** Explain in detail about non-competitive inhibition. **[10]**

**Q.6 Explain**

**a.** Immobilization of enzymes. **[5]**
**b.** Alanine transaminase. **[5]**

**OR**

**Q.6 Write role of:**

**a.** Enzyme in treatment of cancer. **[5]**
**b.** Enzyme in treatment of genetic deficiency diseases. **[5]**

**----------BEST OF LUCK----------**

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# SARDAR PATEL UNIVERSITY

External examination– oct-2017

B.Sc. Biochemistry– V semester

paper code no. US05CBCH04

## CELL BIOLOGY

**Date:13/11/2017** **Time:** 10:0am -1:00pm **Total marks:70**

Monday

Q-1. **Answer the followings.** **10**

1. The main constituents of contractile apparatus of muscle cells are
   A] regulatory protein B] β-tubulin C] myosin and actin D] α- and β-tubuli
2. -------- proto filaments are bundled to form an intermediate filament
   A]Ten b] Eight c] one d] two
3. The end symbiotic origin of mitochondria is established based on----------
   A] DNA sequence data & other characteristics. b] molecular sequence data
   C]molecular sequence data and other characteristics d] DNA sequence data
4. ---------- are cytoplasmic protein complexes involved in the removal of denatured polypeptides.
   A] Microbodies B] Proteasomes C] Kinetosome D] Basal Granule
5. The position of the centriole determines the position of the ----------
   A] Nucleus b]myosin c]centrosome, d] actin
6. Endocytosis is a process for----------
   A] Moving Molecules "Uphill" B] Pushing Substances Out Of The Cell
   C] Phagocytosis For Solids And Water D] Taking Substances Into The Cell
7. Contractile vacuoles pump out --------.
   A]intra water b] excess water c] intra waste d] intra protein
8. Proteosom are involved in the removal of. ----------
   A] Micro bodies B] denatured polypeptides C] Kinetosome D] Basal Granule
9. A genetically-engineered ONYX-015 lacking p53 is known as
   A] adenovirus B] chaperone C] securin D]cohesion
10. Separation of the sister chromatids requires ----------
    A] separase B] chaperone C] securin D]cohesion



(PTO)

Q.2 Answer in short. (Attempt any ten) 20

1. Explain changes during metaphase of cell division.
2. List different stages of meiosis
3. Give meaning for endo replication.
4. How G-actin is recycled
5. Write on difference between polymerization of intermediate filaments and actin.
6. Write Definition of eukaryotes and prokaryotes
7. Write on occurrence of Zonula occludes
8. Define Autophagy.
9. Explain-how microtubules serve as the generating force for the separation.
10. Write on forms of Endocytosis
11. Enlist utilization of lysosomal enzymes
12. Write importance and Examples of intermediate filaments.

## LONG QUESTIONS 40 marks

Q..3 A] Classify and explain role of cell junctions
B] Write on theory of Eukaryote Evolution 5

OR

Q..3 A] Differentiate between animal and plant cell 5
B] Discuss –lipids in the cell is a dynamic ocean. 5

Q.4 A] Explain-Axonemal Microtubules Are Dynamic and Stable 4
B] Explain meaning and functions of centrioles.

OR

Q.4 A] Write importance for F-Actin filaments 6
B] Write on Basal bodies platforms for building cilia 4

Q.5 A] write on types of ER and explain structure and functions . 6
B] Write note on Golgi apparatus

OR

Q.5 A] Write on – proteasomes 4
B]write note on mitochondria. 6

Q.6 Explain - The stages for mitosis with neat diagram.. 10

OR

Q.6 Write detail account on cell cycle and explain events of each phases. 10

—X—

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No. of Pages 02

[26/A-10]

**SARDAR PATEL UNIVERSITY**
**V.V. Nagar-388 120**
**B.Sc. Biochemistry (V- SEMESTER)**
**Subject: HUMAN PHYSIOLOGY AND CLINICAL ENDOCRINOLOGY**
**Subject Code: US05CBCH05**

**DATE: 15/11/2017** Time : 10am to 1.00Pm **TOTAL MARKS: 70**

**Q.1 Multiple Choice questions : (1 Mark each)** **10**

1. The following element exhibit down regulation of aging process
   a. Sodium
   b. Sulfur
   c. Calcium
   d. Chlorine
2. Which of the following element use as emergency therapeutic in heart attack
   a. Mn
   b. Mg
   c. Na
   d. K
3. Which of the following is consider as table salt
   a. Na
   b. NaCl
   c. Cl
   d. None of Above
4. How many peptides present in angiotensin II
   a. 5
   b. 8
   c. 10
   d. 2
5. $PO_2$ in inspired air is
   a. 20 mmHg
   b. 70 mmHg
   c. 30 mmHg
   d. 158 mmHg
6. The following are the parts of respiratory tract except
   a. Alveolarduct
   b. Larynx
   c. Pharynx
   d. Trachea
7. Myosin are the example of
   a. Structure protein
   b. Regulatory protein
   c. Motor protein
   d. Sarcoplasmic protein
8. Which of the following can cause neuropathy in hyperglycaemic condition
   a. Manitol
   b. Cortisol
   c. Sorbitol
   d. Barbitol
9. In human kidneys, functional unit of kidney is also classified as
   a. Nephron
   b. Nebulin
   c. Neurone
   d. Macula Densa
10. LH is released from
    a. Pituitary gland
    b. Liver
    c. Adrenal gland
    d. Pancreas

**Q.2 Answer in very short (Any Ten)** **20**

1. Give the biological importance of "carbon" element in living system.
2. Write down the physiological role of Iron in human body.
3. List the components of renal and digestive system.
4. Define cardiac cycle. Explain the two major events of cardiac cycle.
5. Define Acidosis and Alkalosis.
6. Write down the role of $KHCO_3$ in RBC.
7. Give a brief note : GFR

8. List out various structural protein with its function in muscles.
9. What is chemical synapse? Give the role of neurotransmitter in it.
10. Differentiate between endocrine and exocrine gland.
11. Explain the factors regulate insulin secretion.
12. Justify the statement "hGH is protein anabolic in nature"

Q.3 a) Explain the chemical, cellular and tissue level organization in living system. [5]

b) Write down the biological importance of major elements. [5]

**OR**

Q.3 a) Give accounts on: Integumentary and skletomuscular system. [5]

b) Explain the physiological role of hormone secreted by pituitary gland. [5]

Q.4 a) Describe the sliding filament mechanism for muscle contraction in detail. [5]

b) Define nephron. Explain the structure and function of kidney. [5]

**OR**

Q.4 a) Give a brief accounts on : Chemical composition of muscles [5]

b) What is action potential? Explain the mechanism of nerve impulse transmission. [5]

Q.5 a) Define respiration. Explain the various phase of respiration in detail. [5]

b) Write down the role of haemoglobin as biological buffer. [5]

**OR**

Q.5 Write a note on : a) Chloride shift [5]

b) Carbon dioxide transport in blood [5]

Q.6 Define Diabetes mellitus. Describe the effect of insulin on glucose metabolism. [10]

**OR**

Q.6 Classify hormone based on solubility. Explain the mechanism of action of lipid and water soluble hormone. [10]

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[198A-9] **SARDAR PATEL UNIVERSITY**

**V.V. Nagar-388 120**

**B.Sc. Biochemistry (V- SEMESTER)**

**Subject: BIOINSTRUMENTATION US05CBCH06**

**DATE: 17/11/2017** **TOTAL MARKS: 70**

**Q.1 Multiple Choice questions : (1 Mark each)** **10**

1. Which of the following filter will transmit wavelength less than specified wavelength
   a. Band pass filter
   b. Short pass filter
   c. Long pass filter
   d. None of Above
2. Diodes are present in
   a. Barrier cell
   b. Multiplier tube
   c. Voltaic tube
   d. Photo emissive tube
3. Infrared spectroscopy provides valuable information about
   a. Molecular weight
   b. Conjugation
   c. Melting points
   d. Functional group
4. The following rotor is used in harvesting cell
   a. Continuous flow rotor
   b. Swinging Bucket Rotor
   c. Vertical tube rotor
   d. Elutriator Rotor
5. Speed of centrifuge is denoted by
   a. G
   b. RCM
   c. RPM
   d. RCF
6. Ion exchange chromatography is based on the
   a. electrostatic attraction
   b. adsorption chromatography
   c. ionic species
   d. partition chromatography
7. Salting out compound is required for
   a. HIC
   b. HPLC
   c. HLC
   d. GLC
8. The following chromatography is based on specificity
   a. Gel permeation
   b. Ion Exchange
   c. Affinity
   d. HPLC
9. In isoelectric focusing, proteins are separated on the basis of their
   a. relative content of positively charged residue only
   b. relative content of negatively charged residue only
   c. size
   d. relative content of positively and negatively charged residue
10. Immuno-electrophoresis requires
    a. SDS
    b. Polyacrylamide
    c. Agarose
    d. Starch

**Q.2 Answer in very short (Any Ten)** **20**

1. What is hyper chromatic shift?
2. Differentiate HPLC and GC.
3. Give disadvantages of filter photometer.
4. List the different Infrared region. Write down principle of IR spectroscopy.
5. Derive the equation of RCF.

(P.T.O.)

6. Write down the application of ultracentrifugation.
7. What is gradient media?
8. Discuss the polymerization process occurs in acryamide gel.
9. Write down the role of : a. SDS b. β-mercaptoethanol
10. List types of monochromator and radiant energy sources.
11. Give a brief note on: Stationary and mobile phase used in chromatography
12. Define partition co-efficient and effective distribution co-efficient.

Q.3 a) Give an account on : U.V. spectrometer [5]
b) Explain with diagram : Photo emissive tube [5]

**OR**

Q.3 a) Explain the principle and working process of colorimeter. [5]
b) Describe various types of monochromators. [5]

Q.4 a) Write a note on Isophynic Technique [5]
b) Explain various factors affecting speed of centrifuge. [5]

**OR**

Q.4 a) Explain the working of ultracentrifuge with diagram. [5]
b) Give an account on- Rate zonal rotor [5]

Q.5 a) What is cation and anion exchanger? Describe the principle and working procedure of Ion Exchange chromatography. [5]
b) Write down the principle and procedure of Gel permeation chromatography. [5]

**OR**

Q.5 Write a note on : a) Principle and pumping system of HPLC [5]
b) Detector used in GLC [5]

Q.6 Write down basic principal of electrophoresis. Describe principle and method of SDS-PAGE for protein separation. [10]

**OR**

Q.6 Write a short note on: Agarose gel electrophoresis [10]

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[319A16] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

## B.Sc (V$^{th}$ SEM) (CBCS) EXAMINATION

## Tuesday, 7$^{th}$ NOVEMBER -2017

## US05CBIT01: MOLECULAR BIOLOGY

**TIME – 10.00 am TO 1.00 pm** **Total Marks – 70**

**Note:** Figures to the right indicate full marks

**Q-1** **Multiple Choice Questions (Each question of one mark)** **[10]**

1) Which of the following methods of DNA repair is most error-prone?
   (a) Recombinational repair (c) Photoreactive repair
   (b) Excision repair (d) SOS repair
2) DNA polymerase responsible for leading strand synthesis
   (a) Pol ß (c) Pol ε
   (b) Pol $\alpha$ (d) Pol δ
3) Regulation of eukaryotic DNA replication is carried out by
   (a) RFC (c) PCNA
   (b) Cdks (d) NCR
4) Mature eukaryotic mRNAs have a 5' cap that is residue of
   (a) 7- methylguanosine (c) 3- methylation
   (b) 2-methylation (d) 4- methylguanosine
5) Which of the following is not true of RNA processing in eukaryotes?
   (a) Addition of 5'cap (c) Reverse transcription
   (b) Addition of a poly A tail (d) Splicing of RNA
6) Movement of ribosome from one codon to another is done by ---------
   (a) Translocation (c) Transition
   (b) Transformation (d) Transversion
7) Proteins that facilitate the correct folding of protein synthesized is ---------
   (a) Signal sequence (c) Ribozime
   (b) Chaperone (d) Ribosome
8) The first step in the biosynthesis of polypeptide is catalyzed by
   (a) Terminal transferase (c) Peptidyl transferase
   (b) Aminoacyl-t RNA synthase (d) Initiation protein
9) Which of the following is not an example of transposon
   (a) P element (c) Copia elelment
   (b) Tn element (d) Col element
10) Which of the following enzymes is essential for transposition events
   (a) Transposase (c) RNA polymerase
   (b) Transferase (d) Integrase

**Q-2** **Attempt any ten short questions (Each question of 2 marks)** [20]

**A** Define Telomerase and give its functions
**B** Define DNA Polymerase? Give its significance
**C** What is DNA Polymerase Shifting and give its significance
**D** Give various functions of RNA polymerases
**E** Write the various functions of Enhancer?
**F** What are promoters? Give its significance
**G** What is SRP? Give its uses
**H** What is the charging of t-RNA
**I** What is protein targeting?
**J** Describe the importance of target site in transposition
**K** Define transposons and give its examples
**L** What are autonomous elements?

**Q-3**

**(a)** Discuss the initiation step of replication with its regulation. [07]
**(b)** Enlist types of DNA damages and Explain any one [03]

**OR**

**(a)** Discuss the termination mechanism of eukaryotic replication [06]
**(b)** Give an account on methyl directed mismatch repair system. [04]

**Q-4** **(a)** Describe the termination process of transcription. [05]
**(b)** Explain the processing of r-RNA and t-RNA [05]

**OR**

**(a)** Discuss the initiation process of transcription [05]
**(b)** Explain 5' capping and polyadenylation modifications [05]

**Q-5**

**(a)** Explain in detail the initiation process of translation in eukaryotes [10]

**OR**

**(a)** Discuss in detail the post translational modification process in eukaryotes [10]

**Q-6**

**(a)** Describe the virus like transposable elements with example. [06]
**(b)** Give the application of transposons in r-DNA technology [04]

**OR**

**(a)** Describe the IS transposable element of prokaryotes. [06]
**(b)** Explain the mechanism of transposable element. [04]

—X—

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SC

[41/A19] SEAT No._____

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**SARDAR PATEL UNIVERSITY**
**B.Sc. V SEMESTER EXAMINATION**
**THURSDAY, 9TH NOVEMBER 2017**
**10:00 A.M TO 1:00 P.M**
**BIOTECHNOLOGY: USO5CBIT02**
**MOLECULAR TECHNIQUES**

**Total Marks: 70**

**Q.1 Multiple Choice Questions.** **[10]**

i) The technique for separation of charged molecules was developed by _____.
   a) Tswett c) Sveberg
   b) Tiselius d) Sanger

ii) _____ PCR provides the information about the activity of tumor cells and viruses.
   a) Inverse c) Nested
   b) Reverse transcriptase d) Anchored

iii) In site directed mutagenesis the nick is sealed with _____.
   a) DNA polymerase c) Taq polymerase
   b) DNA ligase d) Restriction endonuclease.

iv) The application of Southern blotting in genetic engineering includes _____.
   a) DNA fingerprinting c) RFLPs
   b) Molecular mapping d) All of these.

v) Northern blotting is commonly used for identification of _____.
   a) DNA-DNA interaction c) DNA-RNA interaction
   b) RNA-RNA interaction d) RNA protein interaction

vi) The range of micro satellite sequences in eukaryotes is _____.
   a) 1-5bps b) 7-13 bps c) 14-20 bps d) 21-27 bps.

vii) RFLP stands for _____.
   a) Random fragment length polymorphism
   b) Restriction fragment length polymorphism
   c) RNA fragment length polymorphism
   d) None of the above.

viii) Which of the following enzyme commonly used for in vitro transcription?
   a) Prokaryotic RNA polymerase
   b) Eukaryotic RNA polymerase
   c) Bacteriophage RNA polymerase
   d) None of the above.

ix) DNA fingerprinting was developed by _____.
   a) Francis Crick c) Alec Jeffrey
   b) Khurana d) James Watts

x) Genomic library is normally made by _____
   a) α phage vector c) β phage vector
   b) λ phage vector d) γ phage vector.



(PTO)

**Q.2 Answer the following questions in short. (Attempt any 10)** **[20]**

i) Mention the role of SDS in SDS PAGE.
ii) How temperature affects the process of electrophoresis?
iii) Which properties are essential for designing primers for PCR?
iv) Give a note on Oligonucleotide mutagenesis.
v) Write about Dot blot hybridization.
vi) Define the terms: a) Hybridization b) Blotting.
vii) Write different applications of DNA fingerprinting.
viii) Define Satellite DNA.
ix) Write a note on FISH and McFISH.
x) Differentiate between cDNA library and genomic library.
xi) What do you mean by DNA sequencing? Write automated method for DNA sequencing.
xii) Give the basic principle of DNA foot printing..

**Q.3 a)** Explain in detail Agarose Gel Electrophoresis. **[05]**
**b)** Give a detail note on RT-PCR. **[05]**

OR

**Q.3 a)** Give an account on SDS-PAGE. **[05]**
**b)** Explain basic methodology and applications of PCR. **[05]**

**Q.4 a)** Give an account on Southern Hybridization. **[06]**
**b)** Explain Colony Hybridization. **[04]**

**OR**

**Q.4 a)** Write a short note Autoradiography. **[06]**
**b)** Explain: In situ hybridization. **[04]**

**Q.5 a)** What is molecular marker? Explain RFLP in detail. **[06]**
**b)** Write a note on SNPs. **[04]**

**OR**

**Q.5 a)** Explain in detail AFLP. **[06]**
**b)** Give an account on construction of cDNA library. **[04]**

**Q.6 a)** Explain in detail Chain termination method for DNA sequencing. **[10]**

**OR**

**Q.6 a)** Describe the Maxam and Gilbert method for DNA sequencing. **[10]**

[33/A21]

No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY EXAMINATION, 2017**

**TYBSc Fifth Semester, 11th November, 2017, Saturday**

**Subject Biotechnology Course: US05CBIT03 Paper---Plant Biotechnology**

**Time:10.00am -1.00pm** **Total marks70**

**Q1. MULTIPLE CHOICE QUESTIONS.** Attempt all questions each carry one mark. **[10]**

**I Gene can be transferred to plant protoplast via endocytosis using--------**

**A.** Ribosomes **C.** Lysosomes

**B.** Liposomes **D.** Chromosomes

**II Function of vir E in Ti plasmid is to----------**

**A.** activate Vir G for transcription

**B.** transfer T-DNA to plant cell

**C.** recognize and nick T-DNA at border sequence.

**D.** protect T-DNA from plant nucleases

**III. Root producing property of *Agrobacterium rhizogenes* is due to-----**

**A.** Vir genes in its plasmid

**B.** Genes for auxin in T-DNA of its plasmid

**C.** Genes for cytokinin in T-DNA of its plasmid

**D.** Opines in its plasmid

**IV. bar gene encodes for---------**

**A.** Glutamine synthase **C** phosphinothricin acetyl transferase

**B.** pyrophosphatase **D.** phosphoenolpyruvate

**V. CpTi gene in transgenic plants provide resistance to-------**

**A.** insects **C.** viruses

**B.** herbicide **D.** fungus

**VI. Temperature of liquid nitrogen is----------**

**A** $-70^0$C **C** $-150^0$C

**B** $-196^0$C **D** $-10^0$C

**VII. Disarmed Ti plasmid is constructed by ----------**

**A.** Adding Multiple Cloning Site **C.** Adding selectable marker

**B.** Removing tumor inducing genes **D.** Removing border sequences

**VIII. Hormone that controls closure of stomata in response to water stress is----**

**A.** ABA **C.** GA

**B.** BAP **D.** IAA

**IX. What makes a plant to bend towards light as it grows?**

**A.** Because green plants need light to carry on photosynthesis

**B.** Because green plants are phototropic

**C.** Light stimulates plant cells on the illuminated side to grow faster

**D.** Auxin accumulates on shaded side stimulating greater cell elongation

**X. Glycerol can be used as----------**

**A.** Cryopreservant **C** Sterilant

**B.** Cryoprotectant **D** A) and C) both

**Q2. Short questions. Attempt any TEN questions. Each carry Two marks** [20]

a) Enlist different methods used to make transgenic plants.
b) Which genes were used to make golden rice, and why?
c) Explain the use of selectable markers in plants.
d) Explain the microinjection method of gene transfer
e) Why cryoprotectants are required in germplasm preservation?
f) Give the full form of ABA ,EPSPS, CAT and DMSO.
g) Define somaclonal variations and micropropagation.
h) Define parthenocarpy and apical dominance.
i) Define secondary metabolites and enlist any four examples.
j) Explain the term ex situ and in situ cryopreservation.
k) What is triple response?
l) Explain the role of GA in seed germination.

**Q3a.** Explain the role of various genes involved in transferring T-DNA in plants. [06]
**Q3b** Write a note on electroporation. [04]

OR

**Q3** Describe various markers used in screening transgenic plants. [10]

**Q4a.** Explain various strategies used to raise glyphosate resistant plant? Explain. [07]
**Q4b** Discuss the mode of action of cry proteins? [03]

OR

**Q4a** Describe the biochemical changes during ripening of tomato. [06]
**Q4b** Define edible vaccine and explain its mode of action. [04]

**Q5a.** Discuss the factors affecting cryopreservation. [06]
**Q5b** Explain the biosynthetic routes of auxins. [04]

OR

**Q5a** Describe in detail the regulation of phototropism and geotropism in plants. [06]
**Q5b** Define artificial seeds give their method of preparation. [04]

**Q6a** Discuss in detail the molecular basis of somaclonal variations. [07]
**Q6b** Write a note on hairy root culture. [03]

OR

**Q6a.** Explain the methods used to isolate somaclonal variations in vitro [06]
**Q6b** What are bioactive compounds? Write a note on antitumor properties of plants. [04]

—X—

SE

[32/A10]

SEAT No._____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

B.Sc Examination, 5th Semester

Monday, 13th November 2017

US05CBIT04

(Immunology)

Time: 10:00 A.M -01.00 P.M. Total: 70 Marks

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**Q-1 MULTIPLE CHOICE QUESTION** 10

1. What indicates a positive reaction in complement fixation test?
   a) Ag-Ab precipitation
   b) No haemolysis of sheep RBC
   c) Agglutination of sheep RBC
   d) Haemolysis of sheep RBC
2. Two or more cytokines that mediate similar function are attributes of
   a) Pleiotrophy
   b) Synergy
   c) Antagonism
   d) Redundancy
3. A crossed precipitin line following double immune diffusion is due to
   a) Shared epitopes between antigen
   b) No common epitopes between antigen
   c) Identify between antigen
   d) Only few epitopes that are common between antigen
4. Indicate the most appropriate test for detecting Typhoid bacterium in the serum
   a) Agglutination
   b) Sandwich ELISA
   c) ELISPOT
   d) RIA
5. Originally was also called T-Cell growth factor.
   a) IL-2
   b) TNF
   c) INF
   d) chemokine
6. The major antibody which is involved in classical pathway?
   a) Ig M
   b) Ig A
   c) Ig E
   d) Ig D
7. Hypersensitivity –type I reaction is also called as?
   a) Reagine type
   b) Ag-Ab complex mediated
   c) Ab mediated lysis
   d) Delayed type
8. _____ is potent activator of Naive T cell, memory T cell and effectors T cell.
   a) Dendritic cell
   b) B cell
   c) Macrophages
   d) RBC
9. Membrane attack complex of complement system is consist of
   a) C1-C4
   b) C5
   c) C5b-C9
   d) C3-C9
10. Auto antibodies to intrinsic factor blocks vitamin B12 absorption.
    a) Pernicious anaemia
    b) Haemolytic anaemia
    c) Drug induced anaemia
    d) All of the above

| | | | |
|---|---|---|---|
| Q-2 | | **SHORT QUESTION (any ten)** | 20 |
| | 1. | What do you understand by coomb's test? | |
| | 2. | Give account on Zone Phenomenon. | |
| | 3. | Explain Positive and negative Thymic selection in brief. | |
| | 4. | Give components of complement system. | |
| | 5. | Differentiate between T- dependent antigen and T- Independent antigen. | |
| | 6. | What are the causes of primary immunodeficiency? | |
| | 7. | What do you understand by Primary and Secondary mediators in Type-I Hypersensitivity? | |
| | 8 | Enlist certain pathogenic factor for the initiation of Alternate pathway | |
| | 9. | Give function of TNF. | |
| | 10. | Explain in brief RID. | |
| | 11. | Give the role of sequestered antigen in autoimmune response. | |
| | 12. | Give a brief account on attenuated Vaccines with example. | |
| Q-3 | A | Write a detailed note on RIA | 05 |
| | B | Explain immuno-electrophoresis along with its variation | 05 |
| | | **OR** | |
| | A | What is the purpose of using sheep and rabbit RBC in Complement fixation test and discuss CFT in detail | 05 |
| | B | Give a detail account on ELISA | 05 |
| Q-4 | A | Give an account on B cell Differentiation with diagram. | 06 |
| | B | How do NK cells recognise foreign antigen? | 04 |
| | | **OR** | |
| | A | Give a detail account on T cell development | 10 |
| Q-5 | A | Give a detail account on SCID | 06 |
| | B | Describe alternate pathway of complement system with figure. | 04 |
| | | **OR** | |
| | A | Discuss the complement system pathway which is activated by formation of Immune Complex. | 06 |
| | B | Discuss HIV as Secondary Immunodeficiency disease. | 04 |
| Q-6 | A | Discuss in detail type-II hypersensitivity | 06 |
| | B | Write a note on Give an account on autoimmune disease mediated by stimulating and blocking auto antibodies | 04 |
| | | **OR** | |
| | A | Discuss structure of MHC Class-I molecule | 05 |
| | B | Discuss the mechanism of graft is rejection. | 05 |

**ALL THE BEST**

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SEAT No._____

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[27/A-117]

# Sardar Patel University

B.Sc Biotechnology Fifth Semester
Wednesday, 15th November 2017
10:00 a.m to 1:00 p.m

**US05CBIT05 (Environmental Biotechnology)**

**Total Marks: 70**

Note: Figures to the right indicates marks.

**Q.I Multiple Choice Questions** **[10]**

**1)** _____ is an indicator of organic water pollution.
a) BOD b) Alkalinity
c) Acidity d) TOC

**2)** Soil pollution is/are caused by _____.
a) Industrial activities b) Agricultural activities
c) Mining activities d) All of these

**3)** Which of the following is not removed from water by tertiary treatment?
a) Solids b) Phosphorus
c) Nitrogen d) None of these

**4)** *Thiobacillus* group of bacteria involved in bioleaching are_____.
a) Phototrophs b) Chemolithotrophs
c) Heterotrophs d) Autotrophs

**5)** $CuFeS_2$ is an ore called_____.
a) Chalcopyrite b) Arsenopyrite
c) Covellite d) Hematite

**6)** _____ is not required for the process of biodegradation.
a) Microorganisms b) Environmental conditions
c) Adhesives d) Nutrients

**7)** Bioremediation can be carried out by_____.
a) Fungi b) Plants
c) Bacteria d) All of these

**8)** _____ biosensor is based on the movement of electron.
a) Amperometric b) Potentiometric
c) Piezoelectric d) Thermometric

**9)** Which of the following is not a bioplastic?
a) PHA b) PVC
c) PHB d) PLA

**10)** Bioreceptor/s used in biosensor is/are_____.
a) Microorganism b) Enzymes
c) Antibody d) All of these

**P.T.O**

| | | |
|---|---|---|
| **Q.II** | **Answer the following questions in short. (Attempt any 10)** | **[20]** |
| **a)** | Write the effects of land pollution. | |
| **b)** | Enlist the control measures for air pollution | |
| **c)** | Differentiate between BOD & COD. | |
| **d)** | Define bioleaching. | |
| **e)** | Enlist the microorganisms involved in the process of bioleaching. | |
| **f)** | Give the significance of Bioleaching. | |
| **g)** | Mention the factors affecting the process of biodegradation | |
| **h)** | Give diagrammatic representation for construction of Superbug in bioremediation. | |
| **i)** | What is In situ bioremediation? | |
| **j)** | Write about the components of Biosensor. | |
| **k)** | Mention the name of natural sources used in the production of bioplastic. | |
| **l)** | Give various applications of PHA. | |
| **Q.III** | Explain any two biological treatment processes for sewage treatment based on aerobic attached growth system. | **[10]** |
| | **OR** | |
| **Q.III** | Write a detail note on the following: | |
| **a)** | TOC | **[05]** |
| **b)** | Activated sludge process of waste water treatment | **[05]** |
| **Q.IV a)** | Give an account on the direct & indirect bioleaching. | **[05]** |
| **b)** | Explain in detail types/methods of bioleaching. | **[05]** |
| | **OR** | |
| **Q.IV a)** | Discuss in detail factors affecting the process of bioleaching. | **[05]** |
| **b)** | Write in detail about Copper bioleaching. | **[05]** |
| **Q.V a)** | Describe biodegradation of any one pesticide. | **[05]** |
| **b)** | Write short note on Ex situ bioremediation. | **[05]** |
| | **OR** | |
| **Q.V a)** | Define biomagnifications. Explain it with the help of suitable example. | **[06]** |
| **b)** | Write short note on Phytoremediation. | **[04]** |
| **Q.VI a)** | Define biosensor. Explain its principle in detail. | **[05]** |
| **b)** | Give an account on applications of biosensor. | **[05]** |
| | **OR** | |
| **Q.VI** | Describe various approaches used for production of bioplastics and also write the properties of bioplastic. | **[10]** |

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Seat No._____ No. of Printed Pages : 02

[20¢ A-20]

# Sardar Patel University

**B.Sc Biotechnology Fifth Semester**
**Friday, 17th November 2017**
**10:00 am to 1:00 pm**
**US05CBIT06 (Cell Biology)**

**Total Marks: 70**

Note: Figures to the right indicates marks.

**Q.I Multiple Choice Questions** [10]

1) The fluid mosaic model proposed in _____by S. Jonthan, Singer & Gorth Nicolson.
   a. 1975 c. 1670
   b. 1980 d. 1972

2) Which is not a component of Plasma membrane?
   a. Carbohydrate c. Protein
   b. Lipid d. None

3) If two solutes are transport in the opposite direction across the plasma membrane the process is called_____.
   a. Facilitate diffusion c. Symport
   b. Uniport d. Antiport

4) _____is also known as microfilaments.
   a. Actin Filament c. Tubulin filament
   b. Myosine filament d. None of these

5) Which of the following cells lacks cytoskeleton?
   a. Eukaryotic plant cell c. Both a & b
   b. Prokaryotic bacterial cell d. Prokaryotic & Eukaryotic animal cell

6) _____is the ability of the system to receive multiple signals & produce unified response.
   a. Cooperativity c. Desentization
   b. Integration d. Amplification

7) _____ is plasma membrane receptor that is also an enzyme.
   a. Tyrosine kinase c. PEP kinase
   b. Pyruvate kinase d. Hexokinase

8) What happen when insulin receptors binds with insulin?
   a. Phosphorylation of IRS-I c. Autophosphorylation of Grb2
   b. Autophosphorylation of IRS-I d. Autophosphorylation of its Tyr residue.

9) Which of the mostly associated with apoptotic pathway?
   a. Myoglobin c. APAF I
   b. NADH d. α- Tubulin

10) Sarcomers are derived from_____.
   a. Endoderm c. Ectoderm
   b. Mesoderm d. Phytoderm

**P.T.O**

| | | |
|---|---|---|
| **Q.II** | **Answer the following questions (attempt any TEN)** | **[20]** |
| **a)** | Define Osmosis with example. | |
| **b)** | Draw a neat and labelled diagram of fluid mosaic model. | |
| **c)** | Give the difference between active and passive transport. | |
| **d)** | Draw and label Myosin I. | |
| **e)** | What are MTOCs? | |
| **f)** | Give the functions of cytoskeleton. | |
| **g)** | Define: Cell signalling. | |
| **h)** | Write basic characteristics of cell signalling. | |
| **i)** | Give the role of second messengers. | |
| **j)** | Define caspases with its role. | |
| **k)** | What do you mean by Metastasis? | |
| **l)** | Write the difference between benign and malignant tumors. | |
| **Q.III** | Explain various components of plasma membrane. Discuss membrane lipids in detail | **[10]** |
| | **OR** | |
| **Q.III** | Write note on following:- a) $Na^+ K^+$ ATpase Pump b) Membrane fluidity | **[10]** |
| **Q.IV a)** | How assembly and disassembly of intermediates filaments occurs? | **[06]** |
| **b)** | What are MAPs? | **[04]** |
| | **OR** | |
| **Q.IV a)** | Write a note on Myosin II and Kinesin. | **[06]** |
| **b)** | Describe the structure of Microtubules. | **[04]** |
| **Q.V a)** | Write a note on G- Protein coupled receptor. | **[06]** |
| **b)** | Write in brief about the role of cAMP as a second messenger with any one example. | **[04]** |
| | **OR** | |
| **Q.V a)** | Explain in detail about the Receptor Tyrosine kinase. | **[06]** |
| **b)** | Give an account on JAK-STAT pathway. | **[04]** |
| **Q.VI a)** | Describe the mitochondrial pathway of apoptosis with neat and labelled diagram. | **[06]** |
| **b)** | Discuss the mechanism of cancer. | **[04]** |
| | **OR** | |
| **Q.VI a)** | How the protooncogenes convert into oncogenes? Explain. | **[06]** |
| **b)** | Give the significance of apoptosis. | **[04]** |

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# SARDAR PATEL UNIVERSITY

## B. Sc. (Bioinformatics) Examination, 5th Semester

## Tuesday, 07th November, 2017

## US05CBNF01: Visual Programming

**Time: 10:00 AM to 01:00 PM** **Total Marks: 70**

**Note:** Answer of all the questions (including Multiple Choice Questions) should be written in the provided answer book only

**Q:1 Give answers of following Multiple Choice Questions** **[10]**

**[01]** What is MSIL?

(A) Compiler (B) Interpreter
(C) Technology (D) Assembly

**[02]** Dim is an Abbreviation of

(A) Dimension (B) Dimer
(C) Dimerization (D) Diameters

**[03]** The JIT is one type of _____.

(A) Hardware (B) Complier
(C) Measurement unit (D) Time

**[04]** In VB .NET, inputbox returns _____ type of data.

(A) String (B) Double
(C) Integer (D) None of these

**[05]** To come out from any loop _____ statement is used.

(A) Break (B) Exit
(C) Goto (D) None of these

**[06]** Which statements are optional in an If...Then statement?

(A) Else (B) Then
(C) If (D) All of the above

**[07]** The Tick event is found only in which object?

(A) Form (B) Timer
(C) Button (D) Textbox

**[08]** Which control display hierarchy of nodes.

(A) Treeview (B) Label
(C) Timer (D) Scrollbars

**[09]** _____ is disconnected, in-memory representation of data.

(A) DataReader (B) DataSet
(C) DataAdapter (D) DataCommand

**[10]** What is the major component of connected data architecture?

(A) DataReader (B) DataSet
(C) DataAdapter (D) DataCommand

**Q:2 Answer the following short questions (any Ten)** **[20]**

**[01]** What is CLS?

**[02]** Write a short note on MSIL?

**[03]** List the parts of IDE.

**[04]** Write down the syntax of If ... End If.

**[05]** What is the use of 'By Val' & 'By Ref' keyword?

**[06]** Write a difference between MDI and SDI.

**[07]** Differentiate between radio button and checkbox.

**[08]** Differentiate between label and linklabel.

**[09]** Differentiate between listbox and combobox.

**[10]** What are the features of ADO.Net?

**[11]** Explain the use of server explorer in data access in .NET.

**[12]** Mention different types of data providers available in ADO .NET.

**Q:3** **[A]** Explain CLR, CTS, and MSIL in detail. **[06]**

**[B]** Write a short note on Solution Explorer and property window **[04]**

**OR**

**Q:3** **[C]** Write a short note on IDE. **[06]**

**[D]** Write a short note on Boxing and Unboxing **[04]**

**Q:4** **[A]** Explain declaration of function in detail with example. **[06]**

**[B]** Explain For ... Next Structure in detail. **[04]**

**OR**

**Q:4** **[C]** Explain Message box with example. **[05]**

**[D]** What is MDI form & explain how it differs from normal form? **[05]**

**Q:5** **[A]** Write a note on HScorllBar and VScrollBar. **[05]**

**[B]** Explain controls with its properties, methods & events: textbox and button **[05]**

**OR**

**Q:5** **[C]** Explain try.... Catch ... final in detail with example. **[05]**

**[D]** Explain timer control with its properties, methods & events **[05]**

**Q:6** **[A]** Explain the connected architecture of ADO .NET in brief. **[04]**

**[B]** Explain the steps to bind the application with the Database in ADO .NET. **[06]**

**OR**

**Q:6** **[C]** Explain the step, how can we retrieve data in DataSet? **[04]**

**[D]** Explain public methods of SqlCommand objects **[06]**

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SARDAR PATEL UNIVERSITY

T.Y.B.Sc : SEMESTER – V

BIO INFORMATICS

**US05CBNF02 : Object Oriented Programming and Data Structure**

Date: 09/11/2017 (Thursday) Time: 10:00am to 01:00pm Max.Marks : 70

| | | |
|---|---|---|
| Q.1 | Multiple choice of Question:<br>[1] _____ is basic run time entity in object-oriented system.<br>[A] Object [B] Class [C] Data [D] Function<br>[2] In _____ data is hidden and cannot be accessed by external functions.<br>[A] OOP [B] POP [C] SOP [D] None<br>[3] _____is a user define data type.<br>[A] Class [B] Variable [C] Operator [D] Function<br>[4] _____ constructor contains an object as argument.<br>[A] Default [B] Parameterized<br>[C] Copy [D] None of Above<br>[5] For string manipulation _____ header file is included.<br>[A] string.h [B] ctype.h<br>[C] iostream.h [D] conio.h<br>[6] Which of the following is a valid function prototype in C++?<br>[A] int sum(int a, int b, int c = 0)<br>[B] int sum(int a = 0, int b, int c)<br>[C] int sum(int a, int b = 0, int c)<br>[D] int sum(int a =0, int b, int c = 0)<br>[7] Defining a function with same name but different types & no. of arguments is known as ___.<br>[A] inheritance [B] function overriding<br>[C] function overloading [D] Inline function<br>[8] _____ of the array represents the kind of data type.<br>[A] Size. [B] Base.<br>[C] Type. [D] Index.<br>[9] If the range of index varies from L..... U then size of the array is_____.<br>[A] U – L + 1. [B] L – U + 1.<br>[C] U / L – 1. [D] L / U – 1.<br>[10] Two dimensional arrays are also called<br>[A] Row array [B] matrix array<br>[C] Column array [D] Index array | 10 |
| Q.2 | Answer the following in short (Any 10) :<br>[1] Define class & object as concept of OOP.<br>[2] Define encapsulation as concept of OOP.<br>[3] List out any four header file in C++.<br>[4] Explain cout in C++ with example.<br>[5] Explain cin in C++ with example.<br>[6] Write syntax for declare & initialize one dimensional array with example.<br>[7] What is *this pointer?<br>[8] What is function? Explain briefly.<br>[9] What is inline function? Give an example of it.<br>[10] Write Algorithm for PUSH( ) operation on stack.<br>[11] Write Algorithm for POP( ) operation on stack.<br>[12] Define Primitive and Non-Primitive data structure. | 20 |



(PTO)

| | | |
|---|---|---|
| Q.3 | [A] Explain features (characteristics) of OOP in detail. | 5 |
| | [B] What is C++? Explain structure of C++. | 5 |
| | OR | |
| Q.3 | [A] Explain different data type available in C++. | 5 |
| | [B] Explain basic concepts of Polymorphism and Inheritance | 5 |
| Q.4 | [A] Explain nameless objects with proper example. | 5 |
| | [B] Explain destructors with an example. | 5 |
| | OR | |
| Q.4 | [A] Explain constructor overloading with example. | 5 |
| | [B] Explain private and public area in class? | 5 |
| Q.5 | [A] Explain the array of pointers with example. | 5 |
| | [B] Explain the pointer to function with example. | 5 |
| | OR | |
| Q.5 | [A] What is function overloading? Explain it with example. | 5 |
| | [B] Explain the concept of friend function with suitable example. | 5 |
| Q.6 | What is Queue? Write an algorithm for Insert and Delete operations on Circular Queue. | 10 |
| | OR | |
| Q.6 | Write detail note on Array. | 10 |

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# SARDAR PATEL UNIVERSITY

**Bachelor of Science (B.Sc.)**
**Fifth Semester Examination November – 2017**
**Saturday, 11th November, 2017**
**10 A.M to 1:00 P.M**
**Subject: Bioinformatics**
**COURSE: US05CBNF03**
**(Basics of Immunology)**

**Total Marks: 70**

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

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**Q. 1 Choose the most appropriate answer from the four alternatives given:** **[10]**

(1) **Which of these is called Altered self cell :**
A) Tumor cell B) Virus infected cell C) both A & B D) B lymphocyte

(2) **Which of these cells is phagocytic?**
A) B-cell B) TH cell C) Dendritic cell
D) Both A and C

(3) **The substances that posses antigenicity but lacks immunogenicity are:**
A) Adjuvants B) Haptens C) Superantigens D) Avidins

(4) **Which of the antibody molecule can cross the placenta?**
A) IgA B) IgE C) IgG D) IgM

(5) **How many classes of MHC molecules are there:**
A) 2 B) 3 C) 4 D) 5

(6) **Principal of RID states that concentration of antigen is directly proportional to:**
A) Concentration of Antibody B) Diameter of the precipitin ring
C) Time of incubation D) Size of the plate

(7) **Major histocompatibility locus in human beings is known as :**
A) H-2 complex B) HLA complex C) Ig complex D) ABO complex

(8) **Antigen Antibody interactions are important because of:**
A) Specificity B) Sensitivity C) Non-ambiguity D) All of these

(9) **Phagocytic pathway would process:**
A) Endogenous Antigen B) Exogenous Antigens C) Haptens D) Super antigens

(10) **The Hybridoma technology was invented by:**
A) Kohler & Milstein B) Porter C) Edelman D) Watson & Crick

**PTO**

Q.2 **Answer any TEN from the following:** [20]

(1) Define Innate immunity and mention its components.
(2) Briefy explain how haptens are different from antigens?
(3) What is active immunity. Mention its features.
(4) Define phagocytosis. Enumerate various phagocytic cells.
(5) Define Secondary lymphoid organ. Mention two examples.
(6) What are the functions of antibody molecule.
(7) Enumerate various features of Antigen antibody reactions.
(8) What are the main differences between agglutination and precipitation reaction.
(9) Define Radio Immuno Assay. What is its limitation.
(10) Write various applications of monoclonal antibodies.
(11) What are the various functions of MHC molecules ?
(12) What are the main differences between endogenous and exogenous antigen?

Q.3 (a) Define Innate immunity. Briefly explain various components of innate immunity [5]

(b) Give a Comparative account of Primary and secondary Immune response [5]

**OR**

Q.3 (a) Briefly explain second line of defence, its features and components. [5]

(b) Give a Comparative account of Active and Passive immunity [5]

Q.4 (a) Explain the structure of antibody molecule with Diagram. [5]

(b) Write a short note on thymus as an lymphoid organ [5]

**OR**

Q.4 (a) Briefly explain various immune cells and their functions in brief. Write a Give a [5]

(b) comparative account of IgG and IgM Molecule. [5]

Q.5 (a) Write an comparative account of RIA & ELISA [5]

(b) Briefly explain precipitation reaction and its types.

**OR**

Q.5 (a) Explain CFT with neat and labelled diagram. [5]

(b) Explain Sandwich ELISA with a diagram. [5]

Q.6(a) Explain Hybridoma technology with proper flow chart. [5]

(b) Explain structure of MHC Class-I Molecule with diagram. [5]

**OR**

Q.6 With the help of labelled diagram explain the processing of endogenous antigen in detail. [10]

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# Sardar Patel University
## Semester examination-2017

**B.Sc V$^{th}$ Semester, Subject – Bioinformatics**

**Course no. US05CBNF04, Date - 13.11. 2017, Monday**

## Genetic Engineering-I

**Time – 3hrs** (10.00am to 1.00pm) **Marks-70**

**NOTE- Figure in the right indicates marks**

**All questions are compulsory. Make necessary diagram wherever needed.**

**Q.1. Multiple Choice Question (MCQ). Select correct answer from given MCQ. (10marks)**

1.a. Type II Restriction enzymes are always recognizes target site that are
(A) Palindromic DNA sequences (B) AT rich sequences
(C) GC rich sequences (D) Repetitive DNA

1.b. Which of the following bond are join by DNA ligase
(A) Phosphodiester bond (B) Hydrogen bond
(C) Glycosidic bond (D) Covalent bond

1.c. Which of the following vector considered as work horse of a gene cloning laboratory
(A) YAC (B) BAC
(C) PBR 322 (D) PUC 8

1.d. Ti plasmid are present in
(A) E. Coli (B) Bacillus subtilis
(C) Agrobacterium Tumifacience (D) Pseudomonas Putida

1.e. Select the vector used for gene transfer in mammalian cell
(A) YAC (B) Retrovirus
(C) PBR 322 (D) YCP

1.f. Select the methods that used for identification of Recombinant clones
(A) Split gene expression (B) Insertional inactivation
(C) Base pairing (D) Insertional activation

1.g. Which of the following bacterial cell are used for transformation of rDNA
(A) Competent cell (B) Wild type cell (C) Protoplast (D) Spheroplast

1.h. Agarose gel electrophoresis can be used for separation of DNA fragments
(A) 0.5 to 60 kb (B) 50-200 kb
(C) 150-450 kb (D) 450-600kb

1.i. 2,3 dideoxynucleotides can terminate the synthesis of DNA through
(A) Block the formation of phosphodiester bond with dNTPs
(B) Block the formation of Hydrogen bond between bases
(C) Block the formation of N glycosidic bond between sugar and base
(D) Block the formation of covalent bond

1.j. Which of the following are template for Reverse Tnscription (RT) PCR
(A) cDNA (B) Genomic DNA
(C) Mitochondrial DNA (D) All of the above

**P.T.O**

(1)

**Q.2. Short questions (2 marks each) attempt any ten** **(2x10=20marks)**

[1] What is r DNA?
[2] Write notes on alkaline phosphatase.
[3] Define cosmid vector.
[4] What is T DNA?
[5] What is retrovirus vector?
[6] Enlist essential features of cloning vectors.
[7] What is transformation?
[8] Write short notes on application of genomic DNA library.
[9] How cDNA can prepare in laboratory?
[10] Enlist various reagents for agarose gel electrophoresis.
[11] What is chromatography?
[12] Write brief notes of application of DNA sequencing.

Q3.a Explain the features and properties of PUC 8 vector. [05]
Q3.b.Discuss the important properties and function of restriction enzymes. [05]

**OR**

Q.3.a. Explain the features and properties of pBR322 plasmid [05]
Q.3.b.Write short notes on properties and application of DNA polymerase. [05]
Q.4.a. What is YAC? Explain. [05]
Q.4.b. Write notes on Binary vector. [05]

**OR**

Q.4.a. Explain co integrate with neat diagram. [05]
Q.4.b. Differentiate between YEP and YIP. [05]

Q.5.a What is insertional inactivation? Explain with suitable examples. [05]
Q.5.b. How will you construct genomic DNA library? Explain [05]

**OR**

Q.5.a. How will you construct cDNA library? Explain with suitable steps. [05]
Q.5.b. Write s notes on application of recombinant selection and screening. [05]

Q.6. a.Explain the process of classical PCR in detail. [05]
Q.6.b. How a DNA fragments sequenced by Maxam and Gilbert Method? Explain. [05]

**OR**

Q.6.a. Explain the various factors required for polyacrylamide gel electrophoresis. [05]
Q.6.b. Write notes on Sanger method of DNA sequencing. [05]

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SEAT No._____

No. of Printed Pages : 02

[287]

SARDAR PATEL UNIVERSITY
EXTERNAL EXAMINATION

DATE - 15/11/17 DAY- WEDNESDAY TIME 10:00 TO 1:00 pm
Course- US05CBNF05 SUBJECT: BIOINFORMATICS
CLASS- T.Y.B.Sc V Sem TITLE--- BIOINFORMATICS APPLICATION-I
TOTAL MARKS: 70

**Q1- Select the correct from the following Multiple Choice: [1 X 10]** **[10]**

(i) **Which of the following organisms is not considered to be a model genetic system?**
a) Mice b)Fruit flies c) Humans d) Yeast

(ii) **Gene duplication has been found to be one of the major reasons for genome expansion in eukaryotes. In general, what would be the selective advantage of gene duplication?**
a) If one gene copy is nonfunctional, a backup is available.
b) Larger genomes are more resistant to spontaneous mutations
c) Duplicated genes will make more of the protein product.
d) Gene duplication will lead to new species evolution.

(iii) **What is the most challenging issue facing genome sequencing?**
a) the inability to develop fast and accurate sequencing techniques
b) the ethics of using information from genomes at the individual level
c) the availability and stability of DNA
d) all of the above

(iv) **Funding for the Human Genome Project comes from the**
a) NIH b) DOE c) NIH and DOE. d)NIH, DOE and ELSI

(v) **Chromosome walking**
a) allows one to move from one chromosome to another
b) requires overlapping cloned sequences
c) requires FISH
d) requires pedigree analysis

(vi) **Each ds DNA has ..... frame in ORF.**
a) 10 b)3 c) 6 d) 2

(vii) **Block is**
a) Sequence with indel b) sequence with mismatch only
c) Sequence with match only d) sequence with gaps only

(viii) **Well-conserved regions in multiple sequence alignments**
a)reflect areas of structural importance. b) reflect areas of functional importance
c) reflect areas of both functional and structural importance
d) reflect areas likely to be of functional and/or structural importance.

(ix) **Why are colour schemes important in creating and analysing sequence alignments?**
a)They look pretty.
b) To make clearer printouts and presentations.
c) To allow you to distinguish conserved residues and residue groups more easily
d) To allow you to detect active sites of proteins

(x) **The regions of DNA in a eukaryotic gene that encode a polypeptide product are called:**
a) hnRNAs b) exons c) enhancers d) leader sequences

**Q2 Answer the following in brief (any ten)** **[2X10]**

(i) Why comparative genomics is important?
(ii) Differentiate conservative and replicative mode of transposons.
(iii) Explain chromosome walking.

(iv) Differentiate prokaryotic genome and eukaryotic genome
(v) Name few model organisms used for human genome project and why they were used?
(vi) Give the importance of sequence logo.
(vii) Diagrammatically explain structure of gene in eukaryotes.
(viii) What is promoter and its utility in gene expression
(ix) Explain <[EST]-{DW}-2(X)-R-{C}
(x) Discuss about the history of HGP.
(xi) How minisatellites differ from microsatellites?
(xii) Why genome sequencing is important.

**LONG QUESTIONS**

Q3 Write a short note on (10)
i) Transposons ii) Alternative splicing
iii) Pseudo genes iv) Repeat regions

OR

Q3 Explain in detail about eukaryotic genome organization (10)

Q4 Discuss the method and significance of genome sequencing. (10)

OR

Q4 Elaborate the aims, objectives and application of HGP. (10)

Q5(a) What is ORF? Discuss the basic algorithm for gene identification. (05)
Q5(b) Write a short note on ANN. (05)

OR

Q5 Explain the structure of prokaryotic gene structure and different methods for its prediction.

Q6 Write a short note on the following: (any 2)
i) Profile ii) Block iii) pattern (10)

OR

Q6(a) What is sequence logo? Explain its importance. (05)
Q6(b) How HMM model can be used for multiple sequence alignment. (05)

********** —X—X— **********

SEAT No._____ [21] No. of Printed Pages : 02 SC

**SARDAR PATEL UNIVERSITY**

**T.Y.Bsc(BNF) Examination, 5th Semester**

**Friday, 17th November, 2017.**

**Time: 10:00 A.M to 01:00 P.M**

**Subject Code: US05CBNF06**

**Subject :- Structure Bioinformatics and RDBMS - I**

**Total Marks: 70**

**Q.1 Multiple Choice Questions** [ 10 ]

1. _____ is of type DDL.
a) Insert b) Update c) Delete d) Create

2. _____ SQL statement is use to delete column of table specified.
(a) drop (b)update (c) alter (d) delete

3. _____ integrity constraints states that no primary key value can be null
a) Referential b) Domain c) Entity d) None of these

4. Business rules, which are enforced on data being stored in a table, are called _____.
(a) NULL b) Constraint c) Unique d) Protocol

5. If the constraints are defined along with the column definition, it is called as a _____ level constraint.
(a) Table b) Column c) Unique d) None of Above

6. Cystic fibrosis occur due to mutation in
(a) alanine (b) tyrosine (c) threonine (d) phenylalanine

7. The imino acid found in the proteins is
a) Aspargine b) Phenyl Alanine c) Histidine d) Proline

8. Protein folding leads to_____ in entropy
a). Increase b). decrease c). no change d). small change

9. Folding of a globular protein is a thermodynamically favored when ΔG is
a). Positive b) negative c) infinite d) zero

10. Rollback query is belonging to _____type of query.
a) TCL b) DDL c) DML d) DCL

Q.2 Short Questions(Attempt Any Ten) [ 20 ]

1. What is DDL?list type of query available udeer DDL.
2. List down types of Relationship.
3. List down types of Integrity Constraint.
4. What is Attribute?
5. What is Relationship?
6. Explain Tuples in detail?
7. Describe tertiary structure of protein.
8. Enlist different motifs for protein family.
9. Explain protein – protein interaction.
10. Explain principle of protein folding.
11. What are prions.
12. Explain about Cystic fibrosis disease.

(P.T.O.)

| | | | |
|---|---|---|---|
| Q.3 | a) | What is Normalization?Explain 1st and 2nd Normal Form. | [ 5 ] |
| | b) | List various basic data types used in oracle. Explain in detail. | [ 5] |

**OR**

| | | | |
|---|---|---|---|
| Q.3 | a) | Explain E.F.Codd Rules. | [5] |
| | b) | What is E-R diageam?Draw the different symbol used in it. | [5] |

| | | | |
|---|---|---|---|
| Q.4 | a) | Explain various ways to change structure of a table using alter statement | [ 5 ] |
| | b) | Explain various ways to insert records in a table. | [ 5] |

**OR**

| | | | |
|---|---|---|---|
| Q.4 | a) | Explain PrimaryKey Constraint in detail with Example. | [5] |
| | b) | List Different operator used in sql?Explain any one of them. | [5] |

| | | | |
|---|---|---|---|
| Q.5 | a) | What are prion? How is cause infection and its consequence. | [ 5 ] |
| | b) | Discuss any two disease in detail for protein misfolding. | [ 5] |

**OR**

| | | | |
|---|---|---|---|
| Q.5 | a) | How the misfolding of protein occur and its consequence. | [5] |
| | b) | Write a note on mad cow disease. | [5] |

| | | | |
|---|---|---|---|
| Q.6 | a) | What are protein? Discuss their types. | [ 5 ] |
| | b) | Write a note on yeast to hybrid method. | [ 5] |

**OR**

| | | | |
|---|---|---|---|
| Q.6 | a) | What are protein motifs? Explain them. | [5] |
| | b) | Discuss the primary and secondary structure of protein. | [5] |

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[33] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

B.Sc. 5th Semester Examination

**BOTANY-US05CBOT01**

**(Algae, Bryophytes, Pteridophytes and Gymnosperms)**

**Date7/11/17 Day- Tuesday** **Time: 10.00 a.m.-1.00p.m.**

**Marks-70**

Q-1 **Choose the correct answer** (10)

(i)Filaments are unbranched in :
(a)*Zygnema* (b)*Spirogyra* (c)*Oedogonium* (d)all the above

(ii) Fusion between motile gametes of unequal sizes is:
(a)isogamy (b)anisogamy (c)dichogamy (d)hologamy

(iii)Iodine is obtained from:
(a)Sea weeds (b)bryophytes (c)gymnosperms (d)fungi

(iv) Elaters are not found in the capsule of:
(a)*Marchantia* (b)*Riccia* (c)*Pellia* (d)*Anthoceros*

(v)The sporophyte of which of the following bryophytes is considered to be the most advanced?
(a)*Riccia* (b)*Pellia* (c)*Sphgnum* (d)*Funaria*

(vi) Heterospory is found in:
(a)*Pteris* (b)*Equisetum* (c)*Isoetes* (d)*Lycopodium*

(vii)Which light is most effective in inducing apogamous development of sporophyte?
(a)far-red (b)green (c)red (d)white

(viii)The elementary process of the telome concept is :
(a)curvation (b)reduction (c)overtopping (d)all the above

(ix)How many cells are present in the male gametophyte of *Ephedra* at the time of pollination?
(a)3 (b)4 (c) 5 (d)7

(x)Endosperm in gymnosperms is:
(a)haploid (b)diploid (c)triploid (d)tetraploid

(PTO)

**Q-2 Attempt any ten.** (20)

(i) Differentiate between zoospore and aplanospore.
(ii) Describe: Haplontic life cycle in algae.
(iii) In what ways can algae be of use to space travelers?
(iv) Arrange the following cells in the archegonium of bryophytes from base to apex- Neck canal cells, cover cells, venter canal cell, egg cell.
(v) Name the types of vegetative reproductions are found in bryophytes.
(vi) Write about medicinal uses of bryophytes.
(vii) Name the elementary processes responsible for the development of higher vascular plants.
(viii) Draw the *Ophioglossum* plant and label it.
(ix) Define:Heterospory.
(x) Differentiate monoxylic and pycnoxylic wood.
(xi) Draw a labeled diagram of gymnosperm ovule.
(xii) Describe fertilization in *Cycas*.

Q-3 Write an illustrated account of the habitat of the algae. (10)

**OR**

Q-3 Write an account of economic importance of algae. (10)

Q-4Give a comparative account of the sporophytes of *Marchantia, Anthoceros and Funaria.*(10)

**OR**

Q-4 (a)Write a note on classification of Bryophytes. (06)
(b)What is the difference between elaters and elaterophore? (04)

Q-5 What is apospory? Give its special features and describe various factors that affect this phenomenon in pteridophytes. (10)

**OR**

Q-5 Write about the external characters and reproduction in *Dryopteris*. (10)

Q-6 Describe: Pollination and fertilization in gymnosperms. (10)

**OR**

Q-6 Write about the economic importance of gymnosperms. (10)

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[43] SEAT No._____ Printed pages: 02

**SARDAR PATEL UNIVERSITY**

**B.Sc. (Fifth Semester) Examination, November-2017**

**Subject: BOTANY**

**(Paper: US05CBOT02- Structural, Adaptive and Reproductive Biology of Angiosperms)**

Date: 9/11/17 Time:10.00 a.m.- 1.00 p.m.

Thursday Marks-70

Q-1 Multiple Choice Questions (10)

(i) Which of the following has contributed much to plant anatomy research?
(a) Gujarat University (b) Sardar Patel University
(c) Saurashtra University (d) M.S. University

(ii) Which of the following is/are involved in transport of food in plants?
(a) xylem (b)phloem
(b) (c)both (a) and (b) (d) neither (a) nor (b)

(iii) Velamen tissue is found in?
(a) Tubers of potato (b) rhizomes of Osmunda
(c) roots of Vanda (d) fruits of coconut

(iv) Avicennia is known for Respiratory roots are produced by:
(a) prop roots (b) photosynthetic roots
(c) respiratory roots (d) clinging roots

(v) Salt glands are present in:
(a) Tamarix (b) Tamarind
(c) Turmeric (d) All the three

(vi) Sunken stomata is a common feature of:
(a) epiphytes (b) halophytes
(c) hydrophytes (d) xerophytes

(vii) Vivipary is often found among:
(a) halophytes (b) hydrophytes
(c) mesophytes (d)xerophytes

(viii) A fruit wherein fruit wall and seed coat are fused in called: caryopsis is a fruit:
(a) carcerule (b) caryopsis
(c) cypsela (d) cremocarp

(ix) Pappus is a modification of calyx which is associated with:
(a) hypogynous ovary (b) epigynous ovary
(c)both (a) and (b ) (d) neither (a) nor (b)

(x) In a culture medium which one of the following is a source of carbon?
(a) thiamin (b)sucrose
(c) solid carbon (d) all the three

Q-2 Answer in brief to <u>any ten</u> of the following: (20)

(a) How plant anatomy can be employed in forensic science?

(b) Name any two plant embryologists with their affiliation and one major contribution.

(c) With the help of a simple sketch, explain apical cell theory.

(d) What are histogens? Where are they located? What is their significance?

(e) What are Raphides? Where are they found? How are they different from starch grains?

(f) What is vascular cambium? What is its major function?

(g) Why xylem and Phloem are known as complex tissues? How do primary xylem and primary phloem differ each other?

(h) What is pollen viability? What are the factors that influence this property?

(i) What is parthenocary? What are its advantages?

(j) What are the Photosynthetic roots? Where are they found?

(k) List various changes occurred during the development of fruit from ovary.

(l) With the help of suitable examples, list the adaptations of seeds and fruits for wind dispersal.

Q-3 With the help of neatly labelled diagrams, describe secondary growth in dicot roots. (10)

**OR**

Q-3 With the help of labelled diagrams, describe the structure and function of endodermis. (10)

Q-4 Write a comparative account of anatomical adaptations of hydrophytes and xerophytes. (10)

**OR**

Q-4 Give notes on:

(a) Salient features of Phloem in deciduous trees. (05)

(b) Structure and function of cuticle. (05)

Q-5 Highlighting their applications, explain in detail about embryo culture and parthenocarpy (10)

**OR**

Q-5 Write an account on the major contributions of P.Maheshwari in Plant embryology (10)

Q-6 Describe the important features of pollen-pistil interaction. (10)

**OR**

Q-6 Write notes on:

(a) Pollen allergy (05)

(b) Dehiscent fruits (05)

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(35) SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**B.Sc.-V Sem, BOTANY-US05CBOT03**

**(Microbiology, Microtechnique and Forestry)**

**11/11/2017, Saturday** **Time-10.00 a.m.-1.00 p.m.**

**Marks-70**

Q.1 Choose the correct answer (10)

(i) Bacteria were first discovered by_____.
(a)A.V.Leewenhoek (b)N.D.Zinder (c)Robert Koch (d)Robert Hooke

(ii) Gram stain is used in the study of_____.
(a) Bacteria (b) Fungi (c) Bryophytes (d) None

(iii)Transformation experiment was first performed on which bacteria?
(a)*Escherichia coli* (b)*Salmonella*
(c)*Diplococcus pneumonia* (d)*Pasteurella pestis*

(iv)Formaldehyde is an example of:
(a)Fixative (b)Dye (c)Stain (d)none of these

(v)The knife of sliding microtome is made up of_____.
(a)Glas (b)Diamond (c)Steel (d)none of the above

(vi)Periodic Schiff's staining is used to mark_____.
(a)Collagen (b)Cell nuclei (c)Carbohydrates (d)Cytoplasm

(vii)An example of extremely durable wood is_____.
(a)*Bombax ceiba* (b)*Albizzia lebbeck* (c)*Sterculia urence* (d)*Tectona grandis*

(viii)Guggal gum is extracted from_____.
(a)*Prosopis cineraria* (b)*Butea monosperma*
(c)*Acacia Senegal* (d)*Commiphora wightii*

(ix)Resin is obtained from_____.
(a)*Pinus* (b)*Cycas* (c)*Sabei* grass (d)*Acacia nilotica*

(x)Cellulose fibers mechanically separated from wood and fiber crops are used to make_.
(a)charcoal (b)drugs (c)paper (d)none of these



(PTO)

Q-2 Short answer questions(**any ten**). (20)

(a)What are gram positive bacteria?
(b)Explain: Viruses are as living or non-living.
(c)Give economic importance of Actinomycetes.
(d)What is meant by vital staining?
(e)What are killing and fixative?
(f)Write the uses of acetocarmine stain.
(g)Explain:Seasoning.
(h)Define:Maceration.
(i)Write differences between wood and timber.
(j)What is the characteristic of ply wood?
(k)Write the sources of Lac shellac.
(l)Write the economic importance of isabgol.

Q-3 Write notes on: (a)Actinomycetes. (06)
(b)cell-wall structure of gram positive and gram negetaive bacteria. (04)

**OR**

Q-3Describe (a)Transmission of viruses. (04)
(b)Economic importance of bacteria. (06)

Q-4(a)What is the significance of dehydration and infiltration? (05)
(b)Write on: Maceration. (05)

**OR**

Q-4Write notes on: (a)Process of embedding. (04)
(b)Carnoy's fluid. (03)
(c)Whole mount preparation. (03)

Q-5Write a brief note on sources ,uses and properties of dyes. (10)

**OR**

Q-5Explain: (a)Fibers. (05)
(b)Tannins. (05)

Q-6 Briefly explain regarding natural rubbers. (10)

**OR**

Q-6 Write a note on composite wood and improved wood. (10)

—X—

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[34] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

**Bsc. ( 5th SEMESTER) Botany**

**Subject code - US05CBOT04 - ECOLOGY OF PLANTS**

**Date : 13/11/2017** **Day:Monday**

**Time: 10:00a.m. To 1:00 p.m.** **Total Marks: 70**

**Note : * All questions are to be attempted.** ***Figures to the right indicate marks.**

| | | |
|---|---|---|
| Q. 1 | **Choose the most appropriate answer.**<br>**1.** The collective and continuous growth of plants in space is called..<br>1. Flora 2. Vegetation 3. Species 4. Factor<br><br>**2.** The study of the ecology of an individual or a particular species of organism called....<br>1. Synecology 2. Population ecology 3.Autecology 4.Habitat ecology<br><br>**3.** The % distribution of species among the various live form of a flora is called.<br>1. Biological clock 2. Biological spectrum 3. Life form 4. Ecotone<br><br>**4.** Organism that occupy the same ecological niche in different geographical regions is known as_____<br>1. Ecological equivalents 2.Standing crops 3.Standing state 4. Ecotone<br><br>**5.** Flowering in plants is affected by temperature through.....<br>1. Thermoperiodism 2.Precipitation 3. Photoperiodism 4. Humidity<br><br>**6.** Ozone layer is present in_____.<br>1. Stratosphere 2. Atmosphere 3. Lithosphere 4. None of the above<br><br>**7.** Soil erosion can be prevented by<br>1.Deforestation 2. Raising forests 3.Excessive use of fertilizer 4.Overgrazing<br><br>**8.** Major source of formation of soil is....<br>1. Snow covered mountain 2. Riverbeds 3. Rocks 4. Volcanoes<br><br>**9.** The occurrence of relatively definite sequence of communities over a period of time in the same area is known as .....<br>1.Competition 2.Colonization 3.Composition 4.Ecological sccession<br><br>**10.** In a barren there reach the seeds and propagules of the species, this is known as.... 1. Migration 2. Ecesis 3. Dominance 4. Composition | 10 |

| | | |
|---|---|---|
| Q. 2 | **Give brief answer the following questions (Any ten).**<br>1. Define:Autecology.<br>2.What is role of producers in ecosystem?<br>3.What is energy flow? Explain it.<br>4.Explain: Dessication.<br>5.What is humidity in the air?<br>6.Explain: Seed dormancy.<br>7.Why water is essential for life?<br>8.Write full form of CPCB and COD<br>9.Explain- Climate.<br>10.Define: Dominance.<br>11.Define: Migration<br>12.Define: Species diversity. | 20 |
| Q. 3 | **Explain the following terms.**<br>Conservation, Standing state, Adaptation, Succession, Pollution | 10 |
| | **OR** | |
| Q. 3 | **Explain the following terms.**<br>Ecades, Population ecology, Ecological pyramid, biome, Biomass, | 10 |
| Q. 4 | **Write short note on:**<br>1.The effects of light on plants<br>2. Liebig's law of Minimum | 06<br>04 |
| | **OR** | |
| Q-4. | **Write short note on:**<br>1. Biological clocks<br>2. Ecological indicators | 06<br>04 |
| Q. 5 | What is natural resources? Give an account of forest resources. | 10 |
| | **OR** | |
| Q. 5 | **Explain it:**<br>1. Soil profile.<br>2. Biological method of soil conservation. | 05<br>05 |
| Q. 6 | **Explain the following:**<br>1. Quadrate method.<br>2. Fresh water ecology. | 05<br>05 |
| | **OR** | |
| Q. 6 | **Explain the following:**<br>1. Marine ecology.<br>2. Transect method. | 05<br>05 |

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No. of Printed Pages : 02

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**SARDAR PATEL UNIVERSITY**
**5th Semester**
**BOTANY-US05CBOT05**
**(Cytology and Genetics)**

**Date-15/11/17** **Time:10.00 a.m.- 1.00 p.m.**
**Day-Wednesday** **Marks-70**

Q-1 Multiple Chioce Questions. (10)

(i)Non-histone protein contains aromatic aminoacids:
(a)Lysine (b)Leucine (c)Arginine (d)Tryptophan
(ii)Nucleolus was first discovered by:
(a)Watson (b)Robert Brown (c)Waldyer (d)Fontana
(iii)What corresponds to a single genetic locus?
(a)centromere (b)chromonema (c)chromatin (d)chromomere
(iv)Chlorophyll is present in:
(a)membrane (b)ribosome (c)stroma (d)grana
(v)Which of the following organelles contains its own DNA?
(a)chloroplast (b)mitochondria (c)nucleus (d)all of the above
(vi)Which of the following is not a membrane bound cell-organelle?
(a)Lysosome (b)Chloroplast (c)Mitochondria (d)Ribosome
(vii)The gene for red green colour blindness is located on:
(a)Y-chromosome (b)X-chromosome (c)Autosome (d)none of these
(viii)Variation in chromosome number in organisms is known as:
(a)ploidy (b)polyploidy (c)euploidy (d)nullisomy
(ix) Bar-eye in Drosophila is an example of:
(a)inversion (b)deletion (c)frame-shift mutation (d)duplication
(x)Kappa-particles in Paramecium are an example of:
(a)cytoplasmic inheritance (b)nuclear inheritance
(c)particulate inheritance (d)sex-linked inheritance

Q-2 Answer the following (any ten). (20)

(a)Define-endomitosis.
(b)Write the functions of nucleus.
(c)Mention the names of single membrane cellular organelles.
(d)Briefly describe the structure of primary cell-wall.
(e)Name the enzymes of peroxisome.
(f)Explain:Rough ER.
(g)Differentiate between 70s and 80s ribosomes.
(h)Write the silent features of sex-linked inheritance.
(i)What is Kappa particle? What is its role?
(j)Define-Mutation.
(k)Differentiate between transition and transversion.
(l)Define-deletion.

Q-3Define:Chromosome. Write an account of special types of chromosomes. (10)

**OR**

Q-3Describe the ultra structure and functions of nucleus. (10)

Q-4Write the ultra structure of: (a)Peroxisome (05)

(b)Ribosome (05)

**OR**

Q-4Describe the ultra structure and functions of mitochondria. (10)

Q-5Describe: Shell coiling in Snail. (10)

**OR**

Q-5Describe following: (a)Cytoplasmic influence in snail (05)

(b)Plastid inheritance in 4 o'clock plant (05)

Q-6Describe the process of transcription. (10)

**OR**

Q-6Describe the structure and semi conservative method of DNA-replication. (10)

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SEAT No._____

No. of Printed Pages :02

[22]

Sardar Patel University
B. Sc. (Semester - 5) External Examination
US05CBOT06 - PLANT PHYSIOLOGY
Friday, 17th November 2017; Time: 10.00 a.m. to 1.00 p.m.

N.B.: Figures in the right indicate marks. Max Marks: 70

Q1. Select the appropriate answer for the following multiple choice questions: (10)

(i) Plant hormones are also known as:
(a) Growth factors (b) Growth regulators
(c) Phytohormones (d) All of these

(ii)_____ have been demonstrated to be effective in breaking dormancy of seeds
(a) Gas (b) Auxins
(c) Cytokinins (d) None of these

(iii)The term _____was suggested to designate the response of organisms to relative length of the day and night
(a) photoperiod (b) photoperiodism
© photonasty (d) de-etiolation

(iv) The PR and PFR are two different forms of:
(a)Phytochrome (b) Cytochrome
(c) Chlorophyll (d) None of these

(v)A permanent and irreversible change in size or volume of a living structure with an accompanied increase in dry weight is the definition of
(a) Meristem (b) Growth
(c) Cambium (d) Parthenocarpy

(vi) Stress caused by flood is one type of:
(a)Biotic stress (b) Abiotic stress
(c) Osmotic pressure (d) None of these

(vii) The study of phenomenon of ageing and senescence and some specialized aspects of senescence such as abscission is known as
(a) Phytogerontology (b) Phytochemistry
(c) Phycology (d) None of these

(viii)Which one of the following is known to retard senescence?
(a) Ethylene (b) GA
(c) Auxin (d)All of these

(ix)Which one of the following is known for promoting senescence?
(a) Kinetin (b) Ethylene
(c) GA (d)All of these

(x) Foolish seedling is correlated with:
(a)Auxin (b) GA
(c) ABA (d) Kinetin

C.P.T.O.

**Q2. Answer any TEN of the following questions in brief:** **(10 x 2 = 20)**

(i) Naming the principal naturally occurring auxin in all the higher plants, list out the names of other naturally occurring auxins

(ii) Comment upon the statement, "Phytohormone has been found to control a number of physiological responses of the plants'.

(iii) Write a brief note on long day plants.

(iv) Give four examples of DNP.

(v) Write a brief not on flowering hormone

(vii) What is senescence?

(viii) Explain the term 'stress' and present the list of various environmental stresses.

(ix) Differentiate between **capacity** adaptation and **resistance** adaptation

(x) Briefly discuss the importance of Post Harvest Physiology

(xi) Define 'Vernalization'.

(xii) What is the role of Plant Physiology in agriculture?

Q3 What are plant hormones? Discuss the physiological roles of (a) Ethylene and (b) GA (10)

OR

Q3 (a) Write an explanatory note on factors affecting growth (06)

(b) Briefly explain the mode of action of auxin (04)

Q4 Write an essay on Photoperiodism. (10)

OR

Q4 Write an essay on phytochrome. (10)

Q5 (a) Discuss the types of senescence and add a note on the biological significance of senescence? (06)

(b) Write a note on sequential leaf senescence (04)

OR

Q5 (a) Write in detail about physiological and biochemical changes during senescence. (07)

(b) Present a concise note on the flower senescence. (03)

Q6 (a) Discuss in detail the types of Abiotic environmental stresses. (07)

(b) Write a brief note on mechanism of stress injury (03)

OR

Q6 (a) How plant develops resistance against stress? (05)

(b) How plants respond to the stress due to temperature? (05)

——— X ———

SC

(34 & A-17) SEAT No._____

No of printed pages: 02 +06

**SARDAR PATEL UNIVERSITY**
**B.Sc.( Semester-V) Examination (CBCS)(Regular & NC)**
**Tuesday, 7th November-2017**
**10:00 a.m. to 01:00 p.m.**
**US05CCHE01:- Organic Chemistry**

**Total Marks:70**

Note: 1. Figures on the right side indicate the marks.
2. All questions are to be attempted.

---

**Q.1** **Choose the correct option for the following:** **10**

1 Which of the compound have the properties of $2^0$ aliphatic amine?
(a) Pyrrolidine (b) Thiophene (c) Pyrolle (d) Pyridine

2 The Electrophilic substitution reaction in pyridine takes place at.....
(a) Position-3 (b) Position-2 (c) Position-4 (d) None of these.

3 Which of the following is not a six member heterocyclic?
(a) Picoline (b) Piperidine (c) Furan (d) Pyridine

4 How many NMR signals would you expect from m-Xylene?
(a) 4 (b) 2 (c) 3 (d) 5

5 How many CMR signals would you expect from n-hexane?
(a) 3 (b) 2 (c) 4 (d) 5

6 How many isomers are possible for $C_2H_4Cl_2$?
(a) 1 (b) 3 (c) 2 (d) 4

7 Which of the following diene is more stable?
(a) 1,3- Butadiene (b) 1,2- Butadiene (c)1,2- Pentadiene (d) None of these

8 Which of the following is the example of Co-polymer?
(a) PVC (b) SBR (c) Orion (d) Plexiglas

9 _____ is the detergent of ampholytic class?
(a) Igepon-T (b) SLR (c) Miranol $C_2M$ (d) None of these.

10 Which of the following insecticide is the derivative of carbamic acid?
(a) Baygon (b) Heptachlor (c)Malathio (d) Ferbum

**Q.2** **Answer the following: (Attempt any Ten).** **20**

1. Discuss the Chichibabin reaction.
2 Describe the structure of furan.
3 Give the synthesis of 1-Methyl isoquinoline from benzene by using Bischler-Napieralski synthesis.
4 Give the various aspects of CMR spectroscopy.
5 Differentiate between Diastereotopic proton and Enantiotopic proton.
6 Explain the shielded and deshielded protons.
7 Explain the term Hyperconjugation in Propylene.
8 What is Vulcanization? Why rubber is vulcanized?
9 Why propylene is 2.7 Kcal more stable than ethylene?
10 Write the application of stomach insecticide.
11 What is fixative? Describe the function of fixative.
12 Give the application of detergent used as scouring agent.

(P.T.O)

Q.3 A Give the detail step synthesis of 5, 6-benzoquinoline from 2-amino naphthalene by Skraup synthesis. 4

B Why electophilic substitution reaction of pyrrole takes place at position-2 but not at the position-3? 3

C Give the synthesis of 1-phenylisoquinoline from the toluene. 3

**OR**

Q.3 A Arrange the increasing basicity order for the pyrrole, Aliphatic amine and pyridine. Give detail explanation of your answer. 4

B Why nucleophilic substitution reaction in pyridine is preferred at the position-2 and position- 4, but not at position-3? Explain. 3

C Give the synthesis of 3,5-Dicarbethoxy-2,4,-dimethyl pyrrole from α-amino-β- ketoester and ethyl acetoacetate by Knorr- Pyrrole synthetic route. 3

Q.4 What is NMR? Give the various aspects of NMR spectroscopy. Deduced the structure of compound having following spectral data. Label all kinds of a protons / carbons and gives appropriate explanation for the structure. 10

(I) Molecular formula:$C_{10}H_{12}O$

IR ($cm^{-1}$): 3100,3000,2950,2900,1670,1620,1370,1385,750

NMR(δ, ppm): (a) Doublet, 6H,1.25 (b) Multiplet,1H, 3.4 (c) Singlet, 5H, 7.67

(II) Molecular formula:$C_6H_{13}N$

CMR(δ, ppm): (a) 22.7, Quartet (b) 31.5, Doublet

(c) 35.8, Triplet (d) 46.9, Triplet

**OR**

Q.4 Discuss splitting of NMR signal by spin-spin coupling. How will you differentiate geometric isomers by using CMR spectroscopy? Draw all possible isomers for the formula $C_5H_{12}$ and tell how many CMR signals do you expect from each of the isomers? Deduce the structure of compound having following spectral data, label all kinds of carbon/protons and give appropriate explanation for the structure. 10

Molecular formula:$C_{10}H_{12}O_3$

NMR (δ, ppm): (a) 1.35,3H, Triplet (b) 4.35,2H, Quartet

(c) 3.8,3H, Singlet (d) 7.5,4H, Quartet

Q.5 A Give the mechanism for polymerization of styrene in presence of sodium metal and naphthalene. 4

B Give the distinguishing features of addition and condensation of polymerisation. 3

C What are plastics? Give there classification and discuss its properties. 3

**OR**

Q.5 A Write about the role of Ziegler-Natta catalyst in the synthesis of polymers. 4

B Discuss the addition of HCl to 2, 4-Hexadiene. 3

C Give the advantages of Co-ordination polymerization over free radical polymerization. 3

Q.6 A Give the synthesis of DDT with its advantages. 4

B Write note on: the principle of cleansing action of detergents. 3

C Give the synthesis of coumarin from the cheapest raw materials. 3

**OR**

Q.6 A What are insecticides? Give the classification of insecticide and discuss in detail any one of them. 4

B Give the synthesis and applications of following from the cheapest raw materials 6

(i) Compound which gives floral soap and detergent.

(ii) Compound containing triazole moiety which used as whitening agent.

****

## Characteristic Proton Chemical Shifts

| Type of proton | | Chemical shift, ppm |
|---|---|---|
| | | δ |
| Cyclopropane | | 0.2 |
| Primary | $RCH_3$ | 0.9 |
| Secondary | $R_2CH_2$ | 1.3 |
| Tertiary | $R_3CH$ | 1.5 |
| Vinylic | C=C—H | 4.6–5.9 |
| Acetylenic | C≡C—H | 2–3 |
| Aromatic | Ar—H | 6–8.5 |
| Benzylic | Ar—C—H | 2.2–3 |
| Allylic | C=C—$CH_3$ | 1.7 |
| Fluorides | HC—F | 4–4.5 |
| Chlorides | HC—Cl | 3–4 |
| Bromides | HC—Br | 2.5–4 |
| Iodides | HC—I | 2–4 |
| Alcohols | HC—OH | 3.4–4 |
| Ethers | HC—OR | 3.3–4 |
| Esters | RCOO—CH | 3.7–4.1 |
| Esters | HC—COOR | 2–2.2 |
| Acids | HC—COOH | 2–2.6 |
| Carbonyl compounds | HC—C=O | 2–2.7 |
| Aldehydic | R- CHO | 9–10 |
| Hydroxylic | R - OH | 1–5.5 |
| Phenolic | Ar - OH | 4–12 |
| Enolic | C=C—OH | 15–17 |
| Carboxylic | RCOOH | 10.5–12 |
| Amino | $RNH_2$ | 1–5 |

## Characteristic Infrared Absorption Frequencies

| Bond | Compound type | Frequency range, $cm^{-1}$ |
|---|---|---|
| C-H | Alkanes | 2850-2960<br>1350-1470 |
| C-H | Alkenes | 3020-3080 (m)<br>675-1000 |
| C-H | Aromatic rings | 3000-3100 (m)<br>675-870 |
| C-H | Alkynes | 3300 |
| C=C | Alkenes | 1640-1680 (v) |
| C≡C | Alkynes | 2100-2260 (v) |
| C=C | Aromatic rings | 1500, 1600 (v) |
| C-O | Alcohols, ethers, carboxylic acids, esters | 1080-1300 |
| C=O | Aldehydes, ketones, carboxylic acids, esters | 1690-1760 |
| O-H | Monomeric alcohols ,phenols<br>Hydrogen bonded alcohols, phenols<br>Carboxylic acids | 3610-3640 (v)<br>3200-3600 (broad)<br>2500-3000 (broad) |
| N-H | Amines | 3300-3500 (m) |
| C-N | Amines | 1180-1360 |
| C≡N | Nitriles | 2210-2260 (v) |
| $-NO_2$ | Nitro compounds | 1515-1560<br>1345-1385 |



(P.T.O.)

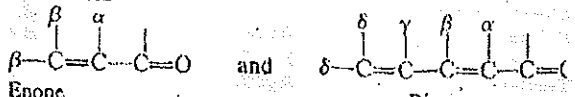
## Characteristic absorption for dienes

| | |
|---|---|
| Base value for heteroannular diene | 214 |
| Base value for homoannular diene | 253 |
| Increments for | |
| Double bond extending conjugation | +30 |
| Alkyl substituent or ring residue | +5 |
| Exocyclic double bond | +5 |
| Polar groupings: OAc | +0 |
| OAlk | +6 |
| SAlk | +30 |
| Cl, Br | +5 |
| $N(Alk)_2$ | +60 |
| Solvent correction[a] | +0 |
| $\lambda_{calc}$ = Total | |

## Characteristic absorption for substituted benzene derivatives

| ArCOR/ArCHO/$ArCO_2H$/$ArCO_2R$ | | $\lambda_{max}^{EtOH}$ (nm) |
|---|---|---|
| Parent chromophore: Ar = $C_6H_5$ | | |
| G = Alkyl or ring residue, (e.g., ArCOR) | | 246 |
| G = H, (ArCHO) | | 250 |
| G = OH, OAlk, ($ArCO_2H$ and $ArCO_2R$) | | 230 |
| Increment for each substituent on Ar: | | |
| —Alkyl or ring residue | o-, m- | +3 |
| | p- | +10 |
| —OH, —$OCH_3$, —OAlk | o-, m- | +7 |
| | p- | +25 |
| —$O^-$ (oxyanion) | o- | +11 |
| | m- | +20 |
| | p- | +78[b] |
| —Cl | o-, m- | +0 |
| | p- | +10 |
| —Br | o-, m- | +2 |
| | p- | +15 |
| —$NH_2$ | o-, m- | +13 |
| | p- | +58 |
| —$NHCOCH_3$ | o-, m- | +20 |
| | p- | +45 |
| —$NHCH_3$ | p- | +73 |
| —$N(CH_3)_2$ | o-, m- | +20 |
| | p- | +85 |

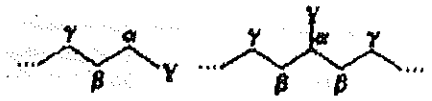
## Characteristic absorption for α, β-unsaturated carbonyl compounds




Enone Dienone

| | | (nm) |
|---|---|---|
| *Base values* | | |
| Acyclic α,β-unsaturated ketones | | 215 |
| Six-membered cyclic α,β-unsaturated ketones | | 215 |
| Five-membered cyclic α,β-unsaturated ketones | | 202 |
| α,β-Unsaturated aldehydes | | 210 |
| α,β-Unsaturated carboxylic acids and esters | | 195 |
| *Increments for* | | |
| Double bond extending conjugation | | +30 |
| Alkyl group, ring residue | α | +10 |
| | β | +12 |
| | γ and higher | +18 |
| Polar groupings: —OH | α | +35 |
| | β | +30 |
| | δ | +50 |
| —OAc | α,β,δ | +6 |
| —OMe | α | +35 |
| | β | +30 |
| | γ | +17 |
| | δ | +31 |
| —SAlk | β | +85 |
| —Cl | α | +15 |
| | β | +12 |
| —Br | α | +25 |
| | β | +30 |
| —$NR_2$ | β | +95 |
| Exocyclic double bond | | +5 |
| Homodiene component[a] | | +39 |

## $^{13}C$ shifts for terminal and internal systems



Terminal Internal

| Y | α Terminal | α Internal | β Terminal | β Internal | γ |
|---|---|---|---|---|---|
| $CH_3$ | + 9 | + 6 | +10 | + 8 | −2 |
| $CH{=}CH_2$ | +20 | | + 6 | | −0.5 |
| $C{\equiv}CH$ | + 4.5 | | + 5.5 | | −3.5 |
| COOH | +21 | +16 | + 3 | + 2 | −2 |
| $COO^-$ | +25 | +20 | + 5 | + 3 | −2 |
| COOR | +20 | +17 | + 3 | + 2 | −2 |
| COCl | +33 | +28 | | + 2 | |
| $CONH_2$ | +22 | | + 2.5 | | −0.5 |
| COR | +30 | +24 | + 1 | + 1 | −2 |
| CHO | +31 | | 0 | | −2 |
| Phenyl | +23 | +17 | + 9 | + 7 | −2 |
| OH | +48 | +41 | +10 | + 8 | −5 |
| OR | +58 | +51 | + 8 | + 5 | −4 |
| OCOR | +51 | +45 | + 6 | + 5 | −3 |
| $NH_2$ | +29 | +24 | +11 | +10 | −5 |
| $NH_2^+$ | +26 | +24 | + 8 | + 6 | −5 |
| NHR | +37 | +31 | + 8 | + 6 | −4 |
| $NR_2$ | +42 | | + 6 | | −3 |
| $NR_3^+$ | +31 | | + 5 | | −7 |
| $NO_2$ | +63 | +57 | + 4 | + 4 | |
| CN | + 4 | + 1 | + 3 | + 3 | −3 |
| SH | +11 | +11 | +12 | +11 | −4 |
| SR | +20 | | + 7 | | −3 |
| F | +68 | +63 | + 9 | + 6 | −4 |
| Cl | +31 | +32 | +11 | +10 | −4 |
| Br | +20 | +25 | +11 | +10 | −3 |
| I | − 6 | + 4 | +11 | +12 | −1 |

## $^{13}C$ Shifts for some linear and branched chain alkanes

| Compound | C-1 | C-2 | C-3 | C-4 | C-5 |
|---|---|---|---|---|---|
| Methane | −2.3 | | | | |
| Ethane | 5.7 | | | | |
| Propane | 15.8 | 16.3 | 15.8 | | |
| Butane | 13.4 | 25.2 | 25.2 | | |
| Pentane | 13.9 | 22.8 | 34.7 | 22.8 | 13.9 |
| Hexane | 14.1 | 23.1 | 32.2 | 32.2 | 23.1 |
| Heptane | 14.1 | 23.2 | 32.6 | 29.7 | 32.6 |
| Octane | 14.2 | 23.2 | 32.6 | 29.9 | 29.9 |
| Nonane | 14.2 | 23.3 | 32.6 | 30.0 | 30.3 |
| Decane | 14.2 | 23.2 | 32.6 | 31.1 | 30.5 |
| Isobutane | 24.5 | 25.4 | | | |
| Isopentane | 22.2 | 31.1 | 32.0 | 11.7 | |
| Isohexane | 22.7 | 28.0 | 42.0 | 20.9 | 14.3 |
| Neopentane | 31.7 | 28.1 | | | |
| 2,2-Dimethylbutane | 29.1 | 30.6 | 36.9 | 8.9 | |
| 3-Methylpentane | 11.5 | 29.5 | 36.9 | (18.8, 3-$CH_3$) | |
| 2,3-Dimethylbutane | 19.5 | 34.3 | | | |
| 2,2,3-Trimethylbutane | 27.4 | 33.1 | 38.3 | 16.1 | |
| 2,3-Dimethylpentane | 7.0 | 25.3 | 36.3 | (14.6, 3-$CH_3$) | |



(P.T.O.)

# $^{13}C$ shifts for substituted benzenes
## Base value for benzene is 128.5 ppm

| Substituent | C-1 (Attachment) | C-2 | C-3 | C-4 | C of Substituent (ppm from TMS) |
|---|---|---|---|---|---|
| H | 0.0 | 0.0 | 0.0 | 0.0 | |
| $CH_3$ | +9.3 | +0.7 | −0.1 | −2.9 | 21.3 |
| $CH_2CH_3$ | +15.6 | −0.5 | 0.0 | −2.6 | 29.2 ($CH_2$), 15.8 ($CH_3$) |
| $CH(CH_3)_2$ | +20.1 | −2.0 | 0.0 | −2.5 | 34.4 (CH), 24.1 ($CH_3$) |
| $C(CH_3)_3$ | +22.2 | −3.4 | −0.4 | −3.1 | 34.5 (C), 31.4 ($CH_3$) |
| $CH{=}CH_2$ | +9.1 | −2.4 | +0.2 | −0.5 | 137.1 (CH), 113.3 ($CH_2$) |
| $C{\equiv}CH$ | −5.8 | +6.9 | +0.1 | +0.4 | 84.0 (C), 77.8 (CH) |
| $C_6H_5$ | +12.1 | −1.8 | −0.1 | −1.6 | |
| $CH_2OH$ | +13.3 | −0.8 | −0.6 | −0.4 | 64.5 |
| $CH_2OCCH_3$ (O) | +7.7 | −0.0 | −0.0 | −0.0 | 20.7 ($CH_3$), 66.1 ($CH_2$), 170.5 (C=O) |
| OH | +26.6 | −12.7 | +1.6 | −7.3 | |
| $OCH_3$ | +31.4 | −14.4 | +1.0 | −7.7 | 54.1 |
| $OC_6H_5$ | +29.0 | −9.4 | +1.6 | −5.3 | |
| $OCCH_3$ (O) | +22.6 | −7.1 | −0.4 | −3.2 | 23.9 ($CH_3$), 169.7 (C=O) |
| CH (O) | +8.2 | +1.2 | +0.6 | +5.8 | 192.0 |
| $CCH_3$ (O) | +7.8 | −0.4 | −0.4 | +2.8 | 24.6 ($CH_3$), 195.7 (C=O) |
| $CC_6H_5$ (O) | +9.1 | +1.5 | −0.2 | +3.8 | 196.4 (C=O) |
| $CCF_3$ (O) | −5.6 | +1.8 | +0.7 | +6.7 | |
| COH (O) | +2.9 | +1.3 | +0.4 | +4.3 | 168.0 |
| $COCH_3$ (O) | +2.0 | +1.2 | −0.1 | +4.8 | 51.0 ($CH_3$), 166.8 (C=O) 168.5 |
| COCl (O) | +4.6 | +2.9 | +0.6 | +7.0 | |
| $CNH_2$ (O) | +5.0 | −1.2 | 0.0 | +3.4 | |
| $C{\equiv}N$ | −16.0 | +3.6 | +0.6 | +4.3 | 119.5 |
| $NH_2$ | +19.2 | −12.4 | +1.3 | −9.5 | |
| $N(CH_3)_2$ | +22.4 | −15.7 | +0.8 | −11.8 | 40.3 |
| $NHCCH_3$ (O) | +11.1 | −9.9 | +0.2 | −5.6 | |
| $NO_2$ | +19.6 | −5.3 | +0.9 | +6.0 | |
| $N{=}C{=}O$ | +5.7 | −3.6 | +1.2 | −2.8 | 129.5 |
| F | +35.1 | −14.3 | +0.9 | −4.5 | |
| Cl | +6.4 | +0.2 | +1.0 | −2.0 | |
| Br | −5.4 | +3.4 | +2.2 | −1.0 | |
| I | −32.2 | +9.9 | +2.6 | −7.3 | |
| $CF_3$ | +2.6 | −3.1 | +0.4 | +3.4 | |
| SH | +2.3 | +0.6 | +0.2 | −3.3 | |
| $SCH_3$ | +10.2 | −1.8 | +0.4 | −3.6 | 15.9 |
| $SO_2NH_2$ | +15.3 | −2.9 | +0.4 | +3.3 | |
| $Si(CH_3)_3$ | +13.4 | +4.4 | −1.1 | −1.1 | |

Influence of functional group X on the chemical shift position (δ) of nearby carbons in alkane chains[1]

$$X\text{—}\overset{\alpha}{C}\text{—}\overset{\beta}{C}\text{—}\overset{\gamma}{C}\text{—}C$$

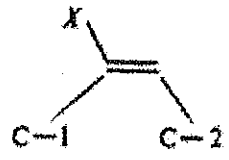
| X | α-shift: $X\text{—}CH_2\text{—}$ (1°) | α-shift: $X\text{—}CH(R)\text{—}$ (2°) | α-shift: $X\text{—}C(R)_2\text{—}$ (3°) | β-shift | γ-shift |
|---|---|---|---|---|---|
| $-CH_3$ | 9 | 6 | 3 | 9 | −3 |
| —R: see table 3.11 | | | | | |
| axial $-CH_3$ | 1 | – | – | 5 | −6 |
| equatorial $-CH_3$ (in cyclohexanes) | 6 | – | – | 9 | 0 |
| $-CH{=}CH_2$ | 22 | 16 | 12 | 7 | −2 |
| $-C{\equiv}CH$ | 4 | – | – | 3 | −3 |
| $-C_6H_5$, —Ar | 23 | 17 | 11 | 10 | −3 |
| —F | 70 | – | – | 8 | −7 |
| —Cl | 31 | 35 | 42 | 10 | −5 |
| —Br | 19 | 28 | 37 | 11 | −4 |
| —I | −7 to 20 | – | – | 11 | −2 |
| $-NH_2$, —NHR, $-NR_2$ | 29 | 24 | 18 | 11 | −4 |
| $-NO_2$ | 62 | – | – | 3 | −5 |
| —NHCOR, —NRCOR | 10 | – | – | 0 | 0 |
| $-NH_3^+$ | 25 | – | – | 7 | −3 |
| —CN | 3 | 4 | – | 2 | −3 |
| —SH | 2 | – | – | 2 | −2 |
| —OH | 50 | 45 | 40 | 9 | −3 |
| —OR | 50 | 24 | 17 | 10 | −6 |
| —OCOR | 52 | 50 | 45 | 7 | −6 |
| —COOH, —COOR, —CON< | 20 | 16 | 13 | 2 | −3 |
| —COR, —CHO | 30 | 24 | 17 | 2 | −3 |
| $-SO_3H$, $-SO_2N$< | 50 | – | – | 3 | 0 |

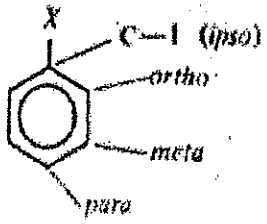


C.P.T.O.

## Influence of functional group X on the chemical shift positions (δ) of nearby carbons in alkene groups and benzene rings

*Base values:* ethylene (δ 123) and benzene (δ 128)




| | Alkenes | | Benzenes | | | |
|---|---|---|---|---|---|---|
| | C—1 | C—2 | C—1 (*ipso*) | *ortho* | *meta* | *para* |
| —$CH_3$ | 10 | −8 | 9 | 0 | 0 | −2 |
| R,  | 16 | −8 | 15 | 0 | 0 | −2 |
| R,  | 23 | −8 | 21 | 0 | 0 | −2 |
| —CH═$CH_2$ | 15 | −6 | 9 | 0 | 0 | −2 |
| —C≡CH | – | – | −6 | 4 | 0 | 0 |
| —$C_6H_5$, —Ar | 13 | −11 | 13 | −1 | 1 | −1 |
| —F | 25 | −34 | 35 | −14 | 1 | −5 |
| —Cl | 3 | −6 | 6 | 0 | 1 | −2 |
| —Br | −8 | −1 | −5 | 3 | 2 | −2 |
| —I | −38 | 7 | −32 | 10 | 3 | −1 |
| —$NH_2$ | – | – | 18 | −13 | 1 | −10 |
| —NHR | – | – | 20 | −14 | 1 | −10 |
| —$NR_2$ | – | – | 22 | −16 | 1 | −10 |
| —$NO_2$ | 22 | −1 | 20 | −5 | 1 | 6 |
| —NHCOR, —NRCOR | – | – | 10 | −7 | 1 | −4 |
| —CN | −15 | 15 | −16 | 4 | 1 | 6 |
| —SH | – | – | 4 | 1 | 1 | −3 |
| —OH | – | – | 27 | −13 | 1 | −7 |
| —OR | 29 | −39 | 30 | −15 | 1 | −8 |
| —OCOR | 18 | −27 | 23 | −6 | 1 | −2 |
| —COOH, —COOR, —CON< | 4 | 9 | 2 | 2 | 0 | 5 |
| —COR, —CHO | 14 | 13 | 9 | 1 | 1 | 6 |
| —$SO_3H$, —$SO_2N$< | – | – | 16 | 0 | 0 | 4 |
| —$PMe_2$ | – | – | 14 | 1.6 | 0 | −1 |
| —$PAr_2$ | – | – | 9 | 5 | 0 | 0 |

[44/A20]

SEAT No._____

No. of printed pages : 03

# SARDAR PATEL UNIVERSITY

**B. Sc. V - Semester Examination**
**Thursday, 9th November,**
**2017**
**10.00 a.m. to 1.00 p.m.**
**US05CCHE02 - ORGANIC CHEMISTRY**

**Total Marks : 70**

Note : (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

**Q.1 Choose the correct option for the following :** **[10]**

(i) The intermediate formed in Sommelet rearrangement is known as .....
(a) ylide (b) cation (c) radical (d) betaine

(ii) Using ..... reaction carboxylic acid can be converted into primary amine.
(a) Benzilic acid (b) Curtius-Schmidt (c) Wittig (d) Beckmann

(iii) ..... reaction fails to proceed in the dark.
(a) Crigee – Kasper (b) Hoffmann–Loeffler (c) Baeyer – Villager (d) Benzoin

(iv) ..... is used to kill / remove the worms.
(a) anthelmintics (b) antihistamine (c) antipyrine (d) antimalerial

(v) Which Vitamin is a fat soluble ?
(a) C (b) E (c) B (d) none of these

(vi) Acedapsone belongs to ..... class of drugs.
(a) antibacterials (b) antileprotic (c) antibiotics (d) none of these

(vii) General molecular formula of terpenoid is .....
(a) $C_5H_8$ (b) $-(C_5H_8)_n-$ (c) $-C_5H_8-$ (d) $-(C_5H_{10})_n-$

(viii) Which of the following reagent is used for the separation of Nerol and Geraniol from essential oils ?
(a) $CaCl_2$ (b) $CdCl_2$ (c) anhydrous $CaCl_2$ (d) $CuCl_2$

(ix) Oestrone was isolated by .....
(a) Butenandt (b) Doisy (c) E. Laqueur (d) both 'a' & 'b'.

(x) Androgens are ..... hormones.
(a) Female (b) Male (c) both 'a' & 'b' (d) none of these

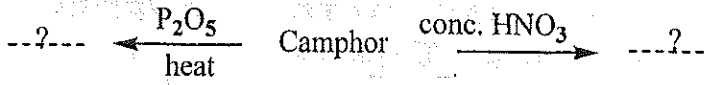
**Q.2 Answer the following (Attempt any ten):** **[20]**

(i) Explain Birch reduction of toluene.
(ii) State Benzoin condensation reaction. Why $CN^-$ ion is a very specific catalyst for Benzoin condensation reaction ?
(iii) Explain Perkin condensation reaction using suitable illustration.
(iv) What is Drug ? What are the requirements of an ideal drug?
(v) Write the structure and uses of (a) Vioform & (b) Dimenhydrinate.
(vi) Define : (a) Pharmacophore & (b) Medicinal chemistry.
(vii) What is gem dialkyl group and its rule ? Give its utility in the structure

(PTO)

determination of terpenoids.

(viii) Complete and re-write the given reaction :




(ix) Enlist the methods used for isolation and separation of terpenoids from the plants.

(x) Define : Hormones and Vitamins.

(xi) Explain : α, β - unsaturated carbonyl compounds are more reactive than simple alkenes.

(xii) Give classification of Hormones.

**Q.3**

[a] Write reaction mechanism for Mannich reaction and show that out of two $-CH_2-$ group in Mannich base one is from formalhedyde. **[4]**

[b] Write reaction mechanism for Crigee – Kasper mechanism of Baeyer – Villiger Oxidation reaction. **[3]**

[c] State Benzilic acid rearrangement. Also explain that in an unsymmetrical benzil, the aryl group with electron donating character migrates faster than simple aryl group. **[3]**

**OR**

**Q.3**

[a] Write reaction mechanism for Beckmann rearrangement and show that it is highly stereospecific reaction. **[4]**

[b] Discuss Favorskii rearrangement. **[3]**

[c] Complete the given reaction and suggest appropriate reaction mechanism involved in it. Also suggest name of such reaction : **[3]**

Cyclohexanone + $(Ph)_3P=CH_2$ ⟶ ----------

**Q.4** Give the broad classification of drugs. Discuss the mode of action of antipyretic drugs. Write synthesis and uses for Novalgin and Chloroquine. **[10]**

**OR**

**Q.4** Which drug is used to cure the infections caused by cocci bacteria? Discuss the mode of action of it. Write synthesis and uses for Phenobarbitone, Warfarin and Miracil-D. **[10]**

**Q.5**

[a] Discuss Wallach's oxidative degradation for elucidation of position of double bond and *tert.* alcoholic group in the structure of α-terpineol. **[4]**

[b] Write synthesis of Citral using Arens – Van Dorp's synthesis. **[3]**

[c] Show that Nerol is a geometrical isomer of Geraniol. **[3]**

**OR**

**Q.5**

[a] Define isoprene rule and special isoprene rule. Show that special isoprene rule is a guiding principle and not a fixed rule. **[4]**

[b] Discuss the uses of following reagents for the structure elucidation of **[3]**

terpenoids :
(i) Tilden's reagents (ii) alkaline $KMnO_4/CrO_3$ (iii) $(CH_3CO)_2O$ **[3]**

[c] Write synthesis of : (i) Terebic acid using ethyl acetoacetate.
(ii) Linalool via Ruzicka synthesis.

**Q.6**

[a] How will you determine the presence of steroid nucleus, three double bonds, benzenoid ring and position of phenolic –OH group in the structure of oestrone ? **[4]**

[b] Write synthesis of testosterone from cholesterol. **[3]**

[c] Discuss electrophilic addition and nucleophilic addition reaction mechanism for α, β-unsaturated carbonyl compounds using suitable illustrations. **[3]**

**OR**

**Q.6**

[a] Discuss the constitution of testosterone. **[4]**

[b] Write synthesis of osterone. **[3]**

[c] Explain mechanism of Michael addition reaction using suitable illustration. **[3]**

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[36/A22] SEAT No._____ Page : 2

# SARDAR PATEL UNIVERSITY

## B.Sc. (Semester-V) EXAMINATION

**Saturday, 11th Nov 2017, 10:00 am To 01:00 pm**

**Subject Code: Inorganic Chemistry (US05CCHE03)**

Total marks: 70

**Q:1 Choose the correct option from the following.** 10

1 The point Group of $H_2O$ molecule is _____.
(a) $C_2v$ (b) $C_3v$ (c) $D_3h$ (d) Oh

2 Which of the following is the principle axis of rotation in $[PtCl_4]^{-2}$ molecule?
(a) $C_1$ (b) $C_2$ (c) $C_3$ (d) $C_4$

3 Which of the following geometries contain infinite fold axis of symmetry?
(a) Linear (b) Tetrahedral (c) Octahedral (d) Square Plannar

4 The paramagnetic property of transition elements is due to _____.
(a) fully filled configuration (b) partially filled d- orbitals
(c) partially filled f-orbitals (d) both 'b' and 'c'

5 What is the value of "L" for $^1D$?
(a) 4 (b) 1 (c) 5 (d) 2

6 Fourth postulate may be stated as follows : the time development of a wave function is given by
$ih/2\pi * d\Psi/dt =$
(a) $\nabla^2\Psi$ (b) $V_{(r)}\Psi$ (c) $\hat{H}\Psi$ (d) $\Psi_{(r)}$

7 The electronic degeneracy is reduced on slight _____ of a system.
(a) Vibration (b) distortion (c) improve (d) deviation

8 _____ is more stable chelate for the chelate ring containing single bond.
(a) 4 – member in ring (b) 5- member in ring
(c) 6-member in ring (d) 'b' and 'c' both

9 $SN^2$ mechanism is known as _____.
(a) substitution mechanism (b) association mechanism
(c) Dissociation mechanism (d) Formation mechanism

10 In aqueous solution the concentration of water is _____.
(a) [ 5.55 M] (b) [0.55M] (c) [555M] (d) [55.5M]

**Q:2 Answer the following. (Any Ten )** 20

1 Construct the multiplication table for $C_2v$ point group.
2 Distinguish between σv and σh.
3 Identify symmetry element and detect the point group: (i) $BCl_3$ (ii) $SO_2$
4 Sketch the diagram splitting of d-orbital of tetrahedral field.
5 Give micro state of $t_2g^2$ configuration.
6 Explain "d- orbitals are five fold degenerate".
7 Define vector operator.
8 Discuss the conditions are satisfied the function is Ψ called well behaved function.
9 Give the second postulate of quantum mechanics.
10 Mention all the factors affecting the stability of complexes.
11 Define : (i) Anation Reaction
(ii) substrate
12 Distinguish between $SN^1$ and $SN^2$ mechanism.

(P.T.O)

Q:3 Prove with Proper Example : 10

(i) $S_n^n = E$ for n= even number

(ii) $S_n^{2n} = E$ for n= odd number

OR

Q:3 Give an account on : (i) Improper rotation 10

(ii) Reflection

(iii) Cubic Point Group

Q:4 (a ) Discuss the splitting of d-orbitals in an octahedral field. 5

(b ) Distinguish between diamagnetism and paramagnetism. 5

OR

Q:4 (a ) Explain "$[V(H_2O)_6]^{+3}$ is green in color". 5

(b ) For $[Fe(H_2O)_6]^{2+}$ ion the mean pairing energy is 17,600 $cm^{-1}$, the magnitude of $\Delta_o$ is 10,400 $cm^{-1}$.calculate LFSE for complex in corresponding both states. which state is more stable ? why? 5

Q:5 (a ) Discuss the electron in three dimensional box. 5

(b ) calculate the energies of the lowest two quantum states for an electron confined to one dimensional box of 5 A° length. Calculate the wavelength of a radiation emitted in transition of electron from the excited state to the ground state. 5

Given : $h = 6.625 \times 10^{-27}$ erg.sec $m_e = 9.108 \times 10^{-28}$ gm

OR

Q:5 (a ) Give an account on : (i) Hermition operator 5

(ii ) unitary operator

(b ) An electron moves in three dimensional box which has edge 1.00 cm.calculate the energy required in ergs to raise the electron from the ground state to the state where $n_x=2, n_y=2$ and $n_z=1$ Given ; $h = 6.625 \times 10^{-27}$ erg.sec $m_e = 9.108 \times 10^{-28}$ gm 5

Q:6 (a )Discuss the $SN_1$ mechanism in ligand substitution reaction in octahedral complex. 5

(b ) Discuss the continuous variation (Job's) method for the determination of composition of the complex. 5

OR

Q:6 (a ) Define : Trans effect. Discuss the electrolytic polarization theory of trans effect. 5

(b ) Discuss the stepwise formation of complexes, stepwise formation constant and overall formation constant. Give the relationship between $\beta_n$ and $k_1, k_2, k_3 \ldots k_n$ 5

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SC

Seat No. _____ No. of Printed Pages: 02

[35/A11]

# SARDAR PATEL UNIVESITY

## B. Sc. Examination (Fifth Semester, CBCS)

**Monday, 13th November - 2017**

**Session:- Morning, Time:- 10:00 A.M. To 01:00 P.M.**

**Subject:- Chemistry, Course Code:- US05CCHE04**

**Course Title:- Inorganic Chemistry-**

**Note:** (1) All questions are compulsory **Total Marks: 70**
(2) Figures to right indicate full marks.

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**Q : 1 Give the most correct choice to the following multiple choice questions.** **(10)**

i. Which one of the following is not Lewis acid?
(a) $SO_3^{2-}$ (b) $Cu^{2+}$ (c) $AlCl_3$ (d) $Me_3B$

ii. According to Pearson's SHAB principle which metal ions occur in nature both as carbonates and oxides?
(a) $Cu^{2+}$, $Ni^{2+}$ (b) $Ca^{+}$, $Pb^{2+}$ (c) $Mg^{2+}$, $Ca^{3+}$ (d) $Mg^{2+}$, $Ag^{+}$

iii. _____ is poisonous solvent, hence find much less use as a solvent.
(a) Liq. $NH_3$ (b) Liq. HF (c) Liq. $SO_2$ (d) Hydrazine

iv. The strength of $H_2O_2$ solution labeled as '16 volume' is _____ .
(a) 10/7 N (b) 7/20 N (c) 10/14 N (d) 20/7 N

v. The number and types of bonds between two C – atoms of acetylide ion are .....
(a) one bond σ and one bond - π (b) two bond σ and one bond – π
(c) one bond σ and two bond - π (d) one bond σ and half bond – π

vi. Fused silica is also known as _____ .
(a) quartz (b) silica glass (c) borosilicate glass (d) flint glass

vii. _____ is mechanical process for making large number of similar articles.
(a) Pressing (b) Jolling (c) Knoading (d) Throwing

viii. The long chain vitreous sodium phosphate polymers are used in _____ industries.
(a) electric (b) ceramic (c) rubber (d) food processing

ix. A _____ is a mixture of equal proportions of linear and cyclic polymers.
(a) silicone resins (b) silicone rubber (c) silicone fluids (d) silicone greases

x. Inorganic polymers are .....
(a) stronger, harder & brittle than org. polymers (b) stiffer than org. polymers
(c) soluble in polar solvents (d) all of above

**Q : 2 Attempt any <u>ten</u> short answer type questions of the following.** **(20)**

i. Liquid ammonia is best non aqueous solvent. Explain.
ii. Give the limitations Lewis concept.
iii. Explain the term "amphiprotonic substances".
iv. List uses of carborundum.

v. Calculate degree of hardness of water containing 6 mg of $MgSO_4$(M-120) per kg of water.
vi. How will you remove both type of hardness of water by washing soda?
vii. List the basic raw materials used for the manufacture of ceramics.
viii. Explain the term 'annealing'.
ix. What are pyrex glasses?
x. Give all the possible structures of imides of sulphur.
xi. Write the general properties of inorganic polymers.
xii. What are borophosphate glasses?

Q : 3[A] Discuss the periodic variations of acidic properties of oxyacids. (5)
[B] Describe the general chemical reactions that occur in ionizing solvent. (5)

OR

Q : 3 [A] Give a brief account on Usanovich concept of acids and bases. (5)
[B] Classify solvents in a different ways. (5)

Q : 4 [A] Give preparation, properties, structure and uses of aluminium carbide. (5)
[B] 20 mL of a '10 volumes' labelled solution of $H_2O_2$ after acidification with dilute $H_2SO_4$ required 30 mL of N/12 $KMnO_4$ for complete oxidation. Calculate the percentage of $H_2O_2$ in the solution. (5)

OR

Q : 4 [A] Give the general methods of preparation of carbides. (5)
[B] Discuss the large scale methods of preparation of hydrogen peroxide. (5)

Q : 5 What are ceramics? Classify ceramics in a different ways and explain in detail ;- recuperative pot furnace. (10)

OR

Q : 5 What are porcelain and china? Discuss the raw material used in production of porcelain and china and describe regenerative tank furnace. (10)

Q : 6 [A] Discuss the structure of cyclic triphosphonitrilic chloride. (5)
[B] Compare the chemical properties of inorganic benzene with that of organic benzene. (5)

OR

Q : 6 [A] What are silicones? Describe high thermal silicone and silicone oils. (5)
[B] Give a brief account on nitrides of sulphur. (5)

**BEST OF LUCK**

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(2)

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SEAT No._____

No. of Printed Pages : 03

[30/A-12]

**SARDAR PATEL UNIVERSITY**

**B.Sc. (Semester – V) Examination**

**Physical Chemistry**

**US05CCHE05**

**Date: - 15/11/2017** **Time: 10:00 am to 1:00 pm.**

**Day: - Wednesday** **Total Marks: 70**

**Note: - 1. Figure to the right indicate full marks.**

**2. All questions are to be attempt.**

**Q.1. Choose the correct option and rewrite the sentence.** **[10]**

1. _____ is the best source of UV radiation.
   (a) Mercury Lamp (b) Candle
   (c) Sodium Lamp (d) Tungston Lamp
2. Radiation is the type of _____.
   (a) Monochromator (b) Detector
   (c) Filter (d) Source of light
3. Crystal can be classified into ____ crystal system.
   (a) 2 (b) 5 (c) 7 (d) 4
4. In the powder diffraction method, the diffracted X-rays patterns are collected on _____.
   (a) Blank Paper (b) Camera
   (c) Screen (d) Photographic Plates
5. Natural rubber is basically a polymer of _____.
   (a) Isoprene (b) Ethylene
   (c) Propane (d) Propylene
6. A plastic which can be soften on heating and hardened on cooling is called_____.
   (a) Thermoelastic (b) Thermoplastic
   (c) Thermosettimg (d) Thermite
7. Polymer are made up of two different types of monomeric units in their chain is called_____.
   (a) Block copolymer (b) Graft copolymer
   (c) Co-polymer (d) Random copolymer
8. Mark- Houwink Sakurade equation is given by _____.
   (a) $\eta_{sp} = \eta_{rel-1}$ (b) $\eta_{red.} = \eta_{sp}/c$
   (c) $\eta_{rel} = \eta / \eta_0$ (d) $[\eta] = km^{a}$
9. Which of the following technique yield a weight average molecular weight?
   (a) Light Scattering (b) Vapour Pressure Osmometry
   (c) Viscometry (d) Osmometry
10. In Emulsion polymerization, the initiator is _____.
    (a) Insoluble in both (b) Soluble in water
    (c) soluble in both (d) Soluble on monomer

**Q.2** **Answer the following. [Any Ten]** **[20]**

1. Define : (a) Incandescence (b) Luminescence
2. Differentiate between thermal and photochemical reactions.
3. State Lambert's law. Give its mathematical expression.
4. Write the procedure for determing the Miller Indices for a plane.
5. Define : (a) Ionic Radii (b) Axis of Symmetry
6. Define : (a) Constructive Interference
   (b) Destructive Interference
7. Distinguish between HDPE and LDPE.
8. Show that bifunctionally in a monomer is a must for the growth of a polymer chain.
9. Write the salient features of anionic polymerization.
10. Explain the term "Auto Acceleration".
11. Define: (a) Relative Viscosity (b) Tyndall Effect.
12. Define: (a) Specific Viscosity (b) Polydispersity

**Q.3** (a) What is Quantum yield? Explain the reason of high and low quantum yield as well as explain the factors affecting quantum yield. **[05]**

(b) For the photochemical reaction, B $\rightarrow$ C, $1.0 \times 10^{-5}$ mole of B was formed on absorption of $6.62 \times 10^{7}$ ergs at 3600A$^0$. Calculate quantum yield. **[05]**

[ Given : $h = 6.62 \times 10^{-27}$ erg.sec , $c = 3 \times 10^{10}$ cm / sec
$N = 6.02 \times 10^{23}$ molecules / mole ]

**[OR]**

**Q.3** (a) State Beer's law. Give the factors responsible for the deviation from Beer's law. **[05]**

(b) Calculate the energy in calories per mole or per Einstein for radiations of wavelength 1000A$^0$. **[05]**

[ Given : $h = 6.62 \times 10^{-27}$ erg.sec , $c = 3 \times 10^{10}$ cm / sec
$N = 6.02 \times 10^{23}$ molecules / mole ]

**Q.4.** (a) Derive Bragg's equation with suitable diagram. Discuss its limitations. **[05]**

(b) What are the miller indices for planes with the following intercepts each expressed in terms of the unit cell dimensions? **[05]**
(1) [ 1, ½,½ ] (2) [ ¼, ½, ½ ] (5) [ 2a, 3b, c]
(3) [ 1, ∞, ½ ] (4) [ ∞, 1, $^2/_3$ ]

**[OR]**

**Q.4.** (a) Discuss the powder method of X-ray crystallography to determine the structure of a crystal. **[05]**

(b) Tugston has a BCC lattice and its density and molecular weight are 19.30 gm/cm$^3$ and 183.25 gm/mole respectively. Calculate the volume of the Tugston atom and the distance between $d_{200}$, $d_{110}$ and $d_{222}$ planes. **[05]**

**Q.5** Explain mechanism of free-radical chain polymerization. Describe kinetics of chain polymerization. Also give its limitation and characteristics. **[10]**

**[OR]**

**Q.5** What are polycondensation reaction. Give its suitable example. Explain kinetics of catalysed and non-catalysed polycondensation. **[10]**

**Q.6** (a) Write the principal, draw the sketch and describe the membrane osmometric method for the determination of molecular weight of polymer. **[05]**

(b) The intrinsic viscosity of solution polyisobutylene at 20°C is 180 cm$^3$/gm. If [n] is related to the viscosity average molecular weight. Calculate the molecular weight $\overline{Mv}$ of polymer. **[05]**
Given : $\alpha = 0.64$
$K = 3.60 \times 10^{-4}$

**[OR]**

**Q.6** (a) List out the types of polymerization technique. Describe any one polymerization technique. Mention the advantages, disadvantages and its application. **[05]**

(b) Polymer molecule weight 2 X10$^3$, 1 X 10$^4$ and 3 X 10$^4$ are mixed talking 10%, 80% and 10% respectively. Calculate $\overline{Mn}$ and $\overline{Mw}$ assuming percentage by weight and percentage by number. **[05]**

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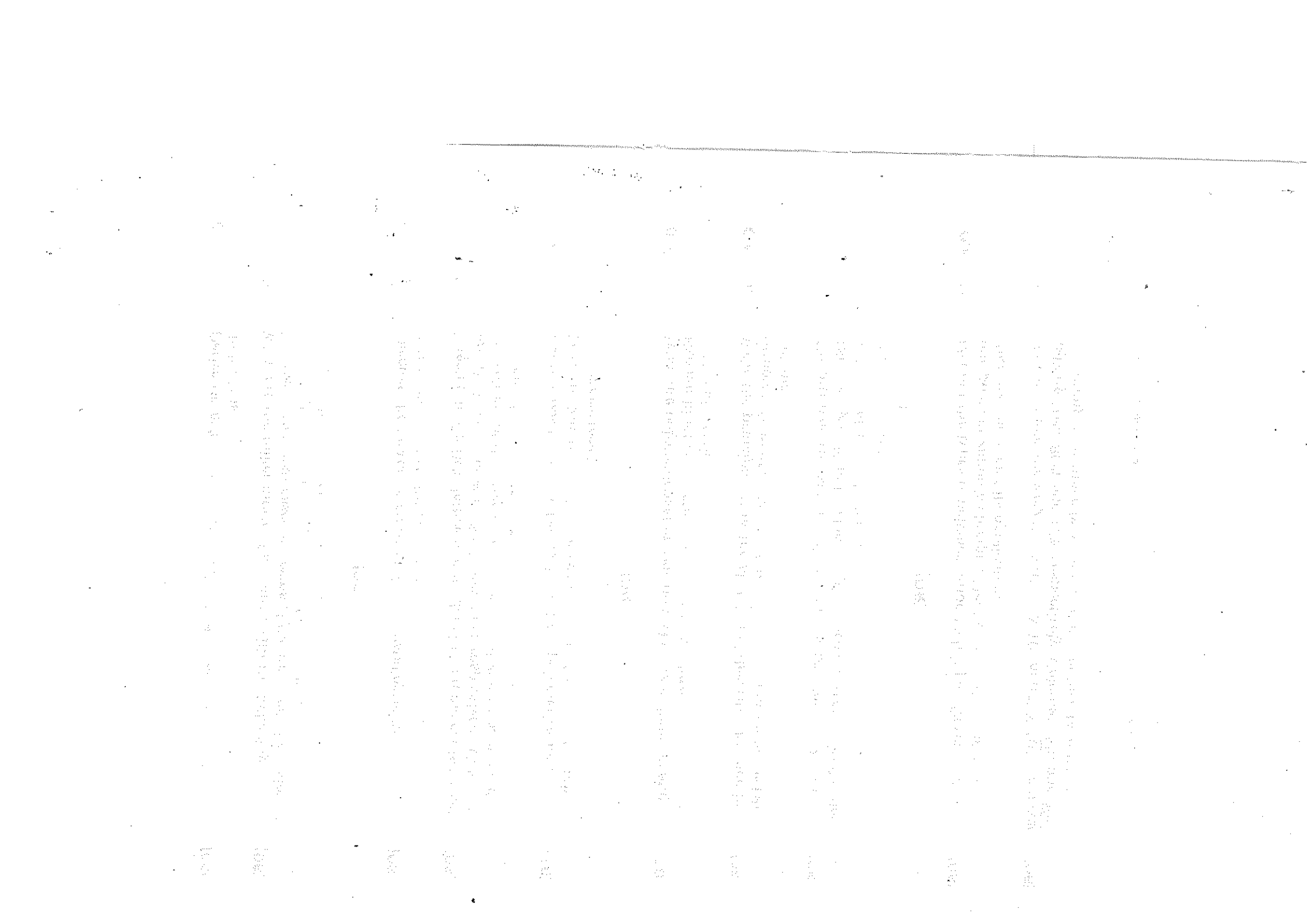

SEAT No._____

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[23 & A-11]

Number of printed pages: 02

**SARDAR PATEL UNIVERSITY**

**B.Sc. EXAMINATION (SEMESTER-V)**

**NOVEMBER-2017**

**PHYSICAL CHEMISTRY (US05CCHE06)**

**DATE : 17/11/2017(FRIDAY)** **TIME :10.00 to 1.00 pm**

**QUE-1 Choose the most appropriate option for the following** **[10]**

1 How many degrees of freedom are there in a system of liquid water and water vapor at equilibrium at pressure of 1 atmosphere?
(a)0 (b) 1 (c) 2 (d) 3

2 A compound when heated giving a new solid phase and a solution with a composition different from that of solid phase is said to possess____
(a) Incongruent melting point (b) Congruent melting point
(c) Peritectic temperature (d) Eutectic temperature

3 How many phases are present in $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
(a)0 (b) 1 (c) 2 (d) 3

4 Which one of the following is an incorrect statement for physisorption?
(a)It is reversible process (b) It requires less heat of adsorption
(c) It requires activation energy (d) It takes place at low temperature

5 Rate of physisorption increase with_____
(a) Decreases in temperature (b) Increase in temperature
(c) Decrease in pressure (d) Decrease in surface in area

6 In GLC quantitative determination is done by_____
(a)Area of peak (b) Position of peak
(c) Number of peaks (d) Resolution of peak

7 The quality and quantity of heavy metals present in organometallic compounds can be identified by
(a) Thermal conductivity detector (b) Flame ionization detector
(c) Flame photometric detector (d) Electron capture detector

8 Increase in number of theoretical plates increase with_____
(a)decrease in column length (b) increase in column length
(c)decrease in column diameter (d) both b AND c

9 The current due to the concentration gradient between two part of cell solution is known as _____
(a) Diffusion current (b) Capacitive current
(c) Migration current (d) Charging current

10 In polarography, quantitative determination can be done by measuring
(a) Half wave potential (b) Limiting diffusion current
(c) Applied voltage (d) Residual current

**QUE-2 Answer the following in very short (Any Ten)** **[20]**

1 Define: Degree of freedom and polymorphism.

2 Calculate number of degree of freedom in aqueous solution of
(i) sodium chloride (ii) Acetic acid

3 Why it is not possible to have quadruple point in a phase diagram for a one component system?

4 Differentiate between adsorption and absorption.

5 Define: (1) Adsorption isotherm (2) Sorption.

6 Under which condition Langmuir adsorption isotherm becomes identical with Freunlich adsorption isotherm?

7 Enlist important requirements of carrier gas.

8 Explain the term: Retardation factor.

9 Enlist important requirements of stationary liquid phase in GC.

| | | |
|---|---|---|
| 10 | Give merits and demerits of DME. | |
| 11 | What are the advantages of polarography? | |
| 12 | Describe polarographic maxima. | |
| **QUE-3** | **Attempt the following** | |
| [A] | Draw and discuss the phase diagram of sulphur system. | [05] |
| [B] | Rhombic sulphur changes to monoclinic form at a temperature of 95.6 $^0$C and 1 atm pressure. What would be the change in the transition temperature per atm change of pressure? Given: Heat absorbed in the change = 597.5 cal/mole, density of rhombic sulphur is 2.05g/c.c. and density of monoclinic sulphur is 1.95g/c.c. | [05] |
| | **OR** | |
| **QUE-3** | **Attempt the following** | |
| [A] | Draw and discuss the phase diagram of simple eutectic system. | [05] |
| [B] | The vapor pressure of water at 95 $^0$C is found to be 634 mm of Hg. What would be the vapor pressure at a temperature of 100 $^0$C? The molar heat of vaporization in this range of temperature may be taken as 40593 J/mole. | [05] |
| **QUE-4** | **Attempt the following** | |
| [A] | Starting with assumption, derive Langmuir adsorption isotherm. | [05] |
| [B] | Describe various types of experimental physical adsorption isotherms. | [05] |
| | **OR** | |
| **QUE-4** | **Attempt the following** | |
| [A] | Discuss Frendluich adsorption isotherm. Give its limitations. | [05] |
| [B] | Describe the forces responsible for physical adsorption. | [05] |
| **QUE-5** | Describe the general requirement of gas chromatography detectors. Describe thermal conductivity detector and Flame ionization detector in detail. | [10] |
| | **OR** | |
| **QUE-5** | Sketch the block diagram of gas chromatography. Describe the basic principle and working of it. | [10] |
| **QUE-6** | **Attempt the following** | |
| [A] | Write a note on: (i) Catalytic current (ii) Kinetic current | [05] |
| [B] | A DME has following characteristics. (i) Weight of mercury collected through capillary for 100 seconds is 0.196 gms. (ii) 5 drops of mercury collected in 21.6 seconds. When above DME was used then it gives diffusion current of 8.76 μA for the solution of 0.001M $Zn^{+2}$. After this experiment, A new DME was used having drop time 6.13 second and flow rate of mercury of 3.85 mg/sec. Calculate the concentration of $Zn^{+2}$ which gave diffusion current of 16.3 μA with new electrode. | [05] |
| | **OR** | |
| **QUE-6** | **Attempt the following** | |
| [A] | Write a note on: (1) Direct comparison method (2) Pilot ion method | [05] |
| [B] | Diffusion current constant of $Cd^{+2}$ in 0.1M KCl is 3.42. Calculate the diffusion current in 0.001M $Cd^{+2}$ using a capillary with a drop time of 3 seconds. The weight of 20 drops of mercury is 100 mg. | [05] |

—X—

[358A20] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

## T.Y. B.Sc. EXAMINATION, SEM – V

## US05CCSC01 : OBJECT ORIENTED PROGRAMMING USING C++

**Date : 07/11/2017** **Time:10:00am To 01:00pm** **Max. Marks : 70**

Q – 1 Multiple Choice Question [10]

i) C++ allows declaration of variables at _____?
A. anywhere in the scope B. Before it is used in executable statement
C. Both (A) and (B) D. None

ii) _____refers to fixed value that do not change during the execution of a program.
A. Constant B. Variable
C. Both (A) and (B) D. None

iii) The header file _____ should be included that use input/output statements.
A. iostream B. stdio
C. conio D. io

iv) Object without name is known as _____.
A. nameless object B. live object
C. constant object D. default object

v) For string manipulation _____ header file is included.
A. iostream.h B. ctype.h
C. string.h D. conio.h

vi) Defining a function with same prototype in base class & derived class is known as ____.
A. inheritance B. function overriding
C. function overloading D. Inline function.

vii) One base class & multiple derived classes means _____ inheritance.
A. multiple B. hierarchical
C. multilevel D. hybrid

viii) Which function is mostly used to initialize string data-member inside the parameterized constructor?
A. strstr( ) B. strlen( ) C. strcpy( ) D. None of these

ix) A pointer is_____.
A. A keyword used to create variables
B. A variable that stores address of an instruction
C. A variable that stores address of other variable
D. All of Above.

x) Which of the following declarations are illegal?
A. void *ptr B. char *str1 = "xyz"
C. char str2 = "abc" D. const *int p1

Q – 2 Answer the following in short. (Any 10) [20]

i) Define encapsulation as concept of OOP.
ii) Define class & object as concept of OOP.
iii) Differentiate : Data abstraction and data encapsulation.
iv) Define string and write how to declare string in C++.
v) List all access specifiers and also write its use.
vi) Explain cin in C++ with example.
vii) List situations when inline function is not expanded inline.
viii) Differentiate: virtual function & pure virtual function.
ix) What is a virtual base-class? What is the use of it?
x) What is stream?
xi) Explain the multiple meanings of the operators << & >> in C++.
xii) List out the operators that cannot be overloaded using Friend function.



CP-T.O.

| | | | |
|---|---|---|---|
| Q – 3 | a) | What is C++? Explain structure of C++. | [5] |
| | b) | Explain different operators available in C++. | [5] |
| | | OR | |
| Q – 3 | a) | Differentiate: OOP & POP. | [5] |
| | b) | Describe with examples the uses of enumeration data types. | [5] |
| Q – 4 | a) | Can we give the objects as arguments in function? If yes then explain it with an example, and if no then give the reason. | [5] |
| | b) | Explain destructors with an example. | [5] |
| | | OR | |
| Q – 4 | a) | How many types of constructors we can create in C++ programs? Also write the characteristics of constructor. | [5] |
| | b) | Explain all operations on Arrays. | [5] |
| Q – 5 | a) | Discuss inheritance in protected mode & its effects on accessibility of base-class members. | [5] |
| | b) | Explain the concept of friend function with suitable example. | [5] |
| | | OR | |
| Q – 5 | a) | Discuss inheritance in public mode & its effects on accessibility of base-class members. | [5] |
| | b) | Explain multiple & multilevel inheritance with suitable example | [5] |
| Q – 6 | a) | Explain the restriction and limitations in overloading operator. | [5] |
| | b) | What is file mode? Describe the various file mode operations available. | [5] |
| | | OR | |
| Q – 6 | a) | Explain seek() and write() function with example. | [5] |
| | b) | Explain binary operator overloading with example. | [5] |

[45/A22]



# SARDAR PATEL UNIVERSITY

## T.Y. B.Sc. EXAMINATION, SEM – V

## US05CCSC02 : Business Data Processing Through DBMS.

Date : 09/11/2017 Thursday  Time:10:00am To 01:00pm  Max. Marks : 70

**Q – 1** Multiple Choice Question [10]

i) When Lee makes out a cheque for Rs.50 and sends it to Young, then Lee is known as:
a) The Banker  b) The Creditor
c) The Payee  d) The Drawer

ii) A debit balance of Rs.100 in a cash account shows that:
a) Rs.100 was the total of cash paid out
b) There was Rs.100 cash in hand
c) Cash has been overspent by Rs.100
d) The total of cash received was less than Rs.100

iii) Which of the following is a liability?
a) Creditors for goods  b) Machinery
c) Motor Vehicles  d) Cash at Bank

iv) _____ is used to print results on printer.
a) ?  b) ??  c) ???  d) None of these

v) _____ specifies a two-digit year format.
a) set century off  b)set century on
c) set year off  d) set year on

vi) The default format of date data type is_____
a) dd-mm-yy  b) mm/dd/yy
c) mm-dd-yy  d) yy/mm/dd

vii) The default extension of program file is .....
a) .idx  b) .frx  c) .prg  d)None of these

viii) _____ is the extension of simple index file
a) .idx  b) .srt  c) .dbf  d) .ind

ix) A DO WHILE programming structure ends with _____
a) ENDWHILE  b) WHILE
c) ENDDO  d) None of these

x) To validate the data entered with @ GET use _____ clause with @ GET
a) VALID  b) RANGE
c) CHECK  d) Both (a) and (b)

**Q – 2** Answer the following in short (Any 10). [20]

i) Define the term Assets.
ii) Define the term Income.
iii) Define the term Debts.
iv) Differentiate: Zap and Pack.
v) Differentiate: ? and ??? .
vi) Differentiate: Go and Skip.
vii) Differentiate: Find & Seek.
viii) Differentiate: SORT & INDEX.
ix) Explain EOF() and BOF() functions.
x) What is Command file? List steps to create Command file
xi) Differentiate: LOOP and EXIT
xii) Write down the syntax and use of @ ...GET command.



(PTO)

| | | | |
|---|---|---|---|
| Q – 3 | a) | Describe advantages and limitations of accountancy in brief. | [5] |
| | b) | Explain the classification of accounts in detail. | [5] |
| | | OR | |
| Q – 3 | a) | Explain advantages and limitations of journal in book-keeping. | [5] |
| | b) | Explain basic rules of accounting. | [5] |
| Q – 4 | | Explain the following commands with example.<br>1. DELETE 2. LOCATE 3. REPLACE 4. INPUT | [10] |
| | | OR | |
| Q – 4 | | Explain the following functions with example.<br>1. SUBSTR() 2. REPLICATE() 3. CMONTH() 4. INKEY() | [10] |
| Q – 5 | a) | Explain the concept of multiple databases with Select & Set relation command. | [5] |
| | b) | How corrupted index file is reorganized? Explain it with suitable example. | [5] |
| | | OR | |
| Q – 5 | a) | What do you mean by indexing? Explain the different types of index file. | [5] |
| | b) | What is sorting? Explain SORT command with example. | [5] |
| Q – 6 | a) | What is procedure? How procedures are created & how parameters are passed to them? Also give example. | [5] |
| | b) | Explain in detail 'JOIN' command with appropriate example | [5] |
| | | OR | |
| Q – 6 | a) | Explain in detail 'APPEND FROM' command with example: | [5] |
| | b) | Explain the following commands with example<br>1. Do Case ... Endcase 2. Scan ... Endscan | [5] |

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[37] SEAT No._____ Total No. of Printed Pages: 02

# SARDAR PATEL UNIVERSITY

## B.Sc (Semester – V) (CBCS) (Reg. & NC) Examination 2017

## US05CCSC03: Visual Programming through VB.NET

## Saturday, 11th November' 2017

**Time: 10.00AM To 1.00PM** **Max. Marks: 70**

**Note:** Figure indicates right side is maximum marks for each question

**Que: 1 Select an appropriate answer for the following.** **[10]**

1. Through Visual Basic projects you can create _____.
   **[A]** Circuit **[B]** Windows Application **[C]** Both a & b **[D]** None of these

2. VB.Net is Called as _____ Programming Language.
   **[A]** Assembly **[B]** Procedural **[C]** OOP **[D]** Functional

3. The JIT is one type of _____.
   **[A]** Hardware **[B]** Measurement Unit **[C]** Time **[D]** Compiler

4. SDI stands for _____
   **[A]** Standard Document Interface **[B]** Single Document Interface
   **[C]** Standard Document Integrated **[D]** None of these

5. _____ is default event for form.
   **[A]** Click **[B]** Dblclick **[C]** Load **[D]** Move

6. _____loop execute at least once.
   **[A]** While **[B]** do..while **[C]** for **[D]** if

7. What is the method used to activate the color dialog box?
   **[A]** ActivateDialog **[B]** DisplayDialog **[C]** ExhibitDialog **[D]** ShowDialog

8. Which control display hierarchy of nodes.
   **[A]** Label **[B]** Timer **[C]** Scrollbar **[D]** TreeView

9. _____ method is used to populate DataSet.
   **[A]** Populate **[B]** Fill **[C]** Open **[D]** Store

10. For insert, update, and delete SQL commands, _____ method is used.
    **[A]** ExecuteDataReader **[B]** ExecuteScalar
    **[C]** ExecuteNonQuery **[D]** ExecuteReader

**Que: 2 Answer the following questions in brief: (Attempt any Ten)** **[20]**

1. What is CLS?
2. List types of project.
3. List the Data Types supported by VB.NET.
4. **Differentiate:** MDI V/S SDI.
5. **Define**: Property, Method and Event.

**[P.T.O]**

6. How functions are declared in VB .NET?
7. Explain any four properties of RichTextBox.
8. Explain use of Timer.
9. Compare RadioButton and Checkbox.
10. What are the applications of ADO.net?
11. Explain DataGrid control.
12. Explain System.Data.SqlClient namespace.

**Que: 3** Explain .NET Architecture in detail. Discuss VB.NET with its features. **[10]**

**OR**

**Que: 3** Write a short note on IDE and Solution Explorer. **[10]**

**Que: 4 [A]** Explain Form life cycle in detail. **[05]**

**[B]** Explain Modules in detail. **[05]**

**OR**

**Que: 4 [A]** Explain Message box with example. **[05]**

**[B]** Explain the ways of passing arguments with example. Explain use of 'By Val' & 'By Ref' keyword. **[05]**

**Que: 5 [A]** Explain different type of error handling. Explain any one in detail. **[05]**

**[B]** Explain Listbox, Combobox and Checklistbox. **[05]**

**OR**

**Que: 5 [A]** Explain try... catch ... final in detail with example. **[05]**

**[B]** Explain Button control with its properties, methods and events. **[05]**

**Que: 6 [A]** Explain the connected architecture of ADO.NET in brief. **[05]**

**[B]** Explain major ADO .net objects. **[05]**

**OR**

**Que: 6 [A]** Explain use of "ExecuteScalar", "ExecuteNonQuery" and "ExecuteReader" methods in detail. **[05]**

**[B]** Explain the step, how can we retrieve data in DataSet? **[05]**

**### Best ☺f Luck ###**

[36/A13] No. _____ No. of Pages 2

SC

# SARDAR PATEL UNIVERSITY

## T.Y. B.Sc. (SEMESTER – V) EXAMINATION

## COMPUTER SCIENCE

## US05CCSC04 : COMPUTER NETWORKS

**Date : 13/11/2017 Monday Time:10:00am To 01:00pm Max. Marks : 70**

**Q – 1 Multiple Choice Question** [10]

i) Broadcasting means _____.
   a) Sending message to some computer
   b) Receiving message from all computer in the network
   c) Sending message to all computer in the same network
   d) Receiving message from some computer in the network

ii) A computer network permits sharing of _____.
   a) Resources b) Information
   c) Both a & b d) None of these

iii) If a computer on the network shares resources for others to use, it is called _____.
   a) Router b) Client
   c) Mainframe d) Server

iv) Which of the following modulation requires the lowest bandwidth?
   a) ASK b) PSK c) FSK d) QPSK

v) For long distance data transmission, what is the preferable mode of communication?
   a) Simplex b) Half duplex
   c) Serial transmission d) Parallel transmission

vi) Transmission media are usually categorized as _____.
   a) Fixed or unfixed b) Metallic or Non-metallic
   c) Determinate or indeterminate d) Guided or unguided

vii) Which of the following is a method of Wireless Transmission?
   a) Electromagnetic Spectrum b) Infrared and millimeter waves
   c) Light wave transmission d) All of the above

viii) A Bluetooth network can have _____ master(s).
   a) Eight b) Two c)Three d) One

ix) A repeater takes a weakened or corrupted signal and _____ it.
   a) Regenerates b)Reroutes c)Amplifies d) Resample

x) Which topology requires a central controller or hub?
   a) Ring b) Mesh c) Bus d) Star

**Q – 2 Answer the following in Short.(Any 10)** [20]

i) Define Host.
ii) Define Network Topology.
iii) Define Spectrum.
iv) Explain serial transmission in brief.
v) Explain phase modulation in brief with example.
vi) Explain amplitude modulation in brief with example.
vii) Write Full Form of: POP & HTTP
viii) List seven layers of OSI.
ix) Define bent pipe.
x) Explain Router with example in brief.
xi) Explain switches with example in brief.
xii) Explain Gateway with example in brief.



(PTO)

| | | | |
|---|---|---|---|
| Q – 3 | a) | Name the two popular LANs. Also explain the two division of broadcast network in brief. | [5] |
| | b) | Discuss the importance of computer networking. | [5] |
| | | OR | |
| Q – 3 | a) | Write short note on MAN and WAN. | [10] |
| Q – 4 | a) | What is switching? Explain packet switching in detail. | [5] |
| | b) | Discuss FDM in detail. | [5] |
| | | OR | |
| Q – 4 | a) | Write the difference between circuit switching and packet switching. | [5] |
| | b) | Write a short note on "Fiber Optic". | [5] |
| Q – 5 | | Explain any four layers of OSI model. | [10] |
| | | OR | |
| Q – 5 | | List and explain design issues for layers in detail. | [10] |
| Q – 6 | a) | Explain Ring topology with advantages and disadvantages. | [5] |
| | b) | Write a short note on CSMA protocol for LAN. | [5] |
| | | OR | |
| Q – 6 | a) | Write a short note on "Mesh Networks". | [5] |
| | b) | Explain Star network with advantages and disadvantages. | [5] |

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SC

SEAT No: _____ Total no of Pages: 02

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# SARDAR PATEL UNIVERSITY

## B.Sc Sem-V (Computer Science) November - 2017

## US05CCSC05 || System Analysis and Design

**Date: 15-11-2017 Time: 10:00 A.M. To 01:00 P.M Marks: 70**

**Q-1 M.C.Q** **10**

1 _____ System is an example of Natural system.
a) solar b) information c) business d) defense

2 _____ System is an example of man-machine system.
a) solar b) information c) business d) defense

3 The third step of SDLC is _____.
a) Problem identification b) System evaluation
c) System requirement analysis d) System study

4 SSADM does not includes_____.
a) System Survey b) Structured Design c) Maintenance d) System Analysis

5 _____is considered as an input of the Configuring Hardware Study.
a) Physical Requirements b) Hardware c) Packaged Design d) Test Plan.

6 The processed data with specific purpose are called_____.
a) Data b) Information c) Picture d) System

7 _____ is the process to detect error.
a)Data Capture b) Computer Input c) Data Validation d) Data preparation

8 _____is not the fact finding technique.
a) Interviewing b) Questionnaires c) Record inspection d) Data input

9 DFD stands for_____.
a) Data Flow Diagram b)Database Flow Diagram
c) Data Flow Design d) None of above

10 The DFDs that shows "What is going on" is known as _____DFDs.
a) Physical b) Logical c) Physiological d)None

**Q-2 Short Question (Any Ten)** **20**

1 Define system.
2 List steps of SDLC.
3 Differentiate between open system and closed system.
4 Explain Documentation in short.
5 List any two Tangible Benefits.
6 Write any four steps of SSADM.
7 List any five points to remember while Interviewing.
8 Describe any two types of Inputs.
9 List any four design principles of output.
10 Draw the context level diagram for railway reservation system.
11 Explain Code Generator.
12 Explain Any two advantages of CASE Tools.

**(P.T.O)**

| | | |
|---|---|---|
| **Q-3** | | |
| **A** | Explain the elements of system. | **5** |
| **B** | List the types of systems. Give some examples of each system. | **5** |
| | **OR** | |
| **Q-3** | | |
| **A** | Explain the Problem Identification step of SDLC. | **5** |
| **B** | Explain evaluation of the system. | **5** |
| **Q-4** | | |
| **A** | Explain Structured Analysis in brief. | **5** |
| **B** | Explain structured design in brief. | **5** |
| | **OR** | |
| **Q-4** | | |
| **A** | What are the advantages of SSADM? | **5** |
| **B** | List different stages of SSADM. Explain any three. | **5** |
| **Q-5** | | |
| **A** | Explain basic steps in Data capture. | **5** |
| **B** | Explain Different types of output. | **5** |
| | **OR** | |
| **Q-5** | | |
| **A** | Explain Record inspection. | **5** |
| **B** | Describe Questionnaires in detail. | **5** |
| **Q-6** | What is DFD? Draw Symbols of DFD. Write Rules of DFD. Prepare context level diagram and zero level data flow diagram for the saving and withdrawal system in nationalized bank. | **10** |
| | **OR** | |
| **Q-6** | List Case Components. Explain and limitation of Case Components. | **10** |

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S-C

(36) SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

**B.Sc. (SEM V) (Electronics & Communication)**

**Subject : Analog Circuit Design & it's Applications**

**Date & Day:** 07-11-2017, Tuesday

*Note : The figure right indicates full marks*

**Time:** ~~10-00 AM~~ To ~~1-00 PM~~

**Total No. of Printed Pages : 02**

US05CELC01

**Total mark : 70**

## Q-1 Choose the correct answers (10)

1. Class AB operation is often used in power amplifier in order to_____
   (a) Overcome cross over distrotion (b) get maximum efficiency (c) Remove even harmonics (d) Reducing collector dissipation
2. In a _____ amplifier, the current flows only during positive half cycle.
   (a) Class A (b) Class B (c) Class AB (d) Class C
3. Negative feedback in an amplifier_____
   (a) Reduces bandwidth (b) Increases noise (c) Reduces gain (d) Increases frequency
4. Voltage series feedback results in _____
   (a) Increases both i/p & o/p impedance. (b) Decreases both i/p & o/p impedance. (c) Increases i/p & decreases o/p impedance. (d) Decreases o/p & increases i/p impedance.
5. _____ oscillator employs two capacitor in series & inductor in parallel.
   (a) Collpitt's (b) Hartley (c) Phase shift (d) Crystal
6. _____ is a very popular circuit & is commonly used in a local oscillator in the radio receiver.
   (a) Phase shift oscillator (b) Hartley oscillator (c) Crystal oscillator (d) Collpitt's oscillator
7. In a single RC network _____ phase shift is obtained.
   (a) $>90^0$ (b) $=90^0$ (c) $<90^0$ (d) $>80^0$
8. The 555 timer Ic can be operated at supply voltage_____
   (a) 5-15V (b) 1-18V (c) 2-20V (d) 5-18V
9. The 555 timer Ic is used to provide _____
   (a) Time delay (b) Rectification (c) Amplification (d) Oscillation
10. The efficiency of a Class A amplifier is _____%.
    (a) 78.5 (b) 50 (c) 68.5 (d) 70

## Q-2 Attempt any ten of the following (20)

1. Sketch out the circuit diagram of PPM and explain it.
2. Differentiate between Class A and Class B amplifier.
3. Define : Oscillator
4. Discuss the miller's effect.
5. Why feedback is necessary in amplifier?
6. Note down the frequency of Hartley & Collpitt's oscillator.
7. Explain the Bi-stable multivibrator as a RS flipflop.
8. Give the comparison between the negative and positive feedback.
9. List out the salient features of 555 timer Ic.
10. What do you mean by cross over distortion?
11. List out the different types of feedback in amplifier.

(P.T.O)

| | | |
|---|---|---|
| Q-3 (a) | What do you mean by power amplifier? Explain class A amplifier in detail with circuit diagram. | (07) |
| Q-3 (b) | List out the different types of an amplifier with circuit diagram. | (03) |
| | **OR** | |
| Q-3 | Describe the push pull amplifier in detail. | (10) |
| Q-4 (a) | Describe in detail the construction and working of RC phase shift oscillator. | (06) |
| Q-4 (b) | Write a note on Hartley Oscillator. | (04) |
| | **OR** | |
| Q-4 | Discuss in detail Wein bridge oscillator & derive it's expression. | (10) |
| Q-5 | Derive the equation of the negative feedback in amplifier with necessary circuit diagrams. | (10) |
| | **OR** | |
| Q-5 (a) | Discuss in the detail about feedback in amplifier. | (07) |
| Q-5 (b) | List out the merits and demerits of negative feedback. | (03) |
| Q-6 | Explain the circuit diagram of Astable multivibrator and derive it's frequency of oscillation. | (10) |
| | OR | |
| Q-6 | Draw the functional block diagram of 555 timer Ic and explain it. | (10) |

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[46] SEAT No._____ No. of Printed Pages : 2

Sardar Patel University

B.Sc. (semester-V) CBCS Examination Nov. – 2017

09/11/2017, Thursday

10:00 am to 1:00 pm

Electronics & Communication

US05CELC02: Introduction to 8-bit Microprocessor

Maximum Marks: 70

*Note: Figure to the right indicates full marks.*

**Q-1** **Choose the correct Answer.** **[10]**

1. There are _____ general purpose registers.
   a) four b) five c)six **d) eight**

2. IN 8085 Microprocessor, ADD instruction byte size is _____.
   a) 1 byte b) 2 byte c) 3 byte d) 4 byte

3. The address bus of 8085 contains _____ bits.
   a) 8 b)16 c)32 d)64

4. _____ addressing mode use only register as oprends.
   a) immediate b) indirect c) register d) direct

5. _____ Instruction is used to rotate the contain the accumulator left through carry.
   a) RLC b) RAL c) RAR d) RRC

6. _____ Instruction is used to transfer control to subroutine.
   a)PUSH b) POP c) CALL d) RETURN

7. A 16 bit microprocessor has word length equal to _____.
   a) 1 byte b) 2 byte c) 3 byte d) 4 byte

8. _____ Instruction is used to rotate the contain the accumulator right through carry.
   a) RLC b) RAL c) RAR d) RRC

9. JMP 2345H is _____ instruction.
   a) 1 byte b) 2 byte c) 3 byte d) 4 byte

10. The address bus of 8085 is_____.
    a) unidirectional b) bidirectional c)multidirectional d) none

**Q-2** **Answer in short.(Any ten)** **[20]**

1. Give the example of three byte instruction.
2. Explain the function of SID and SOD?
3. Give the function of a system bus.
4. What is the difference between ADD and ADI instruction?
5. Why the data bus is bidirectional?
6. Explain Subroutine.

7. Explain the function of ALE.
8. Compare RAR AND RRC instruction.
9. What is stack? State the uses of stack pointer.
10. Compare RET and POP instruction.
11 Differentiate INR and INX instruction.
12. Explain the function of program counter?

**Q-3** Explain the pin out diagram of 8085 microprocessor. **[10]**

**OR**

**Q-3** Explain in detain architecture of 8085 microprocessor. **[10]**

**Q-4 (a)** Write a program to add ten data stored in memory location, save the carry in one register and display the entire sum at two outputs ports. Also draw the flow chart of above program. **[10]**

**OR**

**Q-4 (a)** Explain the FLAG register in 8085. **[05]**

**(b)** Explain the Arithmetic instruction with example. **[05]**

**Q-5** Write a program to count continuously from FFH to 00H in system with 2MHz clock frequency time delay between each count of 1 second. Display the number at output port 01H. **[10]**

**OR**

**Q-5 (a)** Explain Call and RETURN instruction with example. **[05]**

**(b)** Discuss in detail advanced subroutine concepts. **[05]**

**Q-6** Write a main program and subroutine to multiply two unsigned numbers place in the register H and L. Return the result in to HL pair. **[10]**

**OR**

**Q-6 (a)** Explain the following instruction with example. **[05]**

(1) LHLD (2) SHLD

**(b)** Write a main program and a conversion subroutine to convert the binary number stored at 6000H into its equivalent BCD number. Store the result from memory location 6100H. **[05]**

**********

[38] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

## B.Sc. Fifth semester

## Electronics & Communication

## US05CELC03

## Measuring instrument and Signal generators

**Saturday, 11/11/2017**

**Time: - 10:00AM To 1:00 PM** **Marks: - 70**

Q1 **Choose the correct Answer.( Attempt all)** [10]

1. What is the typical range of resistance measurement of Kelvin's bridge?
   a) 0.1Ω to MΩ b) 0.00001Ω to MΩ c) 1Ω to low MΩ d) None
2. What is the balance condition for the ac bridge?
   a) Z1=Z2Z3 Z4 b) Z1Z4=Z2Z3 c) Z1=Z2Z3 d) None
3. Which of the following is used for measurement of resistance only?
   a) Wheatstone bridge b) Hay bridge c) Maxwell bridge d) None
4. What is the normal operating temperature range of Thermistors?
   a) -100°C to 300 °C b) 0°C to 300°C c) 100°C to 300°C d) None
5. Low impedance component such as low value resistors, large capacitors are measured by connecting them _____ with measuring circuit.
   a) parallel-series b) series c)Parallel d)None
6. What is the equation of the gage factor K?
   a) k=R+ΔR b) k=1-2μ c) k=1+2μ d) None
7. Capacitive transducer is a _____ transducer.
   a) passive b) Active c) analog d) digital
8. Which of following is an electromechanical device containing a resistance element that is contact by a movable slider?
   a) RTD b) Capacitivetransducer c) Potentiometric transducer d) None
9. Attenuator is used to _____ the power level of a signal by fixed amount.
   a) Reduce b) Increase c) Keep constant d) None
10. In which of following the oscillation frequency is controlled by input voltage?
    a) voltage-controlled oscillator or VCO b)spectrum analyzer c) Peak detector d) None

(1)

(P T O)

| | | | |
|---|---|---|---|
| Q2 | | **Answer in short.(Any ten)** | [20] |
| 1. | | What is the measurement errors associated in whetstone bridge? | |
| 2. | | Draw the neat and clean circuit diagram of Schering bridge. | |
| 3. | | Draw the general circuit diagram of kelvin bridge. | |
| 4. | | Why digital voltmeter is more versatile instrument than analog? | |
| 5. | | What is the input range and absolute accuracy of Digital Voltmeter? | |
| 6. | | Which three basic questions are asked while selecting transducers? | |
| 7. | | What is the main function of frequency synthesized function generator? | |
| 8. | | In what shapes and sizes thermistors are available? | |
| 9. | | Give the classification of transducers. | |
| 10. | | List the advantages and disadvantages of RTD. | |
| 11 | | What are the applications of Peak detector? | |
| 12. | | Draw the block diagram of sine wave generator. | |
| Q3 | | "The Maxwell bridge is limited to measurement of medium Q-coils (1<Q<10)" Justify the statement. Explain working of Maxwell's bridge. | [10] |
| | | **OR** | |
| Q3 | (a) | Explain Wheatstone bridge with necessary circuit diagram and equations. | [5] |
| | (b) | Write a note onHay bridge. | [5] |
| Q4 | (a) | With necessary circuit diagram explain series and parallel Q-meter circuit. | [10] |
| | | OR | |
| Q4 | (a) | With necessary equations and circuit diagram explain basic Q-meter circuit. | [5] |
| | (b) | Explain successive approximation type ADC in detail. | [5] |
| Q5 | (a) | What are the Thermistors? Describe any two characteristics of Thermistor. | [5] |
| | (b) | Write a short note on piezoelectric transducer. | [5] |
| | | **OR** | |
| Q5 | (a) | Explain principle and construction of LVDT. | [5] |
| | (b) | Write a short note on a capacitive transducer. | [5] |
| Q6 | | Explain working of Hartley and Colitis oscillator in detail with circuit diagrams. | [10] |
| | | **OR** | |
| Q6 | | With necessary circuit diagram explain function generator. | [10] |

—X—

(2)

[37] SEAT No._____ No. of Printed Pages : 2

**Sardar Patel University**

**B.Sc. (Semester-V) CBCS Examination October - 2017**

**Subject : Electronics & Communication**

**Date : 13/11/2017, Monday Time : 10:30 AM to 1:00 PM**

**Paper : Digital communication system Code : US05CELC04:**

**Maximum Marks: 70**

*Note: Figure to the right indicates full marks.*

**Q-1 Choose the correct Answer.** **[10]**

1. As the order of the holding circuit in PAM demodulation increases, the distortion is _____.
   a) increase
   b) decrease
   c) depend on input
   d) remain constant
2. Flat top sampling uses_____.
   a) chopping
   b) switching circuit
   c) multiplication
   d) sample & hold circuit
3. Natural sampling uses _____.
   a) chopping
   b) switching circuit
   c) multiplication
   d) sample & hold circuit
4. In _____, the frequency of the carrier is switched depending on the input digital signal.
   a) ASK
   b) FSK
   c) PSK
   d) None
5. Which of following used to avoid effect of under sampling?
   a) interpoling
   b) pre-alise
   c) low pass
   d) high pass
6. Companding is used for _____.
   a)To overcome quantization noise in PCM
   b) to protect the small signal in PCM for distortion
   c) in the PCM transmitter as amplitude limiters
   d) to overcome impulse noise in reciever
7. Quantization noise occurs in _____.
   a) FDM
   b) PWM
   c) TDM
   d) PCM
8. In PAM , the bandwidth of the transmission channel depends on _____.
   a) width of the pulse
   b) rise time of the pulse
   c) height of the pulse
   d) frequency of the pulse
9. Coherent detection is also known as _____.
   a) Synchronous detection
   b) balance detection
   c) product detection
   d) None
10. _____ is used to maintain fame and sample synchronization between TM transmitter and receiver.
    a) framing bit
    b) sign bit
    c) signaling bit
    d) CRC bit



*(P.T.O)*

| | | |
|---|---|---|
| **Q-2** | **Answer in short.(Any ten)** | **[20]** |
| 1. | Give reason ideal sampling is not suitable for transmission purpose. | |
| 2. | Give an account of regenerative repeater. | |
| 3. | Write the time domain and frequency domain representation of flat-top sampled signal. | |
| 4. | What is quantizer? Explain its types. | |
| 5. | What is aliasing? How it can avoid? | |
| 6. | Explain ASK. | |
| 7. | Define multiplexing and mention the different types of multiplexing. | |
| 8. | Explain pulse time modulation. | |
| 9. | Mention the difference between TDM and FDM. | |
| 10. | What do you meant by coherent and non-coherent digital modulation techniques? | |
| 11 | Draw the FSK signal for the digital data 10110010. | |
| 12. | What is DC wandering? When it is arising? | |
| **Q-3** | Discuss, in detail, sampling techniques with necessary circuit diagram and waveform. | **[10]** |
| | **OR** | |
| **Q-3** | State and prove sampling theorem in time domain. | **[10]** |
| **Q-4** | What is PPM signal? Explain the generation and detection of PPM signal with necessary circuit diagram and waveform. Also mention the advantage and disadvantages. | **[10]** |
| | **OR** | |
| **Q-4 (a)** | Elaborate the term "Companding" in digital communication with suitable example. | **[05]** |
| **(b)** | Explain the basic element of PCM signal. | **[05]** |
| **Q-5** | What is BPSK signal? Explain the generation and detection of BPSK signal with necessary diagram and wave-from. | **[10]** |
| | **OR** | |
| **Q-5** | Explain in detail binary shift keying with necessary diagram. | **[10]** |
| **Q-6 (a)** | Explain Time Division Multiplexing(TDM), in detail. | **[05]** |
| **(b)** | Write a short note on: Frequency Division Multiplexing (FDM). | **[05]** |
| | **OR** | |
| **Q-6** | Explain different types of line encoding formats used in telephone line transmission. | **[10]** |

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SEAT No._____ No. of Printed Pages : 02

[327]

# SARDAR PATEL UNIVERSITY V.V.NAGAR

B.Sc. (V$^{th}$ SEM.) ELECTRONICS & COMMUNICATION

15$^{th}$NOVEMBER-2017 EXAMINATION

SUB. – ANTENNA AND ITS APPLICATION

SUB.CODE-US05CELC05

TIME:-10:00 am to 1:00 pm MARKS-70

**Q-1 Choose correct answer** [10]

1. Pitch angle for helical antenna is defined by _____
   a) $\tan^{-1}S/\pi C$ c) $\tan^{-1}S/\pi D$
   b) $\tan^{-1}S/\pi L$ d) none of above
2. The noise voltage for resistance R is given by _____.
   a) $V=2\sqrt{KTBR}$ c) $V=\sqrt{KTBR}$
   b) $V=2\sqrt{KTB}$ d) none of above
3. A _____compares a level of signal power versus a level of noise power and is most often expressed as a measurement of decibels (dB).
   a) signal-to-noise ratio c) phase margin
   b) contrast to noise d) none of above
4. The frequency range of operation of helical antenna is around _____.
   a) 30MHz to 3GHz c) Above 3GHz
   b) 10MHz to 10MHz d) none of above
5. The intrinsic impedance of free space is _____.
   a) 377 π c) 90π
   b) 120π d) none of above
6. The Radiation pattern of end-fire array is _____
   a) uni-directional c) multidirectional
   b) bidirectional d) none of above
7. The Radiation pattern of broadside array is _____
   a) uni-directional c) multidirectional
   b) bidirectional d) none of above
8. Which expression involves the electrostatic field for far field due to alternating current element?
   a) Only $E_\theta$ c) Both and b
   b) Only $E_r$ d) none of above
9. The arrangement consisting two electric poles are known as .....
   a)dipole c)array
   b)monopole d) none of above
10. The intrinsic impedance of free space is symbolized by _____.
    a) $Z_0$ c) $X_0$
    b) $Y_0$ d) none of above

**Q-2 Short answer type question. (any ten)** [20]

1. Define: Effective area and effective height of antenna.
2. State Helmholtz theorem.
3. Sketch the labelled diagram of horn antenna.
4. Evaluate radiation resistance of an element of length L=2 m at 4 KHz.



(P.T.O.)

5. Give only expression of far field due to alternating current element.
6. Obtain the pattern of broadside array of eight element spaced on half wavelength and fed in phase using multiplication of pattern.
7. Explain slot impedance.
8. Evaluate radiation resistance of an element of length L=2 m at 20 KHz.
9. Give the expression for radiated power. Also find power radiated for r=1 cm, $I_{eff}$ = 0.7 amp. At 5GHz.
10. Draw a labelled diagram of volcano smoke and conical antenna.
11 Why signal to noise ratio is required?
12. Find the Tchebyscheff polynimial $T_4(x)$.

Q.3(A) Derive the complete expression for far field due to sinusoidal current distribution. [05]
Q.3(B) Obtain the near field due to sinusoidal current distribution. [05]

**OR**

Q.3(A) Explain the meaning of different terms of Ez, Ey and $H_\psi$. [05]
Q.3(B) Derive the expression for power radiated by current element and discuss its all cases. [05]

Q.4(A) Explain effective area of antenna in detail. [05]
Q.4(B) Write a short note on antenna terminal impedance. [05]

**OR**

Q.4(A) Explain in brief signal to noise (S/N) ratio. [05]
Q.4(B) Explain binomial array in detail. [05]

Q.5(A) Write a note on: Broadside array. [05]
Q.5(B) Write a note on: linear array. [05]

**OR**

Q.5 Explain multiplication of pattern in detail. [10]

Q.6 Sketch and explain yagi-uda antenna. [10]

**OR**

Q.6(A) Explain helical antenna with necessary diagram. [05]
Q.6(B) Derive optimum horn dimension for pyramidal horn. [05]

—X—

SEAT No._____ [25]

No. of Printed Pages : 02

SC

**SARDAR PATEL UNIVERSITY**
**B.Sc. Semester V Examination (CBCS)**
**US05CELC06: Data Communication and Network**
**17th November 2017, Friday**
**10:00 am to 1:00 pm**

**Total Marks: 70**

*Note: Figures to the right indicate maximum marks.*
*Assume data wherever necessary.*

**Q1** **Choose the correct answer.** **[10]**

1 Terminators are used in _____ topology.
a) Bus b) Star c) Mesh d) Ring

2 Communication between a computer and a keyboard involves _____ transmission.
a) Simplex b) half-duplex c) full-duplex d) automatic

3 _____ is a collection of many separate networks.
a) A WAN b) An internet c) A LAN d) None of the above

4 A _____ is a set of rules that governs data communication.
a) Forum b) protocol c) standard d) none of the above

5 For large network which topology is best?
a) Bus b) Star c) Mesh d) Ring

6 _____is defined as the "Interface between data terminal equipment and data communications equipment using serial binary data exchange.
1) RS232 b) RS 449 c)X-21 d) RS532

7 A _____ is a topology for a Local Area Network (LAN) in which all nodes are individually connected to a central connection point, like a hub or a switch.
a) Bus b) Star c) Mesh d) Ring

8 What does stand for CRC ?
a) Cycle Redundancy Check b) Cyclic Reduction Check
c) Cycle Reduction Check d) Cyclic Redundancy Check

9 Which of the following architecture uses CSMA/CD access method?
a) ARCnet b) Ethernet c) CSNET d) ARPANET

10 A _____ is a data communication system within a building, plant, or campus, or between nearby buildings.
a) MAN b) LAN c) WAN d) none of the above

**Q2** **Answer in short [ANY TEN]** **[20]**

1 Explain single-bit error correction.
2 Define Topology.
3 Define Asynchronous transmission.
4 What is Network and list out different types of network.
5 Explain RS- 449 interface.
6 Write down OSI model Layers.

**P.T.O.**

7 Discuss Collision detection.
8 Give short note on mesh topology.
9 Differentiate error correction and error detection.
10 Define RS – 232 interface.
11 Explain protocol efficiency?
12 What is Ethernet?

**Q3** Explain Network application topologies and at least three Standard Creation Committees. **[10]**

**OR**

**Q3** Describe in detail the standard OSI layer with require diagram. **[10]**

**Q4** A Give the description about Transmission modes. **[05]**
B Give the short on Carrier sense multiple accesses with CD. **[05]**

**OR**

**Q4** A Explain Aloha protocol and token passing. **[05]**
B Define Simplex, half duplex and full duplex. **[05]**

**Q5** Discus in detail about Internet Virus and Worm. **[10]**

**OR**

**Q5** Write note on CRC (Cycle Redundancy Check). **[10]**

**Q6** Discuss about Sliding window Protocol. **[10]**

**OR**

**Q6** Write a short note on Protocol Correctness. **[10]**

SC

[37] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

## B.Sc. (5th Semester) Examination

## 2017

## Tuesday, 07th November

## 10:00 a.m. to 1:00 p.m.

## US05CELE01 - Discrete And Linear Circuits

**Total Marks : 70**

**Q.1 Choose the correct answer** **[10]**

1. Voltage series feedback amplifier is also called _____.
   (a) Current amplifier (b) Voltage amplifier (c) Transresistance amplifier
2. In the feedback amplifier, sensitivity D is equal to _____.
   (b) 1+Aβ (b) Aβ (c) 1-Aβ
3. The operational amplifier has _____ output resistance and _____ input resistance.
   (a) Low, High (b) High, High (c) High, Low
4. In every practical oscillator the loop gain is _____ than unity.
   (a) Smaller (b) Equal (c) Larger
5. Radio frequency oscillator generates _____ range frequencies.
   (a) 20 KHz to 30 MHz (b) 20 Hz to 20 KHz (c) 30 MHz to 300 MHz
6. The conversion efficiency of class B amplifier is less than _____ amplifier.
   (a) Class AB (b) Class A (c) Class C
7. Distortion introduced by non-linearity of dynamic transfer characteristics can be eliminated by _____.
   (a) Push-pull amplifier (b) Audio amplifier (c) RC coupled amplifier
8. Power amplifier is _____ power converter.
   (a) AC to DC (b) DC to AC (c) DC to DC
9. Which regulator circuit gives high efficiency ?
   (a) Switching (b) Series (c) Shunt
10. Dual tracking regulator provides _____ power supply.
    (a) Both positive & negative (b) Positive (c) Negative

**Q.2 Answer any TEN questions in brief** **[20]**

1. What are the four possible topologies of a feedback amplifier ?
2. Define Desensitivity.
3. Give a comparison of positive and negative feedback.
4. Define Rise time and Delay time.
5. Draw the circuit diagram of Colpitt's oscillator.
6. State Barkhausen criteria.
7. Draw the circuit diagram of class B push pull amplifier.
8. Write the advantage of push pull amplifier.

9. Define the conversion efficiency.
10. What is peak Inverse voltage ?
11. Draw the block diagram of regulated power supply.
12. List the three reasons why unregulated power supply is not good enough for some applications.

Q.3 Explain the input and output resistance of feedback amplifier. [10]

OR

Q.3 Explain the general characteristics of Negative feedback. [10]

Q.4 Draw the circuit diagram of Phase shift oscillator and explain it in detail. [10]

OR

Q.4 Draw the circuit diagram of Wein bridge oscillator and explain it in detail. [10]

Q.5 Draw the circuit diagram of Class A Push pull amplifier and explain it. [10]

OR

Q.5 Draw the circuit diagram of Class A large signal amplifier and explain it. [10]

Q.6 What is SMPS ? Explain its working with neat diagram. [10]

OR

Q.6 Explain the discrete voltage regulator circuit. [10]

--------- Best of Luck ----------

Sc

[47] SEAT No._____ No. of Printed Pages : 2

# SARDARPATEL UNIVERSITY, V.V.NAGAR

T.YB.Sc. Sem-V EXAMINATION

SUB. CODE:-US05CELE02 Digital Systems

DATE:-09/11/2017, Thursday TIME:-10:00 am to 01:00 pm MARKS-70

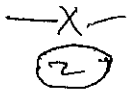
**Q-1** **Choose correct answer** **[10]**

1. A serial-in-serial-out shift register can also work as _____
   (A) Serial in Parallel Out (C) Parallel in Parallel Out
   (B) Parallel in Serial Out (D) None of these
2. In bidirectional register data can be shifted from left to right and right to _____
   (A)Left (C) Right
   (B) Up (D) None of these
3. Carry generate function CG = _____
   (A) A • B (C) A + B
   (B) A - B (D) None of these
4. Low speed modem uses _____ modulation.
   (A) FSK (C)AM
   (B) AM-FM (D) None of these
5. Registers are made up of _____
   (A) Flip-Flops (C) Resistors
   (B) Capacitor (D) None of these
6. PAL means _____
   (A) Programmable Array Logic (C) Program Access Memory
   (B) Programmable Alternate Loop (D) None of these
7. In ring counter data is _____
   (A) Circulated (C) Shift-out
   (B) Shifted in (D) None of these
8. The carry propagate function mean _____
   (A) A+B (C) A - B
   (B) A • B (D) None of these
9. _____ is a basic comparator.
   (A) X-NOR (C) AND
   (B) XOR (D) None of these
10. The Schmitt Trigger has U.T.P. & _____
    (A) LTP (C) Zero-Pt
    (B) NO Pt (D) None of these

**Q-2** **Short answer type question. (any ten)** **[20]**

1. Draw the logic diagram of 4-Bit Parallel-in-Parallel-out simple shift register.
2. Explain UART Drawing Diagram
3. Draw the logic symbol of 74LS83 and label each pin.
4. Draw the logic diagram of 4 bit serial-in-parallel-out simple shift register.
5. Draw the logic diagram of 4 bit serial-in-serial-out simple shift register.
6. Draw the logic diagram of 4 Stage Simple Ring Counter.
7. Draw the logic diagram of 4 Stage Johnson Counter.
8. Draw a neat logic diagram of full Adder Circuit that produces CG & CP Functions.
9. Draw a neat block diagram of Serial Adder and explain in short.
10. Explain FSK Drawing Diagram.
11. Draw the block diagram of digital data transmission using MODEM.
12. Draw the figure of asynchronous data format.

| | | |
|---|---|---|
| Q.3 | List different types of data transmission in shift register and explain its working in detail drawing diagram. | [10] |
| | **OR** | |
| Q.3 | Draw the neat logic diagram of 4-bit controlled buffer register and explain its working in detail. | [10] |
| Q.4 | Give an account of 4-bit Bidirectional register and explain its working in detail. | [10] |
| | **OR** | |
| Q.4 | List applications of shift register and explain any two in detail. | [10] |
| Q.5 | Explain TWO's complements addition and subtraction using parallel adders. | [10] |
| | **OR** | |
| Q.5 | Give an account of comparator. | [10] |
| Q.6 | Give an account of CMOS-TO-TTL interfacing & Explain in brief TTL-TO-CMOS interfacing. | [10] |
| | **OR** | |
| Q.6 | Give an account of Schmitt Trigger as an Interface Circuit. | [10] |



[39/A23] SEAT No._____ No. of Printed Pages : 2

SC

# SARDAR PATEL UNIVERSITY

## B.Sc. (5th Semester) Examination

## Saturday, 11th November 2017

## 10:00 a.m. to 1:00 p.m.

**US05CELE03 - 8-bit Microprocessor programming and its applications**

**Total Marks : 70**

**Q.1 Choose the correct answer** **[10]**

1. 8085 microprocessor has _____.
   (a) 40 pins (b) 14 pins (c) 20 pins
2. Multiplex address and data bus is _____.
   (a) $A_9$- $A_{15}$ (b) $A_8$- $A_{15}$ (c) $AD_0$- $AD_7$
3. The address bus of microprocessor 8085 contains _____ bits.
   (a) 8 (b) 16 (c) 4
4. Which instruction is used to complement the content of accumulator ?
   (a) XRA A (b) ANA A (c) CMA
5. Instructions can be classified according to their _____.
   (a) LSB & MSB (b) Number size (c) Word size
6. In the data transfer instruction the data is copied from _____.
   (a) Source to destination (b) Destination to source (c) None of these
7. In 8085 SUI instruction has _____ byte size.
   (a) Three (b) Four (c) Two
8. Conditional JUMP instruction is _____.
   (a) JMP 16-bit address (b) JC 16-bit address (c) None of these
9. JNC is _____ instruction.
   (a) 1-byte (b) 2-byte (c) 3-byte
10. Which instruction is used to store the content of accumulator to the specified address ?
    (a) STAX D (b) LDAX B (c) STA 8500

**Q.2 Answer any TEN questions in brief** **[20]**

1. What are the inputs of ALU ?
2. How many flags are there in 8085 microprocessor ? Name them.
3. Write a program to load 9FH in register B, Add 9FH with 4CH using ADI instruction, display the result at the OUT PORT0.
4. Which instructions are used to clear the content of accumulator ?
5. How many types of data transfer instructions are there, list them?
6. How many addressing modes are there and name them.
7. How many types of branch instructions are there, list them?



[P.T.O]

8. List the instructions which transfers the data from memory to microprocessor and microprocessor to memory.
9. Define program and software.
10. List the logical instructions.
11. What is the difference between INR R and DCR R instructions.
12. Write a program to load 25H in register B, Display 25H at port address O1H.

Q.3 Discuss in detail the architecture of 8085 microprocessor. [10]

OR

Q.3 Draw the pin out diagram of 8085 microprocessor. Explain in detail the functions of each pin. [10]

Q.4 (a) Classify the instruction according to their word size and explain it in detail. [05]
(b) Explain register addressing mode and direct addressing mode. [05]

OR

Q.4 (a) Explain Immediate addressing mode and Indirect addressing mode in details. [05]
(b) Explain the method of writing and executing a simple program. [05]

Q.5 Discuss in detail the Arithmetic instructions. [10]

OR

Q.5 Discuss in detail data transfer instructions. [10]

Q.6 Discuss in detail the additional data transfer and 16 bit arithmetic instructions. [10]

OR

Q.6 Discuss in detail the programming techniques. [10]

--------- Best of Luck ----------

SEAT No._____

No. of Printed Pages : 2

[38]

**SARDAR PATEL UNIVERSITY**

**B.Sc. - V Semester**

**Date 13/11/2017 , Monday**

**Instrumentation I**

**Session: Morning Time: 10:00 am to 1:00 pm**

**Course Code:**

| U | S | 0 | 5 | C | E | L | E | 0 | 4 |
|---|---|---|---|---|---|---|---|---|---|

**Total Marks: 70**

**Q-1 Multiple Choice questions:** **10**

1. The Maxwell bridge is used to measure
   (i) low value resistors
   (ii) Capacitor
   (iii) Inductor
   (iv) High value resistor

2. At the null condition the current through the detector is
   (i) minimum
   (ii) maximum
   (iii) zero
   (iv) Infinite

3. The modification applied to Hay bridge to measure high Q coil is
   (i) Connecting a resistor in series to capacitor in arm 1.
   (ii) Connecting a resistor in parallel to capacitor in arm 1.
   (iii) Connecting an inductor parallel to capacitor in arm 1.
   (iv) None of above.

4. Dissipation factor is
   (i) reciprocal of quality factor.
   (ii) proportional to quality factor.
   (iii) reciprocal of power factor.
   (iv) none of the above.

5. Schering bridge is used to measure capacitance of a capacitor whose phase angle is
   (i) is nearer to 90°.
   (ii) is lower than 90°.
   (iii) is equal to 90°.
   (iv) none of above

6. Transducer forms a part of _____ in instrumentation system.
   (i) Input device
   (ii) Output device
   (iii) Processing device
   (iv) All of these.

7. In which transducer the emf voltage is generated across the junction of two dissimilar metals when junction is heated
   (i) Thermistor
   (ii) Photoconductive cell

(P.T.O.)

(iii) Thermocouple
(iv) Solar cell

9. Thermistors are widely used in the temperature range
   (i) -100°C to 100 °C
   (ii) -100°C to 200 °C
   (iii) -100°C to 300 °C
   (iv) 100$^0$ C to 300$^o$ C

10. In the construction of phototube the photosensitive material is used in construction of
   (i) Anode
   (ii) Cathode
   (iii) Grid
   (iv) Source

Q-2 **Answer any ten questions in brief.** 20

1. Draw simplified circuit of commercial Kelvin double bridge.
2. Write two differences between ac bridge and dc bridge.
3. Why Kelvin bridge is called double bridge? What is Kelvin bridge used for?
4. What do you mean by Dissipation factor? What does it tell?
5. Draw impedance triangle for inductor and capacitor?
6. What are the important blocks of instrumentation system?
7. Define Transducer.
8. Classify transducer. Give two examples.
9. In what shapes and size the thermistors are available in the market?
10. What are thermistors? They are prepared from which material?
11. What are the three important characteristics of thermistors?
12. Name Acrystalline materials. Where Piezoelectric crystals are used?

Q-3 A. Describe Kelvin double bridge in detail. 10

OR

Q-3 A. Explain why Maxwell bridge is unsuited for measurement of low Q coils. 5
B. The ac bridge is in balance with following constants. Arm AB, R=450 Ω, arm BC, R=300 Ω in series with capacitor C=0.256 μF and arm CD unknown, arm DA R=200 Ω in series with inductor L=15.9 mH. The oscillator frequency is 1 KHz. 5

Q-4 Describe in detail Hay bridge and show that it is suitable for the measurement of High Q coil. 10

OR

Q-4 Describe in detail Schering bridge and show that the dial of Schering bridge can be calibrated directly in terms of dissipation factor D. 10

Q-5 Explain working of LVDT in detail. 10

OR

Q-5 Write a short note on Transducer. 10

Q-6 Describe working of Photoelectric transducer in detail. 10

OR

Q-6 Describe any two characteristics of Thermistors. 10

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SC

SEAT No._____ No. of Printed Pages : 02

# SARDAR PATEL UNIVERSITY V.V.NAGAR

[33/A-13]

B.Sc. (V$^{th}$ SEM.) ELECTRONICS

15$^{th}$NOVEMBER-2017 EXAMINATION

SUB. - INDUSTRIAL ELECTRONICS- I

SUB.CODE-US05CELE05

TIME:-10:00 am to 1:00 pm MARKS-70

**Q-1 Choose correct answer** **[10]**

1. Thyristor mainly used for_____.
   (A) Power controlling (C) Relaxation oscillation
   (B) Rectification (D) None of above
2. Recommended method to TURN-ON SCR is_____.
   (A) Triggering by A.C signal (C) Triggering by D.C signal
   (B) Triggering by pulse signal (D) None of above
3. Dc motor consists of _____.
   (A) TRIAC (C) Amplifier
   (B) Stator (D) None of above
4. Stepper motor used for _____speed variation.
   (A) Discrete (C) Linear
   (B) Constant (D) None of above
5. SUS means _____.
   (A) silicon unilateral switch (C) silicon uni-port switch
   (B) silicon uni-junction switch (D) None of above
6. UJT mainly used for_____.
   (A) relaxation oscillator (C) amplification
   (B) rectification (D) None of above
7. TRIAC____ type of device.
   (A) multi-directional (C) bi-directional
   (B) uni-directional (D) None of above
8. _____ Connection of SCR used for controlling very high current.
   (A) series (C) bi-directional
   (B) parallel (D) None of above
9. _____ is a circuit which convert DC power in to AC power at desired output voltage.
   (A) Rectifier (C) Filter
   (B) Inverter (D) None of above
10. Static equalising circuit is external compensating circuit to produce uniform voltage in _____ operation of SCR.
    (A) parallel (C) normal
    (B) series (D) None of above

**Q-2 Short answer type question. (any ten)** **[20]**

1. State function of gate in SCR.
2. Define string efficiency.
3. Differentiate between semiconductor and thyristor device.
4. What do you mean by power controlling action?
5. Differentiate between D.C. motor and stepper motor.
6. State principle of operation of stepper motor.
7. Define reverse recovery current $I_{RR}$.



(P.T.O.)

8. Define holding current $I_h$.
9. List application of thyristor device.
10. Differentiate TRIAC and SCR.
11. Briefly explain overvoltage protection circuit.
12. State different type of inverter circuit.

Q.3(A) Discuss principle of operation and characteristics of SCR. **[06]**

Q.3(B) Explain TURN-OFF mechanism of SCR. **[04]**

**OR**

Q.3(A) Discuss different method of turning on a SCR with TURN-ON characteristics. **[06]**

Q.3(B) Briefly discuss gate control circuit in SCR. **[04]**

Q.4 Discuss the series operation of SCR with necessary diagram and compensation circuits. **[10]**

**OR**

Q.4 Discuss the parallel operation of SCR with necessary diagram and compensation circuits. **[10]**

Q.5(A) Discuss characteristics and operation of UJT with necessary diagram. **[06]**

Q.5(B) Write a note on UJT as a relaxation oscillator. **[04]**

**OR**

Q.5(A) Discuss triggering mode of TRIAC. **[06]**

Q.5(B) Explain application of SCR as static circuit breaker. **[04]**

Q.6 Draw the schematic diagram of D.C motor and discuss its working in detail. **[10]**

**OR**

Q.6(A) Explain series inverter giving necessary diagram and waveforms. **[06]**

Q.6(B) Write a note on stepper motor **[04]**

—— X ——

SC

SEAT No._____

No. of Printed Pages : 02

[26]

# SARDARPATEL UNIVERSITY V.V.NAGAR

T.YB.Sc. Sem-V EXAMINATION

SUB. CODE:-US05CELE06 Analog Communications

DATE:-17/11/2017 TIME:-10:00 am to 1:00 pm MARKS-70

**Q-1** **Choose correct answer** **[10]**

1. A single transistor working as frequency mixer and local oscillator is called _____.
   (A) converter (C) mixer
   (B) local oscillator (D) None of these
2. IF frequency in case of of super-heterodyne radio receiver is _____.
   (A)455 khz (C) 55 khz
   (B) 45 khz (D) None of these
3. Aspect ratio used in T.V receiver is_____.
   (A) 4:3 (C) 3:3
   (B) 4:4 (D) None of these
4. The function of amplitude de-modulation is opposite of_____.
   (A)Amplitude modulation (C)Frequency modulation
   (B) Phase modulation (D) None of these
5. The function of IF amplifier in super hetero-dyne receiver is _____.
   (A) Reject (C) Attenuate
   (B) select and amplify (D) None of these
6. As different stations are tuned in Radio Receiver o/p frequency of mixer is _____
   (A) Constant (C) Changes
   (B) Zero (D) None of these
7. Problem of flicker is solved by _____
   (A) Interlaced Scanning (C) Cut-off
   (B) Blanking (D) None of these
8. _____ is used to match impedance of TV Receiver to input.
   (A)BALUN (C) RF TUNER
   (B) IF TRAP (D) None of these
9. In TV sound signal is _____modulated.
   (A) AM (C) PM
   (B) FM (D) None of these
10. In TV picture signal is _____modulated.
    (A) AM (C) PM
    (B) FM (D) None of these

**Q-2** **Short answer type question. (any ten)** **[20]**

1. Draw the block diagram of mixer and explain its working.
2. Explain interlaced scanning.
3. Explain principle of superhetrodyne.
4. Draw the circuit of linear diode detector.
5. Explain how AVC works.
6. List salient features of Broad Cast Receiver.
7. Give classifications of a Radio Receiver.
8. Explain Aspect Ratio.
9. Explain scanning.
10. Draw the circuit of BALUN.
11. Draw the block diagram of VHF Tuner in TV.
12. Draw the diagram of IF trap.

(P.T.O.)

| | | |
|---|---|---|
| Q.3 | Draw the circuit of RF Amplifier and explain its working . | [10] |
| | **OR** | |
| Q.3 | Draw the circuit of frequency converter using one transistor and explain its working | [10] |
| Q.4 | Draw the block diagram of super hetero-dyne Radio Receiver and explain function of each block. | [10] |
| | **OR** | |
| Q.4 | List basic functions of AM Receiver and explain each in detail. | [10] |
| Q.5 | Give an account of Composite Video Signal. | [10] |
| | **OR** | |
| Q.5 | Give an account of Image Orthicon Camera tube. | [10] |
| Q.6 | Draw a neat block diagram of Black & White Broadcast TV Receiver and label it. | [10] |
| | **OR** | |
| Q.6 | List different inter stage coupling methods. Explain any two in detail. | [10] |

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[38/A21] SEAT No._____ No. of Printed Pages : 2 SC

**SARDAR PATEL UNIVERSITY**

**T. Y. B.Sc, ( FIFTH SEMESTER) EXAMINATION**

**2017**

**Tuesday,7th November**

**10.00 am to 1.00 pm**

**US05CENV01 Environmental Biotechnology**

**Total Marks :70**

**Q.1. Select the correct answer and write in answer sheet** **(10)**

**1.** The treatment of environmental problems with the use of plant is called as _____
(a) Biomagnification (b) Bioremediation (c) Phytoremediation (d) Phyto transformation

**2.** Fine textured soils like clay has _____ permeability which prevents dispersal of oxygen and nutrients into the soil
(a) High (b) Medium (c) Low (d) Excess

**3.** Uptake and transpiration of a contaminant by a plant is known as _____
(a) Rhizodegradation (b) Phytodegradation (c) Phytoextraction (d) Phytostabilizaton

**4.** Plants are hydroponically grown for the purpose of _____

(a) Rhizofiltraton (b) Phytostabilization (c) Phytodegradation (d) Phytoextraction

**5..**_____ plant was successfully utilized for removal of radioactive compounds during Chernobyl disaster
(a) Mustard (b) Sunflower (c) Poplar (d) Lemna

**6.** The unorganized proliferative mass of cells produced from isolated plant tissue is called _____
(a) embryo (b) callus (c) explant (d) endosperm

**7.** _____ culture is used to produce haploid plants
(a) callus (b) embryo (c) anther (d) protoplast

**8.** Regeneration of large number of plantlets in short time through tissue culture is _____
(a) propagation (b) mass cultivation (c) Micropropagation (d) grafting

**9.** _____ enzymes are the scissors of molecular genetics
(a) Ligases (b) Lipases (c) Exonucleases (d)Restriction endonucleases

**10.** In r DNA technology, _____ are used as tool to transfer the genes
(a) Yeast (b) bacteria (c) Plasmid (d) nucleus

**Q.2.Answer in brief (any Ten)** **(20)**

1. Explain instrinsic and extrinsic bioremediation
2. What is Bio Sparging?
3. Explain thermal process
4. Explain the term Phytoremediation
5. What is hyperaccumulator species ?
6. Explain Phytostabitization
7. What is totipotency ? Explain
8. State the working of Laminar Air Flow
9. Explain the functioning of Autoclave
10. What are Restriction Endonucleases ?
11. Write in brief the application of r DNA technology
12. Give one example of Transgenic animal and discuss its purpose

Q.3.(a) What is Bioremediation? Explain any two methods of In situ bioremediation. (05)

(b) Explain Land farming and composting (05)

**OR**

Q.3.(a) Discuss two methods of Ex situ bioremediation in brief (05)

(b) What is Biosparging and bioslurping ? Explain (05)

Q.4 (a) Discuss the Phytovolatization process (05)

(b) What is Rhizofiltration ? (05)

**OR**

Q.4 (a) Discuss the Role of Hyperaccumulator Plants (05)

(b) State in brief the advantages of Phytodegradation (05)

Q.5.(a) Give a brief account on General process of Plant Tissue culture (05)

(b) Write about the media composition for Plant tissue culture (05)

**OR**

Q.5. (a) Discuss various methods of Organ culture (10)

Q.6. (a) Explain the recombinant DNA technology with suitable diagrams (05)

(b) State Role of Plasmid in r DNA technology (05)

**OR**

Q.6. (a) Discuss the Role of Endonucleases in r DNA technology (05)

(b) What are transgenic animals ? Discuss one example (05)

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(48 & A-24) SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**T. Y. B. Sc. (FIFTH SEMESTER) EXAMINATION**

**2017**

**THURSDAY, 9th NOVEMBER**

**Time: 10.00 a.m. to 01.00 p.m.**

**US05CENV02 (ENVIRONMENTAL SCIENCE)**

**(PESTICIDE, HERBICIDE, FUNGICIDE TOXICOLOGY)**

**Note: 1. Answers of all the questions (including multiple choice questions) should be written in the provided answer book only**

**2. Figures to the right indicate the full marks of sub question**

**3. Draw neat and labelled diagrams wherever necessary**

**Maximum Marks: 70**

**Q. 1. Multiple choice questions** **(10)**

1. The major biotransformation site in vertebrates is _____.
   **a.** Skin **b.** Liver **c.** Kidneys **d.** Lungs
2. If respiratory tract is affected by toxicants then entry of toxicant is by _____.
   **a.** Ingestion **b.** Inhalation **c.** Absorption **d.** Injection
3. Access of some toxicants to foetus is prevented by _____.
   **a.** Placental barrier **b.** GI tract **c.** Skin **d.** Blood–brain barrier
4. Which of the following is an organochlorine insecticide?
   **a.** Malathion **b.** Aldrin **c.** Pyrethroids **d.** Chloroquine
5. Pesticides that kill the target species by vapour action are called _____.
   **a.** Insecticides **b.** Herbicides **c.** Fungicides **d.** Fumigants
6. _____ is composed of cross linked fatty acid polymers.
   **a.** Cell wall **b.** Epi- cuticular wax **c.** Cuticular wax **d.** Nucleus
7. The entry by which only lipoprotein substance finally reaches to plasmadesmata is called as_____.
   **a.** Non polar entry **b.** Polar entry **c.** None **d.** Both
8. The meaning of molecular fate is _____.
   **a.** Bioagumentation **b.** Bioaccumulation **c.** Bioconcentration **d.** Detoxification
9. Chestnut compound is a type of _____ fungicide.
   **a.** Sulphur **b.** Copper **c.** Mercury **d.** Carboxyamide
10. _____ fungicide is not used on acidic soil.
    **a.** Captan **b.** Fyton **c.** Ziram **d.** Benomyl

(P.T.O.) 

(1)

**Q. 2. Answer the following questions in short (Any Ten)** **(20)**

1. Define: Bioassay
2. Write a note on Dose-response curve
3. Enlist the storage depots of toxicants in human body
4. What is class resistance? What is cross resistance?
5. Draw structure of Aldrin and Dialdrin insecticides
6. What is axonic poison? What is neurosynaptic poison?
7. Define: Symplastic system
8. Enlist the morphological response to herbicide by the plants
9. Write about Biotic factors affecting foliar herbicide absorption
10. Define: Protective fungicide & Curative fungicide
11. Write about properties of Ziram & Thiram
12. Draw the structural formula of Dichlone fungicide

**Q. 3.** **a.** Write in detail about sites of absorption of toxicants in the body **(06)**
**b.** Write a short note on excretion of toxicants from the body of organism **(04)**

**OR**

**Q. 3.** Describe in detail about Phase II reaction of biotransformation of Xenobiotics **(10)**

**Q. 4.** **a.** Write a detailed note on classification of pesticides **(06)**
**b.** Write a short note on: DDT in environment **(04)**

**OR**

**Q. 4.** **a.** Write in detail on impact of pesticides on various organisms **(06)**
**b.** Write a note on: Pesticides Resistance **(04)**

**Q. 5.** **a.** Explain Soil Application and draw the hypothetical diagram representing herbicide absorption into roots **(06)**
**b.** Write a note on the effect of Dichlobenil herbicide on the growth and plant structure **(04)**

**OR**

**Q. 5.** **a.** Explain Absorption and translocation of triazine and its effect on the growth and plant structure **(05)**
**b.** Draw the labelled schematic representation of plasma membrane affected by various toxic molecules **(05)**

**Q. 6.** **a.** Write a note on different types of Copper fungicides along with its subtypes **(05)**
**b.** Write about Benomyl fungicides **(05)**

**OR**

**Q. 6.** **a.** Write a detail note on Dichlone Fungicide **(05)**
**b.** Describe Organophosphorous fungicides **(05)**

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(2)

[40] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

B.Sc. FIFTH SEMESTER EXAMINATION

2017

SATURDAY, 11th NOVEMBER

10:00 am to 01:00 pm

USO5CENV03

(ENVIRONMENTAL POLLUTION)

Marks: 70

**Note: 1. Answers of all the questions (including multiple choice questions) should be written in the provided answer book only**

**2. Draw neat and labeled diagrams wherever necessary**

**Q.1. Select the correct answer and write it in the answer sheet.** [10]

**1.** _____ technique is suitable for separation of larger particles having a size more than 10μ

(a) Filtration (b) Sedimentation (c) Impingement (d) Freeze out

**2.** _____ method is usually employed when the given pollutant is extremely low in concentration

(a) Adsorption (b) Absorption (c) Sedimentation (d) Freeze out

**3.** _____ pollutant are organic in nature and contain mainly carbon and hydrogen

(a) Inorganic (b) Organic (c) Solid particles (d) Liquid particles

**4.** The study of soil is commonly known as _____

(a) Pedology (b) Edaphalogy (c) Both of these (d) None of these

**5.** _____ are readily biodegradable in nature

(a) Traizine (b) Carbamates (c) Dalapon (d) DDT

**6.** 75% radiation caused DNA damage is due to which free radical?

(a) OH (b) HOH (c) O (d) HO

**7.** Number of vibrations per second is known as _____

(a) Frequency (b) Wave length (c) Amplitude (d) Sone

**8.** A _____ °C rise in temperature doubles the toxic effect of potassium cyanide

(a) 5°C (b) 10°C (c) 15°C (d) 20 °C

**9.** _____ has high octane and relatively clean combustion characteristics.

(a) Petrol (b) CNG (c) Ethanol (d) Diesel

**10.** _____ is a standard measure of the performance of an engine or aviation fuel

(a) Octane number (b) Oxygen (c) Combustion (d) Fuel

**Q.2. Answer the following questions in brief (Any 10)** [20]

1. Define Air pollution according to the Bureau of Indian Standards
2. Write a note on indoor air pollution
3. Write note on effects of $SO_X$ on materials
4. Enlist sources of soil pollution
5. What is radioactive fallout?
6. Discuss the natural sources of radiation pollution
7. State the principle of sound level meter
8. Name the different parts of human ear
9. Define thermal pollution and enlist its sources
10. Describe carbon monoxide as a vehicular pollutant
11. Define vehicular pollution
12. Write note on particulate matter

**Q.3.** (a) Describe Packed tower scrubbers and Plate tower scrubbers for the control of gaseous pollutants [06]

(b) Explain the measurement of pollutants by dust-fall determination [04]

**OR**

**Q.3.** (a) Describe the sampling of particulate matter [05]

(b) Classify air pollutants [05]

**Q.4.** (a) Discuss the adverse effects of fertilizers and pesticides in soil [05]

(b) Explain the procedures to control soil pollution [05]

**OR**

**Q.4.** (a) Discuss the effects of radiation pollution [05]

(b) Explain the methods for prevention and control of radiation pollution [05]

**Q.5.** (a) Describe the sources of noise pollution [05]

(b) Discuss the control measures of noise pollution [05]

**OR**

**Q.5.** (a) Discuss the effects of thermal pollution [05]

(b) Explain the measures to control thermal pollution [05]

**Q.6.** Discuss the scenario of air pollution in India due to automobile emission [10]

**OR**

**Q.6.** Describe biodiesel as an alternative fuel and abatement of vehicular pollution [10]

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**ALL THE BEST**

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[39] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**
**T.Y.B.Sc.5th SEMESTER EXAMINATION**
**13th November 2017,Monday**
**10.00 AM to1.00 PM**
**Earth System Sciences(US05CENV04)**

**Total Marks-70**

Q.1 **Multiple Choice Questions (one mark each)** 10

1. Drainage _____ is topographic region from which a stream receives runoff .

   (a)density (b)texture (c)basin (d)frequency

2. _____ process involving uplift or warping of large parts of the Earth's crust.

   (a)Epeirogenic(b)Orogenic(c) Both of the above(d) None

3. Lusture of diamond is known as _____.
   (a)Metallic (b) Pearly (c) Vitreous (d) Adamantine
4. Change in colour of mineral due to oxidation at surface is known as _____ .
   (a) Lusture (b)Tarnish (c) Iridescence (d)False colour
5. If the system can exchange energy,but not mass with its surroundings is called as _____ .
   (a)Closed system (b) Isolated system (c) Phase (d) Open system
6. Earthquakes are measured using observations from_____.
   (a) Tsunameter (b)Creepmeters (c) Seismometers (d)Magnetometer
7. _____ zone is least active seismic zone.

   (a)Zone II (b)Zone III (c) Zone IV (d) Zone V

8. Taifu is the term used for tropical cyclone in_____.

   (a)Japan (b)America (c)Australia (d) China

9. Time lag between successive tsunami waves ranges between _____.
   (a)10 to 20 minutes(b)20 to 40 minutes(c)10 to 50 minutes(d)20 to 60 minutes
10. In Japan tropical cyclones are termed as_____ .

    (a)Bagulo (b)Typhoons (c) Taifu (d)Willy willy

Q.2 **Answer any ten** 20

1 Give a short note on denudational processes.
2 Discuss in brief diastrophism and sudden movement.
3 How erosion and deposition takes place in weathering?
4 What is meant by Pseudochromatic colour for minerals?
5 Define (i) Streak (ii) Cleavage.

| | | |
|---|---|---|
| 6 | Enlist Mineral forming processes. | |
| 7 | Define Mineral Stability. | |
| 8 | Define Earthquake. | |
| 9 | Explain in brief classification of volcano based on the frequency of eruption. | |
| 10 | What are the different types of floods?Explain | |
| 11 | Write a note on properties of hurricanes. | |
| 12 | Briefly discuss 2 types of Tsunami. | |
| Q.3a. | Write a note on drainage pattern of river. | 5 |
| b. | Give a detailed note on chemical weathering processes. | 5 |
| | **OR** | |
| Q.3a. | Explain in detail biological process of weathering . | 5 |
| b. | Give a detailed note on endogenic geomorphic processes. | 5 |
| Q.4a. | Discuss specific gravity . | 5 |
| b. | Write a note on hardness of minerals. | 5 |
| | **OR** | |
| Q.4a. | Write a note on property of cleavage in minerals. | 5 |
| b. | Explain in detail Water Cycle. | 5 |
| Q.5a. | Describe in detail volcanic hazards and its impacts . | 5 |
| b. | Discuss Gujarat Earthquake case study in detail. | 5 |
| | **OR** | |
| Q.5a. | Explain types of volcanoes and their characteristics. | 5 |
| b. | Write a detailed note on prediction and causes of Earthquake. | 5 |
| Q.6 | Write a note on Pre-Tsunami disaster stage.Discuss characteristic feature of Tsunami waves. | 10 |
| | **OR** | |
| Q.6 . | Discuss characteristic features of tropical cyclones. | 10 |

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SC

SEAT No._____

No. of Printed Pages : 02

E343

**SARDAR PATEL UNIVERSITY**

**T.Y.B.Sc.5th SEMESTER EXAMINATION**

**15th November 2017,Wednesday**

**10.00 AM to 1.00 PM**

**Natural Resources, US05CENV 05**

**Total Marks-70**

Q.1 **Multiple Choice Questions (one mark each)** 10

1. Forests are _____natural resources.

   (a)biotic (b)abiotic (c) cyclic (d) potential

2. _____energy is derived from water.

   (a)solar (b)wind (c) hydropower (d) geothermal

3. Wind energy is_____ energy resource.

   (a)Conventional (b) alternative (c)both of the above (d) none

4. NALCO is concerned with_____.

   (a)zinc (b) aluminium (c) gold (d) manganese

5. Rain water harvesting is a method of _____conservation.

   (a)soil (b) water (c) food (d) forest

6. Overgrazing causes_____.

   (a)pollution (b) floods (c)desertification (d)all of the above

7. Dams are built for _____.

   (a)power generation(b) flood prevention (c) both (d) none

8. _____ is a soil conservation practice.

   (a) planting of trees (b) grazing (c) erosion (d) None of these

9. _____ is alternative use of insecticide which is environmentally safe..

   (a) rodenticide (b) biocide (c) pesticide (d) none

10. The World Food Conference was held in the year_____.

    (a)1986 (b) 1976 (c) 1990 (d)2000

Q.2 **Answer any ten** 20

1 Give a note on geothermal energy.

2 Write a short note on pros and cons of nuclear power.

3 Write down the renewable natural resources.

4 Define soil erosion.
5 Which are the causes of desertification?
6 Write a note on Manganese.
7 Discuss physical properties of water.
8 Write down uses of Dams.
9 Define drip irrigation.
10 Enlist three methods of water conservation.
11 Explain various aquatic food resources..
12 Explain the uses of biocides.

Q.3 (a) Give a classification of Natural Resources **[06]**
(b) Write about conservation of Natural Resources. **[04]**

OR

**Q.3.** Write Short notes :
(a)Hydropower **[06]**
(b)Tidal energy **[04]**

**Q.4.** (a) Write about the causes and agents of soil erosion. **[06]**
(b)Explain the land management practices. **[04]**

OR

**Q.4.** Write Short notes:
(a) Iron ore **[06]**
(b) Zinc **[04]**

**Q.5.** (a) Write about benefits and problems of dams. **[05]**
(b) Explain chemical properties of water. **[05]**

OR

**Q.5.** (a) Write a short note on sources of water **[05]**
(b) Write in detail about drip irrigation. **[05]**
**Q.6.** Give a detailed account on World Food Problem. **[10]**

OR

**Q.6.** Write all the plant and animal food resources. **[10]**

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SEAT No._____ No. of Printed Pages : 02

[27]

**SARDAR PATEL UNIVERSITY**

**T.Y.B.Sc.(FIFTH SEMESTER) EXAMINATION**

**2017**

**Friday, 17th November**

**10.00 am to 1.00 pm**

**US05CENV06 Population Dynamics and Biostatistics**

**Total Marks -70**

**Q.1. Select the correct answer and write it in the answer sheet** **(10)**

1. Demographic transition is an important factor in _____ growth
(a) Industrial (b) Commercial (c) Population (d) Economic

2. Ethics is derived from Greek word _____
(a) Ethos (b) Etuis (c) Evokes (d) Educes

3. Kidneys are mainly affected by _____ agents
(a) Hepatotoxic (b) Nephrotoxic (c) Neurotoxic (d) Cytotoxic

4.Hyperkeratosis is a pathological effect of _____ heavy metal
(a) Barium (b) Copper (c) Lead (d) Arsenic

5. Firstly, *Vibrio cholerae* was isolated by _____
(a) RPMT (b) GeorgesI. (c) I. Widal (d) Robert Koch

6.Earth provides _____ hector bio-productive space per world inhabitant
(a) 4.3 (b) 1.2 (c) 1.9 (d) 5.5

7. Every gallon of gasoline burned puts an average of _____ pounds $CO_2$in atmosphere
(a) 26 (b) 36 (c) 46 (d) 56

8.Frequency distribution table can be compared with _____ standard distributions
(a) Normal (b) Binominal (c) Both of above (d) None of above

9. Map diagram shows _____ distribution of various frequencies
(a) Geographical (b)Comparative (c) Imaginary (d)Tabular

10. Quota sampling has mainly _____ types
(a) two (b) three (c) four (d) five

(P.T.O.)

**Q.2. Answer the following in brief (Any Ten)** **(20)**

1. What is the need of Environmental Ethics? Explain.
2. Give abrief account on environmental issue: "Diminishing of biological capital"
3. Discuss short term factors which affect the population
4. Write short note on effects of Mercury on public health
5. Give a note on Polio disease
6. Define the terms: (i) Health (ii) Disease
7. Discuss sustainable ways to control air pollution
8. Write a note on biophysical measurements for sustainable development
9. Give a brief account on conservation of energy in home and yard sustainably
10. Write in short about arithmetic mean
11. Discuss cluster sampling
12. What is sample and sampling?

**Q.3 (a)** Write in brief about exponential growth of population study **(05)**

**(b)** Discuss: Howguiding principles helps to follow environmental ethics? **(05)**

**OR**

**Q.3 (a)** Give a note on basic directives of environmental ethics **(05)**

**(b)** Writea note onLogistic growth curve for population studies **(05)**

**Q.4 (a)** Discuss effects of severe environment **(05)**

**(b)** Give a note on HIV with appropriate diagram **(05)**

**OR**

**Q.4 (a)** Write a note on types of stress **(05)**

**(b)** Discuss the effects of disease causing pathogens in water **(05)**

**Q.5 (a)** Discuss imperative for sustainable development **(06)**

**(b)** How can one have improvement of vehicle fuel efficiency sustainably? **(04)**

**OR**

**Q.5 (a)** Write a note on control of noise pollution **(06)**

**(b)** Give a brief note on environmental degradation and conservation issues **(04)**

**Q.6** Give a detailed note on methods to present statistical data **(10)**

**OR**

**Q.6** Calculate mean, median, mode and standard deviation of given data **(10)**

| Class | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|---|---|---|---|---|---|---|---|---|
| Frequenc | 32 | 29 | 21 | 23 | 46 | 10 | 35 | 41 |

—X—

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Seat No.:_____ No. of Printed Pages: 2

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# SARDAR PATEL UNIVERSITY

## B. Sc. (Genetics) – Fifth Semester Examination (CBCS)

## Tuesday, 7th November 2017

## 10:00 a.m. to 1:00 p.m.

## US05CGEN01: Instrumental Methods of Analysis

**Total Marks: 70**

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

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**Q. 1 Choose the most appropriate answer from the four alternatives given: [10]**

i. **Amplitude is responsible for _____of light.**
(a) Colour (b) Intensity (c) Power (d) Bending

ii. **_____is a most expensive component of light microscope responsible for production of the magnified images.**
(a) Condenser lens (b) Objective lens (c) Diaphragm (d) Eye piece

iii. **Live and unstained specimens can be observed best by using_____.**
(a) Fluorescence Microscope (b) Transmission Electron Microscope
(c) Scanning Electron Microscope (d) Phase Contrast Microscope

iv. **The unit for sedimentation is_____.**
(a) Poise (b) Swedburg (c) RPM (d) RCF

v. **_____is obtained by multiplying centrifugal field with gravitational factor.**
(a) RPM (b) Sedimentation coefficient (c) RCF (d) Sedimentation velocity

vi. **Source fo U.V radiation in spectrophotometer is_____.**
(a) Sunlight (b) Prism (c) Hydrogen lamp (d) Tungsten filament

vii. **In High performance liquid chromatography, guard column is inserted between injector and _____.**
(a) Pump (b) Analytical column (c) Recorder (d) Detector

viii. **Size exclusion chromatography is also known as_____.**
(a) Liquid-solid chromatography (b) Ion exchange chromatography
(c) Gel permeation chromatography (d) Liquid-liquid chromatography

ix. **Fractionation of the larger DNA fragments and whole chromosome is done by____.**
(a) IEF (b) Cellulose acetate electrophoresis (c) PFGE (d) Agarose gel

x. **Which of the following is amost commonly used stain for protein?**
(a) Silver nitrate (b) CBB (c) Ehidium bromide (d) BPB

**P.T.O.**



(1)

**Q.2 Answer any TEN from the following:** **[20]**

i. Define the terms wave length and frequency.

ii. Enlist steps for tissue processing in electron microscope.

iii. Write applications of fluorescence microscope.

iv. State Beer- Lambert's law.

v. Write applications of colorimeters.

vi. Differentiate between rate zonal and isopycnic centrifugation.

vii. Define the term partition coefficient.

viii. Enlist different types of column matrix materials.

ix. Write principle of chromatography.

x. What is contour – clamped homogeneous electric field?

xi. Enlist applications of PFGE.

xii. "Electrophoresis is a half electrolytic process" Justify.

**Q.3** (a) Explain principle and working of phase contrast microscope. **[6]**

(b) Briefly explain magnification and resolution in terms of microscope. **[4]**

**OR**

**Q.3** (a) Write short notes on: (i) Polarization (ii) Refraction **[6]**

(b) Differentiate between SEM and TEM. **[4]**

**Q.4** (a) Write a note on electromagnetic radiations. **[4]**

(b) Discuss types of rotors. **[6]**

**OR**

**Q.4** (a) Write a note on Density gradient centrifugation. **[4]**

(b) Differentiate between visible and UV spectrophotometer. **[6]**

**Q.5** (a) Write a note on Thin layer chromatography. **[6]**

(b) Explain applications of gas liquid chromatography. **[4]**

**OR**

**Q.5** (a) Differentiate between anionic and cationic exchangers. **[4]**

(b) Describe affinity chromatography. **[6]**

**Q.6** Explain SDS poly acrylamide gel electrophoresis in detail. **[10]**

**OR**

**Q.6** Explain agarose electrophoresis and isoelectric focusing. **[10]**

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SEAT No._____

No. of Printed Pages: 2

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# SARDAR PATEL UNIVERSITY

## B.Sc. (Genetics) – Fifth Semester Examination (CBCS)

## Thursday, 09th November 2017

## 10:00 a.m. to 1:00 p.m.

## US05CGEN02: Molecular and Microbial Genetics

**Total Marks: 70**

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

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Q. 1 **Choose the most appropriate answer from the four alternatives given:** **[10]**

i. **The first successful transformation of rDNA molecule into a bacterium was carried out by.....**

(a) Nathan, Arber and Smith (b) Boyer and Cohen

(c) Watson, Crick and Wilkins (d) None of them

ii. **The most popular and widely used engineered plasmid vector is ..... .**

(a) pBR 322 (b) pUC vector (c) pSC 101 (d) pUC 19

iii. **Following is not an example of plasmid**

(a) F factor (b) R factor (c) Col factor (d) None of them

iv. **Retrotransposons differ from DNA transposons in–**

(a) The ability to transpose (b) Having no RNA intermediate
(c) Having an RNA intermediate (d)Inability to show transposition

v. **A recent *Drosophila* transposable element is represented by:**

(a) LINES & SINES (b) Transposons (c) P elements (d) Crossover suppressors

vi. **What is the source of the repair template during excision repair?**

(a) There is none, since repair is by direct reversal
(b) There is none, since repair is bypassed.
(c) The strand complementary to the damaged DNA.
(d) The homologue of the damaged DNA.

vii. **In eukaryotes, the vast majority of DNA synthesis occurs during ..... of the cell cycle**

(a) G1 phase (b) G2 phase (c) S phase (d) None of them

viii. **Reassociation kinetics of the genome depends on.....**

(a) Genome Size (b) Types of nucleotide in genome
(c) Types of sequence in genome (d) All the above

ix. **What is the role of eukaryotic RNA polymerase I?**

(a) Transcription of mRNA only

(b) Transcription of mRNA, rRNA and tRNA.

(c) Transcription of 'small' RNAs including tRNAs, 5S RNAs and snRNAs.

(d) Transcription of the major rRNA transcript.

x. **Essential components of eukaryotic cistron are.....**

(a) Intron (b) Exons (c) Operons (d) Operator and regulator gene

P.T.O.

**Q.2** **Answer any TEN from the following:** **[20]**

i. What do you mean by competence factor?

ii. Describe function of F plasmid in conjugation.

iii. What is template phage?

iv. What do you mean by site specific recombination?

v. What is transposable element?

vi. Write a short note on Yeast "Ty" element.

vii. What do you mean by $C_0t$ analysis?

viii. When DNA is replicated in eukaryotes?

ix. What is C-value of a genome?

x. What is transcription unit? Is it the same thing as a gene?

xi. Describe any two post translational modifications.

xii. What do you mean by splicing of tRNA?

**Q.3 (a)** What do mean by conjugation? Write a detail note on F factor and u-tube experiment. **[06]**

**(b)** Discuss in detail about plasmid and it's any two types. **[04]**

**OR**

**Q.3 (a)** Give an account on specialized transduction in bacterial cells. **[06]**

**(b)** Write the brief note on life cycle of virus. **[04]**

**Q.4** Write a detail note on models of DNA recombination studied by you. **[10]**

**OR**

**Q.4** Discuss in detail about of mismatch repair mechanism for DNA and site specific recombination. **[10]**

**Q.5** Explain in detail about DNA reassociation kinetics (Cot curve analysis). **[10]**

**OR**

**Q.5** Write a detail note on organization of chloroplast genome. **[10]**

**Q.6 (a)** Explain in detail about posttranscriptional modification of rRNA in eukaryotes. **[05]**

**(b)** Discuss the initiation factors with its function for Eukaryotic translation. **[05]**

**OR**

**(a)** Give an account on initiation of transcription of mRNA in eukaryotes. **[06]**

**(b)** Write a note phosphorylation of amino acid for posttranslational modification. **[04]**

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**SARDAR PATEL UNIVERSITY**
**5th Semester B.Sc Examination**
**Saturday, 11th November 2017**
**10:00 a.m. to 01:00 p.m.**
**Subject: Genetics**
**Paper Code: US05CGEN03**
**(Introduction to Genetic Engineering)**

Note: i) Attempt all questions. **Total Marks: 70**
ii) Marks are indicated on the right hand side.

**Q.1 Answer the following Multiple Choice Questions. All are compulsory** **1X10=10**

1. **The DNA Polymerase enzyme is also known as:**
A) DNA directed DNA polymerase B) RNA directed RNA polymerase
C) RNA directed DNA polymerase D) DNA directed RNA polymerase
2. **Which of these chemical is used for long term storage of DNA?**
A) 70% Ethanol B) Iso amyl alcohol C) Tris-EDTA D) CTAB
3. **Which of the following bonds are joined by DNA Ligase:**
A) Hydrogen bonds B) Glycosidic bonds
C) Covalent bonds D) Phosphodiester bonds
4. **The size of the bacteriophage λ genome is:**
A) 37 KB B) 52KB C) 49 KB D) 200KB
5. **Which is the most characteristic feature of a shuttle vector:**
A) It can replicate in single host B) It can replicate in unique host
C) It can replicate in different host D) None of the above
6. **Transfer of T-DNA from Ti plasmid into plant cell is mediated by**
A) mob gene B) vir gene C) nif gene D) octopine gene
7. **RNA in a DNA-RNA hybrid is digested by**
A) S1 nuclease B) RNase A C) RNase H D) RNase T1
8. **Transfer of DNA from agarose gel to nylon membrane is :**
A) Southern blotting B) Western blotting C) Northern blotting D) All of the above
9. **Hairpin loop formation is a feature in:**
A) Genomic library B) cDNA Library C) colony hybridization D) Autoradiography
10. **"GI" stands for:**
A) Gene Indexing B) Geographical Indication C) Genetic Identity D) Genomic Identity

**Q.2 Attempt *Any ten* of the following** **2X10=20**

1. Mention various properties of DNA ligase.
2. Enumerate precaution to be taken during DNA isolation.
3. Define STAR activity and Restriction site.
4. What are the main features of Ti plasmid?
5. Define vectors. Mention various phage based vectors.
6. Briefly mention advantages of pUC over PBR322
7. Enumerate at least four transformation methods.
8. Mention various features of Cartagena protocol?
9. Mention applications of GMO in agriculture.
10. What is probe? Enumerate various kinds of probes used frequently.
11. What are the advantages of cDNA library.
12. Define Genomic library and mention its applications **P.T.O**

| | | |
|---|---|---|
| Q.3 A | Explain Plasmid DNA isolation in detail with the rationale of chemicals used. | 10 |
| | **OR** | |
| Q.3 A | Give a comparative account of all three classes of Restriction Endonucleases. | 05 |
| B | Mention various applications of Polynucleotide Kinase and DNA polymerase. | 05 |
| Q.4 A | Write a short note on pTi as vector and its significance. | 05 |
| B | What are the desirable features of vectors to be used in genetic engineering? | 05 |
| | **OR** | |
| Q.4 A | Explain with diagram λ replacement vector. | 05 |
| B | Explain with diagram yeast plasmid based vectors in brief. | 05 |
| Q.5 A | Write a note on Biosafety regulation for GMO | 05 |
| B | What are the applications of gene cloning? | 05 |
| | **OR** | |
| Q.5 A | Write a note on Transformation methods. | 05 |
| B | Explain any two methods of recombinant selection. | 05 |
| Q.6 A | Give a comparative account of c- DNA library and Gene library. | 05 |
| B | Briefly explain biotin mediated probing method. | 05 |
| | **OR** | |
| Q.6 | Mention various blotting techniques with relevant diagrams. | 10 |

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[40] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY EXAMINATION

TYBSc Fifth Semester, 13th November, 2017, Monday

Subject : Genetics; Course: US05CGEN04; Paper---Plant Biotechnology

Time: 10.00am to 1.00pm Total marks70

Q1 MULTIPLE CHOICE QUESTIONS. Attempt all questions each carry one mark. [10]

**i. In plant tissue culture, roots and shoots induction can accomplished by:**

(A) using tissue of a certain minimum size
(B) using a particular auxin-cytokinin ratio
(C) using a specific concentration of sucrose in culture medium
(D) manipulating physical factors such as light, pH and temperature.

**ii. Cellular totipotency is demonstrated by--------**

(A) only carrot cells (B) all plants cells
(C) all eukaryotic cells (D) only bacterial cell

**iii. Protoplast isolation by enzymatic digestion of cell wall was given by**

[A] Murashige [C] Cocking
[B] Miller [D] Haberlandt

**iv. protoplast fusions can be achieved by**

(A) Ficoll (B) Polyethylene glycol
(C) High voltage X-rays (D) Surface protein of Hepatitis B virus

**v. Greatest benefit of shoot tip/meristem culture is----------**

(A) Development of somaclonal variations
(B) Development of transgenic plants
(C) Production of virus free plants
(D) All the above

**vi. Glutamine Synthase is competitively inhibited by**

(A) glufosinate (B) ammonia
(C) glyphosate (D). phosphoenolpyruvate

**vii. Explant is disinfected through**

(A) Autoclaving (B) UV-irradiations (C) Surface sterilization (D) Dry heat

**viii. Biolistic technique is used in----------**

(A). Tissue culture process (B). Gene transfer process
(C). Hybridization process (D). Germplasm conservation process

**ix. Which of the following cannot be used as a vector?**

**(A)** Phage **(B)** Plasmid **(C)** Bacterium **(D)** All can be used as vectors

**x. Function of Vir A in Ti plasmid is to---------**

**A** activate Vir G for transcription
**B** transfer T-DNA to plant cell
**C** recognizes and nicks at T-DNA border sequence
**D** protects T DNA from nucleases of

Q2. **Short questions. Attempt any TEN each carry Two marks.** [20]

a. Define open culture and closed culture.
b. Enlist the composition of MS medium
c. Define cybrid and somatic hybrid.
d. Enlist the applications of plant tissue culture technique.
e. Explain the term selectable markers.
f. Expand the abbreviations—IAA,CAT,GUS,PAT
g. Explain microinjection technique.
h. Describe the meaning and significance of edible vaccine.
i. What do you mean by the term 'flavr savr' tomato?
j. Differentiate between the T--DNA of Ti and Ri plasmid.
k. Enlist all the methods of gene transfer in plants.
l. Define cytoplasmic male sterility?

Q3a Define callus. Explain suspension culture in detail. [07]
Q3b Explain what is laminar air flow? [03]

OR

Q3a Define sterilization. Explain in detail the different ways of using heat for sterilization? [07]
Q3b. Explain the protocol for artificial seed preparation. [03]

Q4. Define androgenic haploids. Discuss in detail the methods of getting haploid through pollen culture. [10]

OR

Q4a. How would you screen somatic hybrids explain any two methods. [07]
Q4b. How nurse culture helps in raising haploids? [03]

Q5a. Explain in detail how Ti plasmid transfers its T-DNA to a plant. [07]
Q5b. Discuss the use of liposome in gene transfer. [03]

OR

Q5 Give a detailed account on markers used in plant transformation. [10]

Q6a. Explain various approaches used to make herbicide resistant plants [07]
Q6b. Define edible vaccine and give its significance. [03]

OR

Q6a. Explain the importance and making of 'Golden Rice'. [07]
Q6b. Write a short note on barnase/barstar system. [03]

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SEAT No._____

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No. of Printed Pages: 2

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# SARDAR PATEL UNIVERSITY

## B.Sc. (Genetics) – Fifth Semester Examination (CBCS)

## Wednesday, 15th November 2017

## 10:00 a.m. to 01:00 p.m.

## US05CGEN05: Immunogenetics

**Total Marks: 70**

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

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Q. 1 **Choose the most appropriate answer from the four alternatives given:** **[10]**

i. **The most abundant immunoglobulin in human body is.....**
(a) IgG (b) IgA (c) IgM (d) IgE

ii. **The following methods of diagnosis utilize labeled antibodies except?**
(a) Enzyme Linked immunosorbent Assay
(b) Agglutination inhibition test
(c) Radio immunoassay
(d) Immunofluorescence

iii. **Lysis of foreign cell is mediated through .....**
(a) Ig D and Ig E (b) Ig M and Ig G (c) Ig M only (d) Ig A only

iv. **Hybridoma is biotechnique which involves fusion of.....**
(a) B cell with T –cell (b) T-cell with spleen cell
(c) Spleen cell with myeloma cell (d) Myeloma cell with B-cell

v. **The MHC antigens serve as essential elements in the regulation of.....**
(a) Cell-cell interactions (b) Tissue –cell interactions
(c) Organ –cell interactions (d) None of these

vi. **The T cell receptor are .....**
(a) Secretary (b) Membrane bound (c) Both (a) and (b) (d) None of above

vii. **MHC class I is a cell surface molecules present on.....**
(a) B cell (b) All nucleated cell (c) APCs (d) T cell

viii. **An excess of antibody inhibits precipitation and agglutination reaction is called.....**
(a) Prozone effect (b) Polyvalent Ab (c) Both a and b (d) None of above

ix. **Which category of hypersensitivities is IgE-mediated?**
(a)Type I (b) Type II (c) Type III (d) Type IV

x. **Which group of the following could be called immune disorder?**
(a) SCID and diphtheria (b) AIDS and cholera (c) SCID and AIDS (d) None of them

P.T.O.

**Q.2** **Answer any TEN from the following:** **[20]**

i. Differentiate between antigen and immunogen.

ii. What do you mean by epitopes?

iii. Write characteristics of antigen-antibody reactions.

iv. Write a short note on BCR.

v. What do you mean by monoclonal antibody?

vi. Write a short note on clonal- selection theory.

vii. Write a short note on inflammation and its signs.

viii. Give different strategies for Immunosuppression.

ix. What is MHC?

x. Write a short note on hypersensitivity.

xi. Define non-ediable vaccine.

xii. What do you mean by immunodeficiencies?

**Q.3** **(a)** Discuss in detail about molecular structure of antibodies. **[06]**

**(b)** Give a detail account on radioimmunoassay techniques. **[04]**

**OR**

**Q.3** **(a)** Write a detail note on Immunoglobulin structure and its classes. **[06]**

**(b)** Give an account on Immunofluorescence. **[04]**

**Q.4** Give an overview of genetics basis of antibiotic diversity. **[10]**

**OR**

**Q.4** Give an account on rearrangement of immunoglobins genes. **[10]**

**Q.5** Explain in detail activation of complement system with classical and alternative pathways. **[10]**

**OR**

**Q.5** Give structure and types of MHC. Write a note on structure and functions of MHC class I and Class II. **[10]**

**Q.6** What do you mean by autoimmunity? Discuss in detail about mechanism of generation of autoimmune disorders. **[10]**

**OR**

**Q.6** **(a)** Give a detail account on AIDS. **[06]**

**(b)** Write a note on types of vaccines. **[04]**

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# Sardar Patel University

## Ty. B.Sc. Fifth Semester Examination-2017

## Subject-Genetics

## Course-US05CGEN06 - Human Genetics

**Time :10.00am to1.00pm Date: 17 /11/2017**

**Total Marks-70**

**Q.1 Multiple Choice Questions (one mark each) Attempt all** 10M

1 Gene for beta chain of the hemoglobin molecule, located on _____ chromosome

a) 29 (b) 13 (c) 11 (d) 24

2 LINEs , SINEs, and LTR elements are example of
a) Retrotransposons (b) transposable elements
(c) RNA transposons (d) All of above

3 Mode of inheritance for Tay Sach's Syndrome----
(a)Autosomal recessive (b) Autosomal dominant
(c) Sex linked (d) None of the above

4 Triple marker test do not have following

a) AFP b) uE3 c) Inhibin A d) none of above

5 Data of recombinants is required for_____ mapping

a)Physical b) Genetic c) (c)Both a and b (d) none of above

6 Guthrie Bacterial inhibition assay is used to diagnose

a)Thalassemia b)PKU c) Sickle cell anemia d) None of above

7 Plaques and tangles are characteristics of

a)Parkinson's b) Alzheimer's c) Down syndrome d) All of above

8 Hemophilia is caused due to deficiency of

a)Beta chains b) Alpha chains c) Both A and B d)Factor VIII

9 Chorionic villus sampling and amniocentesis are examples of------- technique

a)Invasive b) non invasive c) Prenatal d) All of above

10 Human genome project was completed in

a)2001 b) 2003 c) 2004 d) Not competed till date

**Q.2 Short questions : attempt any ten** 20 M

1 Give history and scope of human genetics

2 What are gene families?

3 What are microsatellite?

4 Write about restriction maps.

5 Give differences between physical map and genetic map.

(P. T. O.)

6 Give importance of mapping of human genome .

7 What is Marfan syndrome?

8 Give an account of galactosemia .

9 Write brief about PKU.

10 What are types of tests used for genetic screening?

11 What is ferric chloride test?

12 Give importance of prenatal screening.

Q.3 Write an elaborative note on HGP 10M

**OR**

Q.3 Write an elaborative note on organization and characteristics of human genome. 10M

Q.4 a. Write an elaborative note on genetic mapping of human genome. 6M

b. Write a note on BAC libraries 4M

**OR**

Q.4 a. Give an account of physical mapping 6M

b. Write a note on chromosomal walking 4M

Q.5 a. Write a note on diabetes mellitus 5M

b. Write a note on Alzheimer's disease 5M

**OR**

Q.5 a. Write a note on Parkinson's disease 5 M

b. Write a note on obesity 5 M

Q.6 a. Give commonly used blood and urine test used for screening of genetic disorders 5M

b. Write short note on QUAD test 5M

**OR**

Q.6 a. Write the context of genetic testing. 5M

b. Write short note on SAGE 5M

—— X ——

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(40 & A-18) SEAT No._____ No. of Printed Pages : 3

# Sardar Patel University

**B. Sc. (Semester – V) Examination**

Date: 07-11-2017, Tuesday Time: 10:00pm to 01:00pm

Industrial Chemistry

**COURSE NO: US05CICH01 (Organic Chemistry - II)**

Notes: Figures to the right indicate full marks. Total marks: 70

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Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. Pyridine undergoes nucleophilic substitution with $NaNH_2$ at 100°C to form
   A. 2-Aminopyridine C. 4-Aminopyridine
   B. 3-Aminopyridine D. None of these
2. Which of the following reagents will react with pyrrole to form 2-formylpyrrole
   A. HCOOH C. $H_2O_2$
   B. $CHCl_3$/KOH D. $(CH_3CO)_2O/SnCl_4$
3. Furan reacts with ammonia in the presence of alumina at 400°C to give
   A. Pyridine C. Pyrrole
   B. Furfural D. Furoic acid
4. Naphthalene undergoes nitration with $HNO_3/H_2SO_4$ at 60°C to give mainly
   A. 1-Nitronaphthalene C. 2-Nitronaphthalene
   B. 1,2-Dinitronaphthalene D. 1,5-Dinitronaphthalene
5. All carbon atoms in Anthracene are...
   A. sp hybridized C. $sp^3$ hybridized
   B. $sp^2$ hybridized D. None of these
6. Sodium borohydride is an important ____ reagent.
   A. Bromination C. Reducing
   B. Oxidizing D. Methylating
7. Aldehyde having ____ undergo Aldol condensation
   A. ά- hydrogen C. γ – hydrogen
   B. β – hydrogen D. δ – hydrogen
8. _____ compounds doesn't undergo Aldol condensation reaction.
   A. $CH_3CHO$ C. $CH_3CH_2CHO$
   B. HCHO D. $CH_3CH_2CH_2CHO$
9. Signal pattern of the $CH_3$ protons in the NMR spectra of the $CH_3CH_2Br_2$ and $CH_3COOH$ is____.
   A. Triplet & Singlet C. Triplet & Doublet
   B. Doublet & Singlet D. None of them
10. Number of signals (ignoring the splitting patterns) would you see in the NMR spectra of the *p*-xylene and 2-Propanol is_____.
    A. Two & Three C. Three & Four
    B. Three & Two D. None of them

(P.T.O)

Q.2 Answer the following short questions **(Any Ten)** (20)

1. Give synthesis of Pyrrole.
2. Outline the rules for naming mono & di heterocyclic compound.
3. Write order of relative basicity of $RCH_2NH_2$ and $RC{\equiv}N$.
4. Write a synthesis of β-Naphthol.
5. Give resonating structures of Antharcene.
6. Write a reaction of Naphthalene with conc. sulphuric acid at 165°C?
7. Give synthesis of Aluminum isopropoxide.
8. Write preparation and properties of Osmium tetraoxide.
9. Define a term rearrangement.
10. Write information obtained from $H^1$NMR-spectroscopy.
11. The NMR spectrum of compound $C_2H_6O$, shows one signal only, a singlet. Deduce the structure of it.
12. Giving a formula for calculation of DBE, calculated a value for MF $C_7H_4N_2$

Q.3 Write notes on following: (10)

A. Properties of Pyridine and its constitution.
B. Electrophilic substitution in Thiophene.

OR

Q.3 Discuss the following. (10)

A. Structure of Pyrrole.
B. Nucleophilic substitution in Pyridine.

Q.4 Write notes on following: (10)

A. Electrophilic substitution reaction in Napthalene.
B. Synthesis of Phenanthrene.

OR

Q.4 Discuss the structure of Anthracene with justification of their reactions also write synthesis of it. (10)

Q.5 Write preparation, properties and uses of following reagents. (10)

A. Aluminum isopropoxide
B. $SeO_2$.

OR

Q.5 Write notes on Pinacol–Pinacolone and Benzilic Acid Rearrangement. (10)

Q.6 From the following sets of N.M.R., IR and UV data, give a structure consistent with each of the following: (10)

1. Molecular weight: 56gm/mol; %age: C=85.7%, H=14.3%; UV: λmax: 210nm; NMR: δ 1.6 (doublet 30.0sq) δ 5.6 (quatrate 10.0sq).
2. Molecular weight: 130gm/mol; %age: C=73.84%, H=13.84% and O=12.34%; UV: λmax: 200nm; NMR: δ 1.1 (singlet for all protons).

OR

Q.6. Write the principle of IR spectroscopy and discuss the applications of IR-Spectroscopy. (10)

****

## Characteristic Infrared Absorption Frequencies.

| Bond | Compound type | Frequency range $cm^{-1}$ |
|---|---|---|
| C-H | Alkanes. | 2850-2960, 1350-1470. |
| C-H | Alkenes. | 3020-3080 (*m*), 675-1000. |
| C-H | Aromatic rings. | 3000-3100 (*m*), 675-870. |
| C-H | Alkynes. | 3300 |
| C=C | Alkenes. | 1640-1680 (*v*) |
| C≡C | Alkynes. | 2100-2260 (*v*) |
| C=C | Aromatic rings. | 1500, 1600 (*v*) |
| C-O | Alcohols, Ethers, Carboxylic acids, Esters. | 1080-1300 |
| C=O | Aldehyde, Ketones, Carboxylic acids, Esters. | 1690-1760 |
| O-H | Monomeric alcohols, Phenols | 3610-3640 (*v*) |
| | Hydrogen bonded alcohols, Phenols. | 3200-3600 (*broad*) |
| | Carboxylic acids. | 2500-3000 (*broad*) |
| N-H | Amines. | 3300-3500 (*m*) |
| C-N | Amines. | 1180-1360. |
| C≡N | Nitriles. | 2210-2260 (*v*) |
| $-NO_2$ | Nitro compounds | 1515-1560, 1345-1385 |

| Double Bonds | |
|---|---|
| Structure unit | Frequency $cm^{-1}$ |
| C=C | 1620-1680 |
| C=O | |
| Aldehydes and ketones | 1710-1750 |
| Carboxylic acids | 1700-1725 |
| Acid anhydrides | 1800-1850 & 1740-1790 |
| Acyl halides | 1770-1815 |
| Esters | 1730-1750 |
| Amides | 1680-1700 |
| Substituted derivatives of Benzene | |
| Mono substituted | 730-770 & 690-710 |
| Ortho-disubstituted | 735-770 |
| Meta-disubstituted | 750-810 & 680-730 |
| Para-disubstituted | 790-840 |

## Characteristic Proton Chemical Shift

| Type of Proton | | Chemical shift δ, ppm | Type of Proton | | Chemical shift δ, ppm |
|---|---|---|---|---|---|
| Cyclopropane | | 0.2 | Alcohols | H-C-OH | 3.4 – 4 |
| Primary | $R-CH_3$ | 0.9 -1.8 | Ethers | H-C-OR | 3.3 – 4 |
| Secondary | $R_2CH_2$ | 1.3 | Esters | RCOO-C-H | 3.7 – 4.1 |
| Tertiary | $R_3CH$ | 1.5 | Esters | H-C-COOR | 2 – 2.2 |
| Vinylic | C=C-H | 4.6 -5.9 | Acids | H-C-COOH | 2 – 2.6 |
| Acetylenic | C≡C-H | 2 - 3 | Carbonyl compounds | H-C-C=O | 2 – 2.7 |
| Aromatic | Ar-H | 6 - 8.5 | Aldehydic | RCH=O | 9 – 10 |
| Benzylic | Ar-C-H | 2.2 - 3 | Hydroxylic | RO-H | 1 – 5.5 |
| Allylic | C=C-C-H | 1.7 | Phenolic | ArO-H | 4 – 12 |
| Fluorides | H-C-F | 4 - 4.5 | Enolic | C=C-O-H | 15 – 17 |
| Chlorides | H-C-Cl | 3 - 4 | Carboxylic | RCOO-H | 10.5 – 12 |
| Bromides | H-C-Br | 2.5 - 4 | Amino | $R-NH_2$ | 1 – 5 |
| Iodides | H-C-I | 2 – 4 | | | |

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(50 & A-21) SEAT No._____ **No. of Printed Pages : 2**

# Sardar Patel University

B. Sc. (Semester – V) Examination

Date: 09-11-2017, Thursday Time: 10:00am to 01:00pm

Industrial Chemistry

## US05CICH02 (Unit Process In Organic Manufacture)

Notes: Figures to the right indicate full marks. Total marks: 70

Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. A vortex type of agitation is done in
   A. Biazzi nitration
   B. Schimidnitration
   C. Both of them
   D. None of them
2. Amines can be produced by reduction of……
   A. Nitro group
   B. Nitroso group
   C. Azo group
   D. All of them
3. Which of the following is reducing agent?
   A. Fe + Acid
   B. Alkaline H2O2
   C. Caro's Acid
   D. $KMNO_4$
4. The usual form of oxidation with dichromate is in the presence of…
   A. Sulfuric acid
   B. Acetic acid
   C. Hydrochoric acid
   D. All of these
5. Manufacturing of acetic acid is an example of…
   A. Liquid phase oxidation with O2
   B. Gas phase oxidation with H2O2
   C. Both of these
   D. None of them.
6. In BHC ( Benzene Hexachloride) , Which isomer is Insectically active ?
   A. Alpha-Isomer
   B. Delta-isomer
   C. Gamma-Isomer
   D. Beta-Isomer
7. In chlorobenzene manufacturing process,_____type of reactor is used.
   A. Lead or Glass lined
   B. Polymer lined
   C. S.S lined
   D. All of these
8. Aromatic diazo compounds react with hydrogen fluoride and boron trifloride to form
   A. Aromatic fluorides
   B. Aliphatic fluorides
   C. Heterocyclic fluorides
   D. None of these
9. The temperature of esterifying column in Ethyl acetate manufacturing is…
   A. 80 $^0$C
   B. 8 $^0$C
   C. 180 $^0$C
   D. 280 $^0$C
10. $KCN + H2O \longrightarrow HCN + KOH$, is_____ reaction.
    A. Hydrolysis
    B. Hydrogenation
    C. Esterification
    D. None of these.

(P.T.O.)

Q.2 Answer the following short questions. (ANY TEN) (20)

1. Define term partial reduction.
2. List different factors affecting the Bechamp Reduction.
3. Give suitable example for "Ammonolysis".
4. Define the terms Sulfonation.
5. State the principal Sulfonating agents.
6. Enlist the various peroxide used as an oxidizing agents.
7. Define term Hydrogenation.
8. Enlist the catalyst used for Hydrogenation reaction.
9. Write reactions for Chlorination by substitution reactions.
10. Define term Esterification giving suitable examples.
11. Define term "Trans esterification".
12. Write a reaction for hydrolysis of ester.

Q.3 Write a notes on following: (10)

1. Manufacturing of Nitrobenzene by continuous process.
2. Commercial manufacture of Aniline by Bechamp reduction.

OR

Q.3 Enlist various methods of REDUCTION giving suitable examples. (10)

Q.4 Giving suitable examples, discuss different type of Oxidation reactions. (10)

OR

Q.4 Discuss the commercial manufacturing process of Benzene sulfonic acid and Benzoic acid. (10)

Q.5 Write a notes on commercial manufacturing process of Chlorobenzene. (10)

OR

Q.5 Giving definition of hydrogenation reaction explain Hydrogenation of vegetable oil. (10)

Q.6 Write a notes on manufacturing procedure of Ethyl acetate. (10)

OR

Q.6 Discuss the following: (10)

1. Mechanism of Hydrolysis reaction.
2. Esterification of Carboxy acid derivatives.

—x—

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[42/A247

SEAT No._____

No. of printed pages:02

# SARDAR PATEL UNIVERSITY

## B.Sc. – Semester-V (Industrial Chemistry) (CBCS)

## US05CICH03 Petroleum Technology

**Date: 11-11-2017, Saturday**
**Time: 10.00am to 1.00 pm**

**Total Marks: 70**

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**Q-1** **Multiple Choice Questions. Answer the questions in your answer sheet.** 10

1 Demusification process is used in crude oil for removal of _____.
a.water b. lead c.salt d. sulphur

2 Which one of the following is the cracking catalyst?
a. iron b. calcium c. alumino silicate catalyst d. nickel

3 Which of the following treatment used for removal of sulphur from fuels?
a. Sulphuric acid b. Dewaxing c. Hydrofining d. Alkali washing

4 Saybolt Viscometer is used for the determination of _____.
a. kinematic viscosity b. Aniline point c. carbon content d. Moisture content

5 Aniline Point is used for the determination of _____.
a. carbon content b. moisture content c. aromatic portion d. kinematic viscosity

6 Chloroform is manufactured from chlorination of _____.
a.$CH_4$ b.$C_2H_2$ c.$C_2H_6$ d.$C_3H_8$

7 Hydrogenation of benzoic acid used in plaldium gives the product _____.
a. Caprolactum b. Salicylic acid c. Pthlalic anhydride d. Maleic anhydride

8 _____is used in manufacture for unsaturated polyster manufacture.
a. Maleic anhydride b. HCN c. $CS_2$ d. $H_2O_2$

9 The raw materials used in manufacture of Vinyl acetate are _____.
a. Acetic acid and acetylene b. Acetic acid and ethane
c. Acetic anhydride ethanol d. Acetic anhydride and acetylene

10 Oxidation product of cumin is _____.
a. Benzoic acid b. phthalic acid c. phenol & acetone d. maleic acid

---

**Q-2** **Answer the following in short.(ANY TEN)** 20

1 Write the detail of inorganic theory of petroleum formation.

2 Explain importance of petroleum refining before separation.

3 Explain the conversion of paraffin during thermal cracking.

4 What are the different chemicals derived from $C_2$ fraction?

5 Discuss on Flash and Fire point test methods with diagram for testing petroleum products.

6 Draw diagram for manufacturing carbon disulphide. ($CS_2$).

7 Sketch the flow sheet diagram for manufacture of iso propyl benzene.

8 Write the reaction conditions for manufacture of maleic anhydride.

9 Give the important uses of Hydrogen Cyanide.

10 Discuss applications of Vinyl acetate.

11 Discuss the area where Acetaldehyde can be used.

12 Discuss the area where Ethyl alcohol can be used.

| | | |
|---|---|---|
| **Q-3** | | |
| **(a)** | Write a note on Girbitol Process. | **05** |
| **(b)** | Explain demulsification and desalting of crude oil. | **05** |
| | **OR** | |
| **Q-3** | | |
| **(a)** | Write a note on Gasoline and its additives. | **05** |
| **(b)** | Construction & working of bubble cap tray. | **05** |
| **Q-4** | | |
| **(a)** | Using flow diagram explain separation of $C_8$ aromatic fraction using fractional crystallization. | **05** |
| **(b)** | Explain the hypersorber methods of ethylene separation from cracker gas. | **05** |
| **Q-4** | **OR** | |
| **(a)** | Using azeotropic distillation, explain separation of toluene by using methanol. | **05** |
| **(b)** | Write note on sepration of butane by extractive distillation from butane from butane-butene fraction using acctone. | **05** |
| **Q-5** | | |
| **(a)** | Give manufacture of caprolactum with necessary diagrams. | **10** |
| **Q-5** | **OR** | |
| **(a)** | Discuss manufacture of isopropyl benzene. | **10** |
| **Q-6** | | |
| **(a)** | Discuss manufacture of ethylene oxide from ethylene. | **05** |
| **(b)** | Discuss manufacture of Ethyl alcohol. | **05** |
| **Q-6** | **OR** | |
| **(a)** | Explain on oxo synthesis- hydroformylation of ethylene. | **05** |
| **(b)** | Discuss the manufacture of phenol through cumene. | **05** |

**All The Best**

SC

(41 & A-12) No. of Pages 2

**SARDAR PATEL UNIVERSITY**

**B.Sc. Industrial Chemistry (5th Semester) Examination**

**BUSINESS ORGANISATION**

**Date: 13/11/2017, Monday** **Subject code: US05CICH04**

**Time: 10:00 a.m. to 01: 00 p.m.** **Total Marks: 70**

Q.1 **Select the correct option** 10

I. Formation, of which of the following form of organisation is easy?
a. Proprietorship b. JSC c. Cooperative d. Partnership

II. In which form of ownership, there is a restriction on transfer of a partner's interest?
a. Partnership b. JSC c. Government company d. None

III. The management of cooperative organisation is:
a. Oligarchic b. Democratic c. Hierarchy d. Dictatorship

IV. The nature of management in joint stock companies is _____.
a. Democratic b. Oligarchic c. Dictatorship d. None

V. Mitakshara and dayabhaga are the type of _____.
a. JS company b. JH family c. Proprietorship d. Partnership

VI. The minimum No. promoters required to form the public limited co. are
a. 10 b. 2 c. 7 d. 5

VII Henry Fayol suggested _____ as Principle of management.
a. Scalar Chain of Command b. Unity of Direction
b. Division Of Work d. All of them

VIII. Integrating people within the organisation is refered as:
a. Planning b. Directing c. Decision Making d. Organising

IX. Which of the following is a tangible property?
a. cost b. Quality c. Leadership d. Public relations

X. Panel interview is one of the following types of interview:
a. Planned b. Informal c. Formal d. Group

(P.T.O.)

| | | |
|---|---|---|
| Q.2 | **Answer the following in short (ANY TWO)** | 20 |
| I. | Define the term partner by estoppels? | |
| II. | Define cooperative society. | |
| III. | What is the ownership? Name the different forms of ownership. | |
| IV. | List the re- organisations required in expansion of partnership to JSC. | |
| V. | Name different clauses in the memorandum of association. | |
| VI. | Explain unity of command as discussed in Fayol's principles of management. | |
| VII | List the steps of management by objective. | |
| VIII. | State the principles of planning. | |
| IX. | What are the assumptions behind directing strategy? | |
| X. | Differentiate staffing from recruitment. | |
| XI. | Give the advantages and disadvantages of manpower from internal sources. | |
| XII. | What are the intangible properties? | |
| Q.3a | What are the merits and demerits of partnership organisation. | 05 |
| b. | Discuss the different type of cooperative societies. | 05 |
| | OR | |
| Q.3a | Discuss the characteristics of an ideal organization. | 05 |
| b. | Write the advantage and disadvantage of cooperative organization. | 05 |
| Q.4a | How a Joint Hindu Family does differ from Partnership organisation? Explain | 05 |
| b. | Write a brief note on Fayol's principles of management. | 05 |
| | OR | |
| Q.4a | Discuss the memorandum of association and Article of association. | 05 |
| b. | Write a note on the advantage and disadvantage of Joint Stock Company? | 05 |
| Q.5a | Discuss the principles of directing. | 05 |
| b. | Give an account of management by objectives. | 05 |
| | OR | |
| Q.5a | Discuss the merits and demerits of planning. | 05 |
| b. | Explain briefly the steps involved in decision making. | 05 |
| Q.6 | Discuss the scientific selection process of manpower. | 10 |
| | OR | |
| Q.6 | Discuss various method of establishing control standards also explain the control process. | 10 |

SC

EAT No

No. of Pages : 02

[36/A-14]

**SARDAR PATEL UNIVERSITY**
**T. Y. B.Sc. Industrial Chemistry**
**(Semester – 5th) EXAMINATION**
**15th November 2017**
**Course No. : US05CICH05**
**(Mechanical Operations.)**

**Total Marks: 70** **Time: 10.00 am to 1:00pm**

**Q.1** **Answer the given multiple choice questions.** **[10]**

1. Filter media nylon cloth is used when slurry is
   a) acidic c) neutral
   b) alkaline d) all of the above
2. The slurry is forced against basket sides due to centrifugal force in
   a)Plate filter b) Suspended batch centrifugal c) Leaf filter d) All of these
3. Filters which are operated with less than atmospheric pressure is known as_____
   a)Vaccum filter b) atmospheric filter c) absolute filter d) none of these
4. In a cyclone separator separation is based on
   a)centrifugal force b) gravitational force c) viscous force d) Inertia force
5. The separation of solids from suspension in liquid by gravity settling is called
   a) Filtration b)Sedimentation c) Mixing d)Evaporation
6. For the transportation of ultrafine particle, the equipment used is___
   a) Pneumatic Conveyor c) Apron Conveyor
   b) Screw conveyor d) Belt Conveyor.
7. Highly viscous liquids and pastes are agitated by
   a)Propeller b) Turbine agitator c) Multiple blade paddles d) None of these
8. Ultrafine grinders are commonly reduce the size of solids by
   a)compression b) Impact c) Attrition d) All of these
9. The crusher in which movable jaw is pivoted at the top is____
   a) Blake aw crusher b) Roll crusher c) Dodge jaw crusher d) Gyratory crusher.
10. To get a fine talc powder from its granules, the equipment used is
    a)Roll crusher b) Ball mill c) Jaw crusher d) Gyratory crusher

**Q.2** **Attempt any ten.** **[20]**

i. Write the difference between cake filter and clarifying filters.
ii. List any two desired characteristics of filter media.
iii. Discuss classification of filters.
iv. Explain: Terminal settling velocity and Hindered settling.
v. Explain: Diamagnetic and Paramagnetic materials.
vi. Name any two devices work on magnetic separation technique?
vii. Discuss about different types of impeller.
viii. Explain the function of idlers and tripper with belt conveyer.
ix. List different purpose of mixing.
x. Write (1) Rittinger's law (2) Kick's law
xi. What is the difference between Ball mill and Tube mill.
xii. Discuss classification of size reduction equipments.

| | | |
|---|---|---|
| Q.3 a) | Write a note on: Plate and Frame Filter press. | [5] |
| b) | Discuss about Rotary filter. | [5] |
| | **OR** | |
| Q.3 a) | With the help of diagram explain working of Leaf filter. | [5] |
| b) | Discuss Suspended Batch centrifuge. | [5] |
| Q.4 a) | Write a note on: Magnetic drum separator | [5] |
| b) | Discuss about Hydraulic Jig. | [5] |
| | **OR** | |
| Q.4 a) | Discuss working of Gravity Settling Tank. | [5] |
| b) | Explain working of Cyclone Separator. | [5] |
| Q.5 a) | Write about different equipments used for mixing viscous masses. | [10] |
| | **OR** | |
| Q.5 a) | Explain swirling and vortex .Also discuss about different preventive measures. | [5] |
| b) | Write a note on: Belt conveyor. | [5] |
| Q.6 a) | Write a note on: Jaw Crusher. | [5] |
| b) | List any five differences between open circuit grinding and closed circuit grinding. | [5] |
| | **OR** | |
| Q.6 a) | Derive an equation for angle of nip while selection of crushing rolls | [5] |
| b) | Explain working of Gyratory crusher with the help of diagram. | [5] |

— X —

SC

No. Page : 2

[29 & A-12]

**SARDAR PATEL UNIVERSITY**
**T. Y. B.Sc. Industrial Chemistry**
**(Semester – 5th) EXAMINATION**
**17th November 2017**
**Course No. : US05CICH06**
**(Fluid Mechanics and Heat Transfer)**

**Total Marks: 70** **Time: 10.00 am to 1:00pm**

**Q.1 Answer the given multiple choice questions.** **[10]**

1. *Fluid which does not offer resistance to flow is known as*
   *a) Ideal fluid.* *c) Hydroliquid*
   *b) Real fluid* *d)Non-ideal fluid.*
2. *If the density of fluid is affected appreciably with the change in temperature and pressure, the fluid is _____*
   *a)compressible b) ideal c) incompressible d) real*
3. *A fluid is a substance which is_____*
   *a)Capable to flow* *c)No definite change*
   *b)Undergoes deformation* *d) All of these*
4. *Volute converts the ..... energy of the liquid imparted by the impeller to pressure energy.*
   *a)Mechanical b) Kinetic c) Potential d)Translationl*
5. *..... is used to change the direction of flowing fluid.*
   *a)Plug b)Reducer c) elbow d) none of these.*
6. *When a wall is formed from series of layers of different materials it is called*
   *a)Hot plate b) Composite wall c) conductive mantel d) insulator mantel*
7. *The thermal conductivities of solids may ---------- with increase in temperature*
   *a) increases* *c) decreases*
   *b) Increases or decreases* *d) None of these.*
8. *The ability of a material to conduct heat is*
   *a)volatility b) thermal conductivity c) viscosity d) none of these*
9. *The well suited heat exchanger for in paraffin wax is*
   *a)Scraped surface b)Graphite c) Finned tube d) None of these*
10. *The centre to center distance between two tubes is known as*
    *a) Pitch* *c) Clearance*
    *b) Economy* *d) Efficiency*

**Q.2 Attempt any ten.** **[20]**

i. *Define : 1) Laminar flow 2)Turbulent flow*
ii. *Write briefly on Inclined Manometer.*
iii. *Explain Hydrodynamics and Aerodynamics.*
iv. *Discuss about different types of pipe fittings.*
v. *Explain: Capacity and Overall efficiency of pump.*
vi. *Explain Priming and NPSH.*
vii. *What do you mean by fouling factor?*
viii. *Explain parallel flow heat exchanger and counter flow heat exchanger ?*
ix. *Explain Natural convection and Forced Convection.*
x. *Write any two difference between single and multipass shell and tube heat exchanger.*
xi. *Explain when plate type heat exchanger is used.*
xii. *When kettle type reboiler is used?*

(P. T. O.)

| | | |
|---|---|---|
| **Q.3a)** | *Derive Bernoullie's theorem. Also write its limitations.* | **[5]** |
| **b)** | *Write a note on: U-Tube Manometer.* | **[5]** |
| | **OR** | |
| **Q.3 a)** | *Derive an equation for loss of head due to sudden enlargement.* | **[5]** |
| **b)** | *Explain Reynolds Experiment.* | **[5]** |
| **Q.4 a)** | *Discuss about different types of casing.* | **[5]** |
| **b)** | *Write a note on: Diaphragm Pump.* | **[5]** |
| | **OR** | |
| **Q.4 a)** | *Write a note on: Different types of valves.* | **[5]** |
| **b)** | *Explain working of Reciprocating Pumps.* | **[5]** |
| **Q.5 a)** | *Derive an equation for heat flow through sphere.* | **[5]** |
| **b)** | *Derive an equation for compound resistance in series.* | **[5]** |
| | **OR** | |
| **Q.5 a)** | *Derive an equation for heat flow through cylinder.* | **[5]** |
| **b)** | *Thermic fluid flowing at a rate of 5000 Kg/hr is to be cooled from $150^0$ C to $90^0$C by circulating water at a rate of 15000 Kg/hr. If the water is available at $30^0$C, find the outlet temperature of water.*<br>*Data: Specific heat of thermic fluid =0.65 Kcal/Kg $^0$C.*<br>*Specific heat of water =1.0 Kcal/Kg $^0$C.* | **[5]** |
| **Q.6 a)** | *Write notes on: a) Graphite Heat Exchanger.*<br>*b) Finned Tube Heat Exchanger.* | **[10]** |
| | **OR** | |
| **Q.6 a)** | *Discuss construction of Shell and Tube Heat Exchanger.* | **[5]** |
| **b)** | *Write classification of heat exchange equipments based on its function.* | **[5]** |

X

S.C

[41/419] SEAT No._____ No. of Printed Pages : 2

# Sardar Patel University

B. Sc. ( Semester – V ) Examination

Date: 07-11-2017, Tuesday Time: 10:00am to 01:00pm

Industrial Chemistry Vocational

## US05CICV01 (Organic Chemistry)

Notes: Figures to the right indicate full marks. Total marks: 70

Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. The decreasing order of "s" character in the three hybrid orbitals is....
   A. $Sp>sp^2>sp^3$
   B. $sp^2>sp>sp3$
   C. $sp^3> sp^2>sp$
   D. None of them.
2. The decreasing order of the –I effect (electron-withdrawing inductive effect) of certain atoms/group is...
   A. $NO_2>F>COOH>C_6H_5$
   B. $NO_2>$ $COOH>F>C_6H_5$
   C. $NO_2> C_6H_5>COOH> F$
   D. None of them.
3. Which of the following carbocation has the least stability?
   A. Methyl
   B. Ethyl
   C. Tert-butyl
   D. Isopropyl.
4. Aldehydes having ά- hydrogen on warming with mild base to give β - hydroxy aldehyde called _____ reaction.
   A. Aldol
   B. Friedel – Craft
   C. Diels – Alder
   D. Fries rearrangement
5. ..... compounds doesn't undergo Aldol condensation.
   A. HCHO
   B. $CH_3CHO$
   C. $CH_3CH_2CHO$
   D. $CH_3CH_2CH_2CHO$.
6. Lead tetra acetate is an important .....reagent.
   A. Oxidizing
   B. Acetoxylatingc.
   C. Methylating.
   D. All of these
7. Lithium Aluminium Hydride is an important ____ reagent.
   A. Reducing
   B. Oxidizing
   C. Brominating
   D. Methylating.
8. Selenium dioxide is an important ____ reagent.
   A. Oxidizing
   B. Reducing
   C. Brominating
   D. Methylating.
9. The NMR spectrum of compound (A) $C_2H_6O$, shows one signal only, a singlet. The possible structure of (A) is.....
   A. Dimethylether
   B. Methyl-ethyl ether
   C. Ethanol.
   D. None of them.
10. How many signals (ignoring the splitting patterns) would you see in the NMR spectra of the 2-Propanol...
    A. One signal.
    B. Two signals
    C. Three signals.
    D. Four signals.

Q.2 Answer the following short questions. (Any Ten) (20)

1. Which type of reagent are produce by heterolytic cleavage of bonds?
2. Define term "Nucleophiles"
3. Define term free radicals, How they are generated?
4. Write a reaction for Cross-Aldol condensation reaction.
5. Differentiate terms Reaction and Rearrangement.
6. Give preparation of N- Bromosuccinimide reagent.
7. Enlist various uses of Selenium dioxide.
8. Give preparation of Sodium Borohydride.
9. Define term elimination reaction.
10. Giving a formula for calculation of DBE; calculated a value for MF $C_8H_4N_2$
11. Calculate the molecular formula for the data "MF: 107.5gm/mol; %age: C=34.5%, H=5.6%, N=13.0%, Cl=3.0%."
12. Predict the signal pattern of the $CH_3$ protons in the NMR spectra of the $CH_3COOH$ compounds.

Q.3 What are different types of reaction intermediates formed by homolytic and heterolytic fission of a covalent bond? Explain with examples. (10)

OR

Q.3 Giving suitable examples, discuss the Elimination reaction and Addition reaction. (10)

Q.4 Write a notes on following: (10)

A. Meerwein–Ponndorf–Verley Reduction.
B. Pinacol–Pinacolone Rearrangement

OR

Q.4 Discuss the following: (10)

A. Benzilic Acid Rearrangement
B. Fries Rearrangement.

Q.5 Write properties, preparations and uses of following: (10)

A. Aluminum isopropoxide and
B. N- Bromosuccinimide

OR

Q.5 Write properties, preparations and uses of following: (10)

A. Lead tetra acetate and
B. Lithium aluminum hydride

Q.6 Write the principle of IR spectroscopy and discuss the applications of IR-Spectroscopy. (10)

OR

Q.6 Write a note on $^1$H-NMR spectroscopy. (10)

– X –

[51] SEAT No._____ No. of Printed Pages : 2.

# SARDAR PATEL UNIVERSITY

**T.Y.B.Sc. Industrial chemistry (VOC.) SEMESTER – V**
**EXAMINATION -2017**
**HEAVY AND FINE INORGANIC CHEMICALS**
**SUBJECT CODE: US05CICV02**

**DATE: 9TH November 2017** **TIME: 10:00 AM TO 1:00 PM**
**DAY: Thursday** **TOTAL MARKS: 70**

**Q. 1 Choose the correct answer.** [10]

(1) The reaction slurry is heated at _____ in ammonium phosphate manufacturing process.
(A) $120^0C$ (C) $135^0C$
(B) $140^0C$ (D) $130^0C$

(2) the yield of the phosphorous based on content of _____.
(A) Silica (C) Calcium phosphate
(B) Coke (D) Aluminum oxide

(3) Arsenic is removed from the crude phosphoric acid by the action of _____.
(A) $CO_2$ (C) $H_2O$
(B) $H_2S$ (D) $Na_2CO_3$

(4) In NaCl manufacturing, at which concentration calcium sulfate completely precipitates out by solar evaporation?
(A) $25^0Be$ (C) $27^0Be$
(B) $20^0Be$ (D) $13.5^0Be$

(5) In Glauber's salt preparation, the salt cake is dissolved in hot water to form _____ solution.
(A) $36^0Be$ (C) $32^0Be$
(B) $28^0Be$ (D) None of above

(6) In sodium sulfate manufacture, at which temperature salt enriched brine leaving the well is chilled?
(A) $0^0F$-$5^0F$ (C) $10^0F$-$15^0F$
(B) $15^0F$-$20^0F$ (D) $20^0F$-$25^0F$

(7) The conjugated base of oxalic acid is known as_____.
(A) Dicarboxylic acid (C) Oxalate
(B) Oxalyl chloride (D) None of these

(8) Perchloric acid forms_____ with water.
(A) Perchlorate (C) Hydrate
(B) Azeotrope (D) None of these

(9) Which of the following chemical is used as an anesthetic agent?
(A) Ethanol (C) Carbon tetrachloride
(B) Chloroform (D) None of above

(10) Which is the most widely used packing material in adsorption chromatography?
(A) Starch (C) Inulin
(B) Aluminum oxide (D) Calcium carbonate

**Q.2 Answer the following.(attempt ten)** **[20]**

(1) Enlist the raw materials required to manufacture of triple superphosphate.
(2) Enlist various methods for concentrating nitric acid.
(3) Write uses of ammonia.
(4) Define catalyst with examples.
(5) Enlist the raw material and various methods for manufacturing sodium chloride.
(6) Give the uses of sodium sulfite.
(7) Write properties of sodium borohydride.
(8) Write the uses of oxalic acid.
(9) Explain preparation of Fehling solution No.1.
(10) Write properties of methanol.
(11) What is Nujol?
(12) Enlist the various methods for production of methanol and give its uses.

**Q.3** **(A)** With the help of flow diagram explain the manufacture of ammonia. **[05]**
**(B)** Discuss the manufacture of triple super phosphate. **[05]**

**OR**

**Q.3** **(A)** Write a note on manufacture of lime. **[05]**
**(B)** With the help of flow diagram explain the manufacture of super phosphate. **[05]**

**Q.4** **(A)** Explain the manufacture of sodium chloride in detail. **[05]**
**(B)** Write a complete note on Raney Nickel catalyst. **[05]**

**OR**

**Q.4** **(A)** With the help of flow diagram explain the manufacture of bromine. **[05]**
**(B)** Explain manufacturing process of sodium thiosulfate. **[05]**

**Q.5** Explain the leblanc process for soda ash manufacture. **[10]**

**OR**

**Q. 5** With the help of flow diagram explain the manufacture of sodium borohydride **[10]**

**Q. 6** **(A)** With the help of flow diagram explain the manufacture of methanol using catalytic hydrogenation of carbon monoxide. **[05]**
**(B)** Write a note on potassium bromide **[05]**

**OR**

**Q. 6** **(A)** With the help of flow diagram explain the manufacture of ethanol using indirect hydration. **[05]**
**(B)** With the help of flow diagram explain the manufacture of chloroform. **[05]**

[43] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**B.Sc. INUSTRIAL CHEMISTRY VOCATIONAL (5th Semester) Examination**

**TECHNOLOGY OF PETROLEUM AND PETROLEUM PRODUCTS**

**Date: SATURDAY, 11/11/2017** **Subject code: USO5CICV03**

**Time: 10:00 a.m. to 01:00 p.m.** **Total Marks: 70**

Q.1 **Select the correct option** 10

I. Demulsification process is used in crude oil for removal of
a. water b. Sulphur c. Salts d. None of these

II. Which of the following treatment used for removal of Sulphur from fuels?
a. Sulphuric acid b. Dewaxing c. Hydrofining d. Alkali washing

III. _____mg/lit, tar present in Motor gasoline.
a. 10 – 15 b. 5 – 7 c. 1 – 4 d. 16-20

IV. For production of HCN from methane_____ catalyst is used.
a. pt - Rh alloy b. Copper based c. Silica d. Alumina

V. For the removal of unreacted ammonia____ is used as scrubbing agent in the production of HCN.
a. $H_2SO_4$ b. Water c. Sodium carbonate d. All

VI. Carbon disulphide is produced by the reaction of methane with ___ at High tempe
a. Oxygen b. Sulfur c. a & b both d. Carbon.

VII. The raw material for manufacturing vinyl acetate are _____.
a. Acetylene / Acetic acid. b. Benzene / ethylene
c. Acetylene / ethylene d. Nitro benzene/ methane

VIII. The raw material for manufacturing styrene are _____
a. Acetylene / Acetic acid b. Benzene / ethylene
c. Acetylene / ethylene d. Nitro benzene/ methane

IX. _____are used as catalyzed for vapour phase isomerization of isobutene
a. Molibdenum& tungesten b. $Al_2O_3$ & $AlCl_3$
c. Alúmina d. Silica gel.

X. ____ Is the ideal structure for rubber production.
a. Butadiene b. Butane
c. Pentadiene d. None of these



(PTO)

| | | |
|---|---|---|
| Q.2 | **Answer the following in short (ANY TEN)** | 20 |
| I. | Write the detail of modern theory of petroleum formation. | |
| II. | Name the various reactions taking place in catalytic cracking. | |
| III. | Explain signification of salts removal from crude oil. | |
| IV. | Write a short note on properties & uses of HCN. | |
| V. | Write a short note on properties & uses of $CS_2$. | |
| VI. | Write a short note on properties & uses of Methanol. | |
| VII | Write properties and uses of acrylonitrile. | |
| VIII. | Give the outline the different routes to manufacture glycerine. | |
| IX. | Give the reaction of styrene synthesis from benzene. | |
| X. | Explain the limitation of molecular sieve. | |
| XI. | Name various chemical obtained from butanes. | |
| XII. | Give the outline how the various chemical obtained from propane. | |
| Q.3a | Discuss the theories of formation and composition of petroleum. | 05 |
| b. | Explain the working of Bubble Cap Tray in petroleum distillation. | 05 |
| | OR | |
| Q.3a | Justify significance of the demulsification & desalting of crude oil by giving the process details. | 05 |
| b. | Explain the process of distillation & refining of light petroleum products. | 05 |
| Q.4a | With the help of flow diagram explain the manufacturing of Methanol. | 05 |
| b. | What are the different chemicals derived from Ethane – Ethene fraction? | 05 |
| | OR | |
| Q.4. | Discuss the raw materials used, synthesis, manufacture, properties and uses of HCN and $CS_2$. | 10 |
| Q.5a | With the help of flow diagram explain manufacture and use of ethylene glycol from ethylene oxide. | 05 |
| b. | Describe the mfg of vinyl acetate from acetic acid and ethylene. | 05 |
| | OR | |
| Q.5a | Describe the process of industrial manufacture of Acrylonitrile. | 05 |
| b. | Describe the process of manufacturing Ethylene Oxide from Ethylene. | 05 |
| Q.6 | Describe manufacturing method of Butadiene from Butane. | 10 |
| | OR | |
| Q.6a | Describe the method of production of BTX (Benzene, Toluene,Xylene). | 05 |
| b. | Write the composition, form & general application of Chrome Alumina catalyst. | 05 |

—X—

(42) SEAT No._____ No. of Printed Pages :

**SARDAR PATEL UNIVERSITY, VALLABH VIDYANAGAR**

**B.Sc. (5th Semester) External Examination**

**Monday 13th November 2017**

**Subject: US05CICV04 (Industrial Management & Economics)**

**Industrial Chemistry Vocational**

**Time: 10:00a.m. to 01:00 p.m.** **Total Marks: 70**

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**Q.1 Attempt All Questions (Multiple Choice Questions)** **[10]**

1. Identify the different forms of business organization is _____of ideal form of the organization.

   (A) Characteristics (B) Features (C) Objectives (D) Goal

2. Lawful business is a _____of business organization.

   (A) Characteristics (B) Features (C) Objectives (D) Goal

3. Prompt Decision Making is a _____ of Sole Proprietorship.

   (A) Advantage (B) Disadvantage (C) Features (D) Objectives

4. Scientific management means _____ leading to increased industrial efficiency.

   (A) improve Model (B) improve Method (C) improve Process (D) None

5. _____ Management in Industry the perfection of the mechanical factor and the development of all the technical and mechanical facilities of industry.

   (A) Scientific (B) Marketing (C) Strategic (D) Behavior

6. How many methods usually advocated by the exponents of scientific management in industry?

   (A) 3 (B) 4 (C) 5 (D) 6

7. Interviewing is a_____ of HRM.

   (A) Objectives (B) Function (C) Process (D) None

8. The wage packet is accepted as _____ there will be no motivation.

   (A) Fair (B) Just (C) Fair & Just (D) None

9. How many Factors involved in Project Cost Estimation.

   (A) 10 (B) 11 (C) 12 (D) 14

10. Cost Reporting is a _____of cost accounting.

    (A) Method (B) Element (C) Process (D) None

P.T.O

**Q.2 Short Questions (Attempt Any Ten)** [20]

1. What are the objectives of co-operative society?
2. What are the advantage and disadvantage of sole proprietorship?
3. What are the characteristics of JHF?
4. Define scientific management.
5. What is controlling in organization?
6. What is staffing?
7. What are the functions of HRD?
8. Describe employee evaluation.
9. Describe HR Manager's responsibilities.
10. Define finished product with example.
11. What is man power? How can we implement man power in Organization?
12. Define complexity of project with example.

Q.3 (A) What are characteristics of Partnership? Explain in details. [05]
(B) What are characteristics of Joint Stock Company? Explain in Details. [05]

OR

Q.3 (A) Explain the advantages and disadvantages of Joint Stock Company? [05]
(B) Explain the advantages and disadvantages of Co-operative society? [05]

Q.4 (A) Explain the functions of management with real life example. [05]
(B) What are the functions of management? Explain in details. [05]

OR

Q.4 (A) Explain the Principles of Scientific management. [05]
(B) "Suppose you are manager of any organization and you have to handle one plant then what is your preparation for handling it" Comment on it [05]

Q.5 (A) Explain the Expert System and Executive Information system. [05]
(B) What is Fourth Language? Explain in detail. [05]

OR

Q.5 (A) Explain in details about Functions of MIS [05]
(B) Describe about Components of Safety Services. [05]

Q.6 Explain about Cost Components in detail. [10]

OR

Q.6 Explain in details about Factors involved in Project Cost Estimation [10]

*****

SC

SEAT No._____

[37]

Sardar Patel University
T.Y. B. Sc. (Semester-V)
Industrial Chemistry Vocational
US05CICV05 (Pharmaceutical-I)

Total Pages - 02

Date: 15-11-2017
Wednesday

Time : 10:00 a.m. to 01:00 p.m.
Total Marks: 70

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Q1. Answer the following multiple choice questions. (10)

1. Formulations must provide_____.

   (a) Efficacy (b) Safety (c) Convenience (d) All of these

2. The First edition of Indian Pharmacopoeia was published in _____ .

   (a) 1955 (b) 1996 (c) 1975 (d) 1985

3. _____ route of drug administration is to be considered topical administration of drug.

   (a) Subcutaneous (b) Epicutaneous (c) Endodermal (d) None of them

4. Cat gut is an example of _____type of suture.

   (a) Absorbable (b) Non-absorbable (c) Polymeric (d) Adsorbable

5. _____ is used to seal the blood vessels.

   (a) Ligatures (b) Sutures (c) Cat gut (d) None of these

6. Most of the potent pyrogens are found to be originated from _____ .

   (a) Gram Negative Bacteria (b) Gram Positive Bacteria (c) Algae (d) Fungi

7. Micro crystalline cellulose is _____.

   (a) Bulking agent (b) Disintegrating agents (c) Stabilizer (d) Both (a) & (b)

8. Vanillin is a _____ agent.

   (a) Flavoring (b) Lubricating (c) Sweating (d) Disintegrating

9. Seedless varieties of fruits are obtained by_____.

   (a) Sexual method (b). Asexual method (c) None of these ( d) Both (a) & (b)

10. Characteristic behavior of Bhasma with water is _____.

    (a) Solubilize (b) Floats (c) Settles (d) Suspends

P.T.O. 1/2

Q.2 Answer the following short questions (Any ten). (20)

1. Enlist various types of formulations.
2. Write role of pharmacopoeia.
3. Write advantages of parentral route of drug administration.
4. Write uses of plaster of paris.
5. Give examples of thermoset plastics.
6. Define sutures and ligatures.
7. What is the function of Lubricant in formulation? Give one example.
8. Define Glidant. Give one example.
9. Explain the role of disintegrant with an example.
10. Define "Bhasma" and give it's examples.
11. Write the importance of pH range in soil.
12. Define the term phytopharmaceuticals.

Q.3 A. Write a short note on oral route of drug administration. (05)
B. Write a short note on British Pharmacopeia. (05)

OR

Q.3A. Explain the importance of dosage forms. (05)
B. Write note on Indian pharmacopoeia. (05)

Q.4A. Write a short note on CAT GUT. (05)
B. Write advantages and disadvantages of plastic as packaging material. (05)

OR

Q.4A. Write advantages and disadvantages of glass as packaging material. (05)
B. Write note on densities of powder and their measurement. (05)

Q.5A Write short note on suspending agents. (05)
B. Define Diluents. Write structure, properties and uses of Lactose. (05)

OR

Q.5A. Write a short note on colouring agents. (05)
B. Define Binder. Write structure, properties and uses of Acacia. (05)

Q.6 Discuss different methods of classification of crude drugs. (10)

OR

Q.6 Describe different methods of cultivation and discuss the effect of soil and soil fertility. (10)

SC

SEAT No._____ No. of Printed Pages : 02

[30]

# SARDAR PATEL UNIVERSITY

## B.Sc. Industrial Chemistry (5th Semester) Examination

## SEPARATION TECHNIQUES

**Date: 17/11/2017** **Subject code: US05CICV06**

**Time: 10:00 a.m. to 1: 00 p.m.** **Total Marks: 70**

Q.1 **Select the correct option** 10

I. _____ is the temperature at which a liquid mixture of known composition start to vaporize as temperature increases.

(a) Bubble point (b) Dew point

(c) None of these. (d) Saturation temp.

II. The driving force for separation of constituents of liquid mixture distillation is____.

(a) Solubility of components (b) Relative volatility of system

(c) Distribution of mixture (d) None of these

III. Reflux ratio is the ratio of____

(a) Distillate to reflux (D/L) (b) Reflux to distillate (L/D)

(c) Reflux multiply by distillate (L.D) (d) None of these

IV. Gas absorption is also called as:

(a)Scrubbing (b) Drying

(c) Adsorption (d) None of these

V. What is the tower diameter to packing size ratio for minimizing the channeling?

(a)>8 (b) <8

(c) =8 (d) None of these

VI. Which extractor is used in the petroleum industry for furfural extraction?

(a) Rotating disc contactor (b) Mixer settler

(c) Spray tower (d) Pulse column

VII In crystallization mass transfer occurs from solution to _____ phase.

(a)Liquid (b) Solid

(c) Slurry (d) None of these

VIII. Crystallization is an operation in which solid particles are formed from_____.

(a)Liquid solution (b) Slurry

(c) Solvent (d) None of these

IX. For drying paper sheet _____ dryer is employ.

(a)Drum (b) Tray

(c) Tunnel (d) Rotary

X. In falling rate period, rate of drying _____.

(a)Increases (b) Decreases

(c) Constant (d) Random

(P.T.O.)

| | | |
|---|---|---|
| Q.2 | **Answer the following in short (ANY TEN)** | 20 |
| I. | Define Reflux ratio. | |
| II. | Write in brief on Bubble cap tray | |
| III. | Give limitations of McCabethile method | |
| IV. | Differentiate between distillation and extraction. | |
| V. | Define the following terms with reference to extraction I. Raffinate II.Extract. | |
| VI. | Write the characteristics of tower packing. | |
| VII | Explain the mechanism of crystallization | |
| VIII. | Give Classification of crystallizers. | |
| IX. | Define the term Magma. | |
| X. | Give comparison between Evaporation and Drying. | |
| XI. | Give classification of dryer. | |
| XII. | Explain equilibrium moisture and critical moisture content | |
| Q.3a | Write in brief with a sketch the Simple distillation. | 05 |
| b. | Write a note on Steam distillation. | 05 |
| | OR | |
| Q.3a | Write note on Azeotropic distillation. | 05 |
| b. | Explain the Flash distillation & draw its sketch. | 05 |
| Q.4a. | Give the construction and working of continuous operated mixer-settler with neat sketch. | 05 |
| b. | Write briefly on mechanically agitated vessels used for gas absorption. | 05 |
| | OR | |
| Q.4a. | Draw the neat sketch of packed column used for gas absorption and write its construction and functioning. | 05 |
| b. | Write in brief on rotating-disk contactors. | 05 |
| Q.5a. | Explain the construction and working of Agitated crystallizer with suitable diagram. | 05 |
| b. | Explain the construction and working of Swenson-walker crystallizer with suitable diagram. | 05 |
| | OR | |
| Q.5a. | Explain the construction and working of vacuum crystallizer with suitable diagram. | 05 |
| b. | Explain the working of Basket extractor with suitable diagram. | 05 |
| Q.6 | Explain the construction & working of Tray dryer with neat diagram also give its advantages and disadvantages | 10 |
| | OR | |
| Q.6 | Explain the construction & working of Spray dryer with neat diagram and also give its advantages and disadvantages. | 10 |

X

SEAT No._____ No. of Printed Pages : 2

[42] SC

# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

**B.Sc. (5th Sem) Examination - 2017**

07th November, 2017 (Tuesday)

10:00 AM - 01:00 PM

**US05CINS01** (Instrumentation)

8085 Microprocessor Architecture and Programming - 1

**Maximum Marks: 70**

---

**Que 1 Each question below gives a multiple choice of answers. Choose the most appropriate one.** **[10]**

1 _____: Group of Program.
**a)** Firmware **b)** Hardware
**c)** Software **d)** Machine

2 Each Manufacturer of a Microprocessor has devised (developed) a Symbolic Code for each Instruction. Known as _____.
**a)** Mnemonic **b)** Firmware
**c)** Machine Language **d)** Assembly Language

3 Assembly Language is in _____.
**a)** Binary **b)** Octal
**c)** Hexadecimal **d)** English-Like Languages

4 The Microprocessor (MPU) Uses _____ Bus to Identify a Peripheral or Memory Location.
**a)** Data **b)** Control
**c)** Address **d)** Address and Data

5 The Eight Data Lines Enable the MPU to Manipulate 8 - Bit Data Ranging From _____.
**a)** $00_H$ to $FF_H$ **b)** $00000001_B$ to $11111111_B$
**c)** $0000_H$ to $FFFF_H$ **d)** $0001_H$ to $FFFF_H$

6 _____: Comprised of Various Single Lines that Carry Synchronization Signals.
**a)** Data Bus **b)** Address Bus
**c)** Control Bus **d)** Data Bus and Control Bus

7 _____: Non - Maskable Interrupt.
**a)** INTR **b)** RST 5.5
**c)** RST 7.5 **d)** TRAP

8 _____: Associated With DMA.
**a)** INTR **b)** READY
**c)** HLDA **d)** RESET OUT

9 _____: Flag Not Affected By INR Instruction.
**a)** Parity **b)** Zero
**c)** Sign **d)** Carry

10 _____: No Flags Affected.
**a)** IN **b)** ADD
**c)** ANA **d)** XRI

(PTO)

**Que 2 Short Questions (Attempt any TEN)** **[20]**

1. Define: Program and Software.
2. What is the Use of Flag Register?
3. Explain Briefly Use of Accumulator.
4. Data Bus Is Bidirectional. Justify.
5. Give Relation Between Width of Address Bus and Memory Size. Calculated Memory Size of 8085 Microprocessor.
6. Explain: Encoder.
7. Explain: SID and SOD.
8. Explain: ALE and CLK (OUT).
9. Write on DMA.
10. Write Assembly Language Program to Load $37_H$ in Register B. Display the Number at Out Port 1.
11. Write Assembly Language Program to Add $93_H$ (in Register C) and $B7_H$ (in Register D).
12. Write Assembly Language Program to Subtract $40_H$ (in Register H) From $8C_H$ (in Register B).

**Que 3** **[A]** Write a Note on 8085 Programming Model With Necessary Diagram. **[05]**

**[B]** Give Classification of 8085 Instructions on the Basis of Instruction Word Size. **[05]**

**OR**

**[C]** Write a Note on 8085 Hardware Model With Necessary Diagram. **[05]**

**[D]** Discuss 8085 Instruction Classification on the Basis of Various 8085 Operations. **[05]**

**Que 4** **[A]** Write a Brief Note on Tri - State Devices and Buffer. **[05]**

**[B]** Explain Peripheral - Mapped and Memory - Mapped I/O. **[05]**

**OR**

**[C]** Discuss Bidirectional Buffer and Decoder. **[05]**

**[D]** Give an Account of Microprocessor - Initiated Operations and 8085 Bus Organization. **[05]**

**Que 5** **[A]** Write a Note on 8085 Microprocessor. **[10]**

**OR**

**[B]** Draw Schematic of Latching Low - Order Address Bus. Explain it. **[05]**

**[C]** Draw Schematic to Generate Read/Write Control Signals for Memory and I/Os. Explain it. **[05]**

**Que 6** **[A]** Write Assembly Language Program to Mask Higher Nibble from $BC_H$ (in Register L) and $CD_H$ (in Register C). AND Lower Nibbles. Store Result at $C500_H$. **[05]**

**[B]** Write Assembly Language Program to Add $DF_H$ (in Register B) and $E5_H$ (in Register H). If Sum is Greater Than $FF_H$, Store $CC_H$ at $D500_H$ Otherwise Store Sum at $D500_H$ **[05]**

**OR**

**[C]** Write Assembly Language Program to Mask Lower Nibble from $AB_H$ (in Register D) and $EF_H$ (in Register H). XOR Lower Nibbles. Store Result at $D000_H$. **[05]**

**[D]** Explain: ANI and ADD With Suitable Examples. **[05]**

SC

[52] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**
**T.Y.B.Sc. Examination, FIFTH Semester**
**Thursday, 9TH November 2016**
**Time : 10.00 am To 1.00 pm**
**Instrumentation Course Code : USO5CINS02**
**Course Title : Process Measurement Technique - I**

**Total Marks : 70**

**Q-1 Write answers to the following multiple choice questions in your answer book by selecting the proper option.** **[10]**

**(1)** The basis for measuring the thermodynamic property like temperature is _____ law of thermodynamics.
(a) zeroth (b) second (c) first (d) third

**(2)** The principle of working of the constant volume thermometer is based on _____law.
(a) Boyle (b) Newton (c) Charles (d) Gauss

**(3)** _____ cannot be used for negative pressure measurement.
(a) piezometer (b) U-tube manometer (c) Pirani gauge (d) Bourdon gauge

**(4)** The piezometer is used for measuring _____ pressure.
(a) gauge (b) absolute (c) vacuum (d) total

**(5)** A well type manometer is used in preference to a simple U-tube manometer to obtain better _____.
(a) accuracy (b) volume (c) precision (d) sensitivity

**(6)** 1 micro bar = _____ dyne/$cm^2$.
(a) 1 (b) 2 (c) 3 (d) 4

**(7)** Which of the following type of Bourdon tube shapes has a small tip travel and necessitates amplification?
(a) C - type (b) spiral (c) helical shaped (d) none of these

**(8)** The equation used in capacitive method is _____.
(a) C = K A D (b) C =D A/K (c) C = K D/A (d) C =K A/D

**(9)** 1 micron is equal to _____ mm of Hg.
(a) $10^{-2}$ (b) $10^{-4}$ (c) $10^{-3}$ (d) $10^{-5}$

**(10)** The unit of pressure is _____.
(a) $N/m^2$ (b) $N^2/m^3$ (c) D/ cm (d) $D/cm^3$

**Q-2 Answer the following questions in brief. (Answer any Ten Questions)** **[20]**

**(1)** Enlist the various temperature measurement methods.
**(2)** Explain about the Temperature scales in brief.
**(3)** Define: Thermocouple.
**(4)** Draw diagram for the relation between absolute gauge pressure and atmospheric pressure.
**(5)** State any four characteristics of manometric liquid.
**(6)** Enlist the advantages of Pirani gauge.
**(7)** Draw the schematic diagram of Bourdon gauge.
**(8)** State the limitations of thermal conductivity gauges.

**(PTO)**

(9) State the advantages of ionization gauges.
(10) Define Density and its unit.
(11) State the names of non-electrical and electrical methods.
(12) Draw the schematic diagrams of float and shaft type level measurements.

Q-3 (a) Write a detailed note on bimetallic thermometer. [6]
(b) Explain the laws of intermediate temperatures and intermediate metals. [4]

**OR**

Q-3 (a) Explain the electrical resistance thermometers with typical NTC diagram in brief. [6]
(b) Write a short note on Liquid-in-glass thermometer. [4]

Q-4 (a) Derive the equation of U-tube double column manometer. [6]
(b) Define Static pressure and Total pressure. [4]

**OR**

Q-4 (a) Write a detailed note on single-column manometer. [6]
(b) Discuss the Ring balance manometer. [4]

Q-5 (a) Describe the working of Ionization gauge with the help of necessary diagram. [6]
(b) Write a short note on the Bourdon Gauge. [4]

**OR**

Q-5 (a) Discuss the Thermal Conductivity Gauge with necessary diagram. [6]
(b) Write a short note on McLeod gauge. [4]

Q-6 Discuss and derive the expression for capacitive and ultrasonic method in brief and also discuss their advantages and disadvantages. [10]

**OR**

Q-6 Discuss about the 'Direct Method' and Explain hydrometer method and pressure method of level measurement in briefly. [10]

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**SARDAR PATEL UNIVERSITY**
**T.Y.B.Sc. Examination, FIFTH Semester**
**Saturday, 11TH November 2017**
**Time : 10.00 am To 1.00 pm**
**Instrumentation Course Code : US05CINS03**
**Course Title : Introduction to Control System**

**Total Marks : 70**

**Q-1 Write answers to the following multiple choice questions in your answer book by selecting the proper option.** **[10]**

**(1)** A process control loop regulates some ____ variables in a process.
(a) dynamic (b) static (c) multi (d) single

**(2)** The selection of what controller mode to use in a process is a function of the _____ of the process.
(a) characteristics (b) features (c) constants (d) variables

**(3)** The deviation or error of the controlled variable from the set point is given by e = _____ .
(a) r + b (b) r·b (c) r - b (d) r/b

**(4)** A permanent error taking place in the operating point of the controlled variable due to the change in load is called _____ .
(a) two-set (b) one-set (c) onset (d) offset

**(5)** In the proportional mode if the error is _____, the output is a constant and equal to $p_0$.
(a) 3 (b) 2 (c) 1 (d) 0

**(6)** Compressor controllers or regulators are used to vary the _____ of the compressor.
(a) humidity (b) delivery (c) pressure (d) temperature

**(7)** The decrease in the volume of air in a compressor results in the _____ of water.
(a) precipitation (b) evaporation (c) boiling (d) melting

**(8)** Refrigerated air dryers use _____ to cool the air to a lower temperature.
(a) water (b) refrigerant (c) coolant (d) cooling agent

**(9)** The part of the valve through which the valve plug stem moves is known as _____ assembly.
(a) Bonnet (b) cabinet (c) window (d) opening

**(10)** The relay that senses both an instrument signal and a valve stem position is known as _____ .
(a) leveller (b) positioner (c) controller (d) regulator

**Q-2 Answer the following questions in brief. (Answer any Ten Questions)** **[20]**

**(1)** Provide a list of various control system parameters.
**(2)** If a controller outputs 4 – 20 mA current signal to the final control element and has $p = 25\%$, then find the corresponding current.
**(3)** Give a brief introduction to controllers.
**(4)** Give a brief introduction to continuous controller modes.
**(5)** Enlist the characteristics of Derivative Control Mode.
**(6)** State the characteristics of PI mode.
**(7)** Write a short note on water-cooled intercoolers.
**(8)** Enlist the problems caused by water in the control lines.
**(9)** Enlist important factors for designing of an Instrument Air System.
**(10)** What is cavitation?
**(11)** Write a brief note on control valves.
**(12)** What is erosion of a valve?

**Q-3** **(a)** Explain the floating control mode in detail. **[6]**
**(b)** Discuss the applications of floating control mode in detail. **[4]**

**OR**

**Q-3** **(a)** Discuss the various process characteristics based on which a controller mode is selected. **[6]**
**(b)** With the help of necessary figure and equation explain the Two-Position Control Mode. **[4]**

**Q-4** With the help of a suitable example explain the Proportional Controller Mode in detail with its applications and limitations. **[10]**

**OR**

**Q-4** **(a)** Explain the Proportional-Integral(PI) Controller Mode in detail. **[6]**
**(b)** Discuss about the Three Mode(PID) Controller. **[4]**

**Q-5** **(a)** Write a note on liquid piston compressor. **[6]**
**(b)** Explain the reciprocating type compressor in detail. **[4]**

**OR**

**Q-5** **(a)** Discuss about the sizing criteria, pressure level and air supply source required for the designing of an instrument air system. **[6]**
**(b)** Write a note on sliding vane rotary compressor. **[4]**

**Q-6** **(a)** Discuss the three-way valve in detail. **[6]**
**(b)** Describe the various features of Diaphragm valves in detail. **[4]**

**OR**

**Q-6** **(a)** Discuss about the double port globe valve in detail. **[6]**
**(b)** Write a note on split body valve. **[4]**

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(43 & A-14) SEAT No._____ No. of Printed Pages : 2 Sc

# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar - 388120

**B.Sc. (5th Sem) Examination - 2017**

13th November, 2017 (Monday)

10:00 AM - 01:00 pm

**US05CINS04** (Instrumentation)

Programmable Logic Controller (PLC) - I

**Maximum Marks: 70**

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**Que 1** **Each question below gives a multiple choice of answers. Choose the most appropriate one.** **[10]**

1 _____: Useful For Delaying Turn - ON Events.

**a)** Timer **b)** Counter

**c)** Delay - ON Time Delay Relay **d)** Delay - OFF Time Delay Relay

2 _____: MTW.

**a)** Magnetic Tool Winding **b)** Microwave Transmission Workstation

**c)** Machine Tool Wire **d)** Movable Tool Workstation

3 _____: Includes Features such as Higher Math Functions, PID Control Loops, and Optional Programming Commands.

**a)** Input Module **b)** Personal Computer

**c)** PLC Processor **d)** Programming Unit

4 _____: Not Directly Accessible From the Inputs to the PLC, Nor Can They Be Used as Outputs.

**a)** Relay **b)** Transformer and Push Button

**c)** PLC Physical Components **d)** Internal Relay

5 _____: Useful To Control Things Such as Math Functions and Other Data Manipulation Functions That Are Controlled By a Transitional Contact.

**a)** Oscillator **b)** PLC Software Components

**c)** Internal Relay **d)** Relay

6 _____: Color Lamp of Control Panel Indicates Conditions That Are Important But Not Dangerous.

**a)** Red **b)** Green

**c)** Amber **d)** Pink

7 _____: Excellent For Applications Requiring Time to be "Streched".

**a)** Relay **b)** Counter

**c)** Delay - ON Time Delay Relay **d)** Delay - OFF Time Delay Relay

8 Latch Circuit Cannot Be Obtained By Using a _____ Switch.

**a)** Pushbutton **b)** Selector

**c)** Limit **d)** Maintained

9 _____: THHN.

**a)** Thermocouple Heat - Resistant Nylon Coated **b)** Thermoplastic Heat - Resistant Nylon Coated

**c)** Thermoplastic Humidity - Resistant Nylon Coated **d)** Thermistor Heat - Resistant Nylon Coated

10 _____: Provides Data and Power Connections to the Processor an Modules Via the Backplane.

**a)** PLC Output Module **b)** Transformer and Wiring

**c)** PLC Input Module **d)** PLC Mounting Rack

(P.T.O.)

**Que 2** **Short Questions (Attempt any TEN)** **[20]**

1. What Do You Mean By Normally Open (N/O) and Normally Closed (N/C) Contacts?
2. Draw Ladder Diagram For X-OR and X-NOR Logic Gates.
3. Explain Function of Input and Output Modules.
4. Draw the Ladder Logic Rung For a Normally Open $IN_1$ AND'ed With a Normally Closed $IN_2$ Driving a Coil $CR_1$.
5. Draw Ladder For $Y = \overline{AB + \overline{(C + D)}}$.
6. Delay - OFF Timer (TOF) Relays are Used in Outdoor Lighting Control Motion Sensors. Justify.
7. Explain Basic Difference Between Delay - ON Timer (TON) and Delay - OFF Timer (TOF) Relays.
8. Enlist Any Four PLC Programming Languages.
9. Draw Ladder Diagram For Universal Gates.
10. Draw Ladder For $Y = \overline{(A + B).C}$
11. What is PLC?
12. What Do You Mean By Disagreement Circuit?

**Que 3** **[A]** Write on PLC Contactor With Necessary Diagram. **[05]**

**[B]** Explain Selector Switches Used in PLC. **[05]**

**OR**

**[C]** What is Timer? Explain Delay - ON Timer (TON) Relay With Timing Diagram. **[05]**

**[D]** Discuss Pushbutton Switches Used in PLC. **[05]**

**Que 4** **[A]** Explain Importance of Reference Designators in PLC. **[05]**

**[B]** Give Significance of Latching Contacts in PLC. **[05]**

**OR**

**[C]** Draw Ladder Diagram For AND OR and OR AND Logic. **[05]**

**[D]** Give an Account of PLC Wiring. **[05]**

**Que 5** **[A]** Write a Detailed Note on PLC Configuration. **[10]**

**OR**

**[B]** Discuss "Solve The Ladder" in Terms of PLC. **[10]**

**Que 6** **[A]** Give an Account of Always-ON and Always-OFF Contacts. **[05]**

**[B]** Explain PLC Internal Relay. **[05]**

**OR**

**[C]** Write Note on PLC Physical Components Vs. Program Components. **[10]**

SC

No. of Printed Pages : 02

SEAT No._____

[387]

**SARDAR PATEL UNIVERSITY**

**T.Y.B.Sc. Examination, FIFTH Semester**

**Wednesday, 15TH November 2017**

**Time : 10.00 am To 1.00 pm**

**Instrumentation Course Code : USO5CINS05**

**Course Title : Industrial Electronics - 1**

**Total Marks : 70**

**Q-1** Write answers to the following multiple choice questions in your answer book by selecting the proper option. [10]

**(1)** The primary coil of a transformer is also called
(a) main coil (b) low voltage coil
(c) high voltage coil (d) medium voltage coil

**(2)** The steel used in the core of transformer is of high silicon content to reduce
(a) hysteresis loss (b) eddy current loss
(c) stray loss (d) capacitive loss

**(3)** If the windings surround a considerable part of the core the transformer is called
(a) shell type (b) oil-filled (c) core-type (d) air-tight

**(4)** In a simple loop dc generator the function of split-ring is analogous to that of
(a) capacitor (b) inductor (c) rectifier (d) inverter

**(5)** The machine which converts mechanical power to electrical power is called
(a) generator (b) motor (c) converter (d) inverter

**(6)** In the applications where huge starting torque is required for accelerating heavy masses quickly the _____ dc motor is used.
(a) shunt (b) series (c) parallel (d) inverted

**(7)** shunt motors are suitable for machine tools, lathes, wood-working machines due to their constancy of
(a) speed (b) armature current
(c) armature torque (d) back emf

**(8)** In SCIM, the rotor conductors are short circuited through ___ rings.
(a) slip (b) split (c) spot (d) end

**(9)** In a two phase induction motor the resultant revolving magnetic flux produced by the stator windings has a constant value ____ .
(a) $\Phi_m$ (b) $2\Phi_m$ (c) $\Phi_m/2$ (d) $3\Phi_m/2$

**(10)** The quantity $(N_s - N)$ is called ____ speed.
(a) actual (b) virtual (c) sleep (d) split

**Q-2** Answer the following questions in brief. (Answer any Ten Questions) [20]

**(1)** Write a short note on classification of transformer on the basis of the cooling methods employed.

**(2)** Discuss the theory of an ideal transformer in brief.

**(3)** Write a short note on voltage-transformation ratio.

**(4)** Explain the motor action using the principle of working of a dc motor.

**(5)** Write a short note on mechanical losses in a dc generator.

**(6)** Discuss the general principle of operation of a dc motor.

PTO

(7) Write a short note on speed regulation.
(8) Enlist the various characteristics curves of dc motors.
(9) Enlist the applications of series dc motors.
(10) Provide the classification of ac motors with regards to their principle of operation.
(11) State the advantages of induction motors.
(12) Explain how does the rotor of an induction motor rotate?

Q-3 (a) Explain the construction of Core type and Shell type transformer in detail. [6]
(b) Derive the expressions for the equivalent reactance and impedance of transformer. [4]

OR

Q-3 (a) Discuss the step-by-step procedure for obtaining the single-line equivalent circuit of a transformer. [6]
(b) Derive the formula for the equivalent resistance of a transformer. [4]

Q-4 Describe the construction and working of a simple-loop dc generator in detail. Also discuss the rectifying action of split-ring. [10]

OR

Q-4 (a) Give a detailed account of the total losses in a dc generator. [6]
(b) Write a detailed note on armature torque of a dc motor. [4]

Q-5 (a) Discuss the different types of characteristics of a shunt dc motor in detail. [6]
(b) Derive the expression for the speed of a dc motor. [4]

OR

Q-5 (a) What are compound dc motors? With the help of necessary figures explain the construction and working of cumulatively and differentially compound dc motors in detail. [6]
(b) Write a detailed note on the applications of dc motor. [4]

Q-6 (a) In case of a two-phase induction motor, explain how the rotating magnetic field is generated by its stator windings. [5]
(b) Write a detailed note on the frequency of rotor currents. [5]

OR

Q-6 (a) In case of a three-phase induction motor, explain how the rotating magnetic field is generated by its stator windings. [5]
(b) With the help of necessary diagrams explain the construction of induction motors in detail. [5]

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SEAT No._____ No. of Printed Pages : 02

[31]

**SARDAR PATEL UNIVERSITY**
**T.Y.B.Sc. Examination, FIFTH Semester**
**Friday, 17TH November 2017**
**Time : 10.00 am To 1.00 pm**
**Instrumentation Course Code : USO5CINS06**
**Course Title : Analytical Instrumentation**

**Total Marks : 70**

**Q-1 Write answers to the following multiple choice questions in your answer book by selecting the proper option. [10]**

(1) The useful pH range for glass electrode lies between ____
(a) pH 7 and pH 11 (b) pH 1 and pH 11
(c) pH 7 and pH 111 (d) pH 11 and pH 1

(2) For electron capture detector which is the best carrier gas?
(a) hydrogen (b) oxygen (c) argon (d) helium

(3) Which part of GC is considered as the heart of chromatography?
(a) column (b) recorder (c) gas cylinder (d) Owen

(4) Full form of HPCL is
(a)High Pressure Lead Chromatography
(b)High Pressure Liquid Chromatography
(c) High Pump Liquid Chromatography
(d) High Pump Lead Chromatography

(5) The cell in spectrophotometric detectors may be made up with ___
(a) Teflon (b) aluminum (c) nickel (d) copper

(6) pH of pure water is ___
(a) 5 (b) 7 (c) 4 (d) 2

(7) Which type of gas is used as carrier gas in gas chromatography?
(a) $H_2$ (b) inert gas (c) $CO_2$ (d) $O_2$

(8) The length of column in gas chromatography is between ___
(a) 1 and 30 m (b) 1 and 40 m (c) 1 and 50 m (d) 1 and 60 m

(9) The displacement of the membrane in magnetic wind analyser can be commonly measured by using ____
(a) LEDT (b) LDVT (c) LVDT (d) LEVT

(10) Full form of TLC is
(a) Thermoelectric Lead Chromatography
(b) Thin Layer Chromatography
(c) Temperature Leading Chromatography
(d) Thick Layer Chromatograph

PTO

Q-2 **Answer the following questions in brief. (Answer any Ten Questions)** [20]

(1) Define pH. Give its formula.
(2) Enlist the names of electrodes.
(3) Why column is considered as Heart of gas Chromatography?
(4) Enlist the types of Gas Analyzers.
(5) Give classification of liquid chromatography.
(6) Write a note on adsorption detector.
(7) Enlist the names of pH meters.
(8) Give classification of chromatography.
(9) What is the use of pressure regulator and flow regulator?
(10) Enlist the thermal conductivity meter.
(11) Write a brief note on TLC.
(12) Enlist the detectors of the liquid chromatography.

Q-3 (a) Explain Chopper Amplifier type pH meter. [5]
(b) How to calculate? [5]

OR

Q-3 (a) Explain Buffer solution. [5]
(b) Write a note on glass electrode. [5]

Q-4 Define chromatography. With necessary block diagram explain gas chromatography. [10]

OR

Q-4 (a) Why do we need to connect detector with strip chart recorder? [5]
(b) Write a brief note on capillary column and packed column. [5]

Q-5 (a) With necessary diagram explain magnetic wind analyzer. [5]
(b) Write a note on conductivity cell. [5]

OR

Q-5 (a) Write a note on IR gas analyzer. [5]
(b) Write a note on thermal conductivity analyzer. [5]

Q-6 (a) Write a note on detection system. [5]
(b) Write a note on high pressure pump system. [5]

OR

Q-6 (a) Write a note on column. [5]
(b) Write a note on sample injection system. [5]

[43] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**T.Y.B.Sc.(Semester - V) EXAMINATION November– 2017**

**US05CINT01 : Relational Database Management System-I**

**Date: 07/11/2017 ,Tuesday** **Time: 10:00 to 01:00 PM** **Total Marks : 70**

Q.1 Multiple choice questions: [10]

1. Actual value of a column is also called_____
   [A] Tuple [B] Derived Attribute
   [C] Attribute [D] Domain

2. Which SQL statement is used to update data in a database?_____
   [A] SAVE AS [B] MODIFY [C] UPDATE [D] SAVE

3. To commit a transaction means making the changes _____
   [A] Temporary [B] Permanent
   [C] Parsed [D] Rolled Back

4. Which of the following SQL operations demands the use of wild cards Comparisons_____?
   [A] IN [B] BETWEEN [C] EXISTS [D] LIKE

5. Which SQL keyword is used to sort the result-set?_____
   [A] Sort [B] Order by [C] Sort by [D] Order

6. Business rules, which are enforced on data being stored in a table, are called_____.
   [A] NULL [B] Constraint
   [C] Unique [D] Protocol

7. The data held across the primary key column must be _____.
   [A] Unique [B] Repetitive [C] NULL [D] Simple

8. The _____ function converts char, a CHARACTER value expressing a number, to a NUMBER data-type.
   [A] TO_NUMBER [B] TO_CHAR
   [C] TO_DATE [D] TO_NUM

9. _____ clause imposes a condition of the group by clause.
   [A] Group by [B] Sub Query [C] Having [D] Where

10. The _____ statement provides various types of access to database object.
    [A] Select [B] privileges
    [C] Revoke [D] Grant



(PTO)

(1)

Q.2 Write answer in short (Any Ten) [20]

1. Draw ER- Diagram for E-shopping system.
2. Define Attribute , Tuple
3. What is normalization? List its phases.
4. List any two SQL * PLUS commands with example.
5. Explain concept of DUAL table.
6. List any four arithmetic operator and give any two examples on dual table.
7. List the restriction available on ALTER table.
8. How UNIQUE key can apply at table level?
9. List all scalar functions available in oracle.
10. What is sub query? Why it is used for?
11. List the diff. types of joins.
12. What is synonym?

Q.3(a) Differentiate DBMS and RDBMS. [4]

(b) Explain types of relationship and mapping cardinality with example [6]

Q.3(a) List out Codd rules and explain any four. [4]

(b) Define Normalization. Explain 1NF, 2NF and 3NF by taking suitable example. [6]

Q.4(a) Explain DDL, DML, and DCL. [6]

(b) Explain CREATE Statement. [4]

Q.4(a) Discuss pattern matching predicate in detail. [6]

(b) Explain SELECT statement. [4]

Q.5 Define Primary key and foreign key concept with appropriate illustration [10]

Q.5 List all Aggregate functions available in oracle and explain any Three of them with appropriate syntax and example. [10]

Q.6(a) What is transaction processing? Explain the commit, rollback. [6]

(b) Explain group by & having with example. [4]

Q.6(a) What is view? Why it is created, explain it syntax & example. [6]

(b) What is index? Explain creation of simple & composes index. [4]

—X—

(2)

SEAT No._____ No. of Printed Pages : 2

[53]

# SARDAR PATEL UNIVERSITY

## T.Y. B.Sc. EXAMINATION, SEM – V

## INFORMATION TECHNOLOGY

## US05CINT02 : DATA AND FILE STRUCTURE

**Date: 09/11/2017** (Thursday) **Time : 10:00am to 01:00pm** **Max.Marks:70**

**Q – 1 Multiple Choice Question** **[10]**

i) An array is a _____ data structure.
a. Composite. b. Unordered. c. Non-composite. d. Heterogeneous.

ii) An array is a _____ data structure.
a. Non-composite. b. Non- Linear. c. Ordered. d. Heterogeneous.

iii) The number of elements in an array is called the _____ of the array.
a. Size. b. Base. c. Type. d. Index.

iv) In preorder traversal of a binary tree, root node is always located at _____ position.
a. Second last c. First
b. Second d. Last

v) Preorder traversal of a binary tree can be visited _____ manner.
a. Left sub-tree, Root, Right sub-tree.
b. Root, Left sub-tree, Right sub-tree.
c. Root, Right sub-tree, Left sub-tree.
d .Left sub-tree, Right sub-tree, Root.

vi) Inorder traversal of a binary tree can be visited _____ manner.
a. Left sub-tree, Root, Right sub-tree.
b. Root, Left sub-tree, Right sub-tree.
c. Root, Right sub-tree, Left sub-tree.
d. Left sub-tree, Right sub-tree, Root

vii) K-way merging is known as _____.
a. Multiple merge c. Simple merging
b. Selection sort d. Binary merging

viii) If n denotes the sum of the sizes of the two sub tables to be merged, then the timing performance of merge sort algorithm is _____
a. O (n^2) c. O (n^3)
b. O (n) d. None of these

ix) A _____ is a collection of information items about a particular entity.
a. Record b. Database c. Entity d. None of these

x) _____ is a unit of meaningful information about an entity.
a. Record b. Entity c. Item d. None of these

**Q – 2 Answer the following in short. (Any 10)** **[20]**

i) Write difference between Linear and Non-Linear data structure
ii) List out Characteristics of algorithm for data structure
iii) Define Hierarchical structure of data structure.
iv) Define tree with an example.
v) Define doubly link list.
vi) Write difference between Singly link list and Doubly link list
vii) List application of searching.
viii) List application of sorting.
ix) Define searching.
x) Define: Key, Sequence Key.
xi) Define: File, Database.
xii) What do you mean by Transaction?



(PTO)

| | | | |
|---|---|---|---|
| Q – 3 | | Write detail note on Two-Dimension array. | [10] |
| | | OR | |
| Q – 3 | | What is Stack? Write algorithms for PUSH( ) ,POP( ), PEEP( ) and CHANGE( ) operations on stack | [10] |
| Q – 4 | a) | Explain insertion operation in lexically ordered binary tree. | [5] |
| | b) | Write Algorithm to Insert element in Doubly link list | [5] |
| | | OR | |
| Q – 4 | a) | Write Algorithm to insert element in sorted ordered list. | [5] |
| | b) | Explain Deletion operation in lexically ordered binary tree. | [5] |
| Q – 5 | | List sorting techniques and explain any two of them with algorithm. | [10] |
| | | OR | |
| Q – 5 | | List and explain searching techniques with algorithms. | [10] |
| Q – 6 | | Write a detail note on structure of index sequential file. | [10] |
| | | OR | |
| Q – 6 | a) | Write a detail note on processing of Direct file. | [5] |
| | b) | Write a short note on Multiple buffering. | [5] |

— x —

[45] SEAT No._____ No. of Printed Pages : 2

SC

SARDAR PATEL UNIVERSITY
T.Y.B.Sc : SEMESTER – V
INFORMATION TECHNOLOGY
US05CINT03: Visual Programming Through VB .NET

Date : 11-11-2017 Saturday Time : 10:00am to 01:00pm Max.Marks: 70

Q – 1 Multiple Choice Question [10]

i) Dynamic Arrays can Redimensioned using _____ Keyword.
A) Dim B) Redim
C) ReDim D) Const

ii) A Procedure that does not return a Value is called as _____.
A) Sub Procedure B) Method
C) Constructor D) Function

iii) Toolbox in Visual Studio Consist of _____.
A) Code B) List of Forms
C) List of Servers D) List of Constrols

iv) _____ is default event for form.
A) Click B) DblClick
C) Load D) Move

v) _____ specifies the interior spacing of the control.
A) Padding B) Shifting
C) Width D) Height

vi) _____ is used when all condition becomes false in select...Case statement.
A) End Select B) Case Else
C) Else Case D) Select End

vii) _____statement enables exception handling .
A) Option Explicit B) On Error Goto
C) Option Strict D) None of the above

viii) Which property can not be used with multiline property of textbox.
A) Name B) Passwordchar
C) Font D) Margin

ix) DataSets are loaded from the database using the:
A) Load method B) Read method
C) Fill method D) None of the above

x) Stored procedures are invoked using:
A) SqlCommand object and its ExecuteReader method.
B) SqlConnection and its ExecuteReader method.
C) SqlCommand object and its ExecuteNonQuery method.
D) SqlParameter object and its Execute method.

Q – 2 Attempt any 10 questions: [20]

i) Define Boxing.
ii) What is JIT?
iii) What is a variable?
iv) What is the use of 'By Val' & 'By Ref' keyword?
v) What is procedure? How it is created in VB .NET?
vi) Write down the syntax of With ... End Width.
vii) Explain the use of Menu.
viii) What is the use of Groupbox?
ix) Explain any four properties of DateTimePicker.
x) Explain System.Data Namespace.
xi) What are the features of ADO.Net?
xii) What are the applications of ADO .net?



(PTO)

| | | | |
|---|---|---|---|
| Q – 3 | a) | Explain .NET Architecture. | [5] |
| | b) | Write a note on Class Library. | [5] |
| | | OR | |
| Q – 3 | a) | Write a short note on Solution Explorer | [5] |
| | b) | Write a note on CTS? | [5] |
| Q – 4 | a) | Explain Form life cycle in detail. | [5] |
| | b) | Explain Input box with example. | [5] |
| | | OR | |
| Q – 4 | | Explain the following structures with example.<br>1. For ... Next 2. While ... End While 3. If ... End If | [10] |
| Q – 5 | a) | Explain try.... Catch ... final in detail with example. | [5] |
| | b) | Write a note on HScorllBar and VScrollBar. | [5] |
| | | OR | |
| Q – 5 | | Explain following controls with its properties, methods and events<br>1) Treeview 2) RichTextBox 3) ColorDialogBox | [10] |
| Q – 6 | | Explain use of "ExecuteScaler" , "ExecuteNonQuery" and "ExecuteReader" method in detail. | [10] |
| | | OR | |
| Q – 6 | a) | Explain the steps to bind the application with the Database in ADO .net. | [5] |
| | b) | Explain the connected architecture of ADO.NET in brief. | [5] |

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(447) SEAT No._____ No. of Printed Pages : 2 8c

SARDAR PATEL UNIVERSITY
B.Sc. (Information Technology) Examination
5th Semester (CBCS) (Regular & NC)
Monday , Date: 13th November, 2017
Session : Morning Time : 10:00 A.M. TO 01:00 PM

Course Code: US05CINT04
Course Title : Operating Systems
Total Marks: 70

**Q1. Multiple Choice Questions.(Attempt All)** [10]

1. A Program in execution is known as _____.
   A. File C. Record
   B. Process D. Task
2. _____ is **not** a valid process state.
   A. RUNNING C. NEW
   B. READY D. STOP
3. Round Robin scheduling is essentially the preemptive version of _____.
   A. SJF C. FCFS
   B. Priority D. None of these.
4. _____ scheduling algorithm gives minimum Page Faults.
   A. FIFO C. Optimal
   B. LRU D. None of the these
5. Which of the following memory allocation strategy is fastest?
   A. Best-fit C. Worst-fit
   B. First-fit D. Next-fit
6. A _____ process produces information that is consumed by a consumer process.
   A. Cooperating C. Producer
   B. Consumption D. Independent
7. _____Section in EXT2 file system represents permissions on a file.
   A. node C. block
   B. superblock D. i-node
8. Option of **ls** command in LINUX will sort output according to file size.
   A. -r C. -s
   B. -l D. -o
9. In LINUX the case statement ends with _____.
   A. end C. end case
   B. end esac D. esac
10. _____ command is used to is change a permission of a file in LINUX.
    A. cmode C. chmod
    B. mode D. change

**Q2. Answer the following short questions (Attempt any TEN)** [20]

1. What are Turnaround Time and Response Time?
2. Draw the diagram of PCB.
3. Define Operating system. Give 2 examples.
4. Explain Best-fit memory allocation technique in brief.
5. List different types of fragmentation.
6. List out all page replacement algorithms.
7. Justify "Linux is a Secure Operating System".
8. List three requirements for solution to Critical section problem.
9. Explain when does Race condition arise?
10. Explain **man** command in short.
11. Explain **date** command along with its options.
12. Explain **rm** command in brief.

Q3. a. Explain the functions performed by Operating System in brief. [05]

b. Explain **Round Robin scheduling** with example. Draw Gantt chart and find average waiting time for 4 processes given below : [05]
(Time Quantum:03 millisec)

| PROCESS | BURST TIME (millisec) |
|---|---|
| P1 | 21 |
| P2 | 3 |
| P3 | 6 |
| P4 | 2 |

**OR**

Q3. a. List and explain various Process states with labeled diagram. [05]

b. Explain **FCFS Scheduling** algorithm in brief. Draw Gantt chart and find average waiting time for 4 processes given below: [05]

| PROCESS | BURST TIME (millisec) |
|---|---|
| P1 | 21 |
| P2 | 3 |
| P3 | 6 |
| P4 | 2 |

Q4.a. Explain FIFO page replacement in brief and Calculate Page faults using IFO page replacement algorithm for following reference string: [05]

Reference string = 1, 2 ,3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 1,3,1

b. What is Fragmentation? Explain any one type of Fragmentation in detail. [05]

**OR**

Q4.a. Explain Paging techniques with advantages and disadvantages. [05]

b. Explain Optimal page replacement Algorithm in brief and Calculate Page faults using Optimal page replacement algorithm for following reference string: (Number of Frames = 3) [05]

Reference string = 1, 2 ,3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 1,3,1

Q5.a. Explain concept of Process Synchronization in brief. [05]

b. Explain Critical-section problem in details. Explain algorithm 3 for solving critical section problem for two-process. [05]

**OR**

Q5.a. What do you mean by Deadlock? Explain all necessary conditions for occurrence of deadlock. [05]

b. What is LINUX? Explain basic features of LINUX Operating System. [05]

Q6. Explain following LINUX commands in brief: [10]
i) ls ii) cp iii) who iv) rmdir v) mv

**OR**

Q6. Explain for and while loop statements in LINUX. [10]



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(2)

5 C

SEAT No._____ No. of Printed Pages : 02

[39]

# SARDAR PATELUNIVERSITY
## B.Sc. EXAMINATION, 5th SEMESTER
**15th November Wednesday, 2017**
**10:00a.m. to 1:00 p.m.**
**US05CINT05**
**[System Analysis Design and Software Engineering]**
**Maximum Marks: 70**

Q-1 Multiple Choice Question.[Each Question carries one Mark] [10]

1) The inputs and outputs of subsystem are known but not the actual transformation from one to the other , is called _____.
   A. Boundary B. Subsystem
   C. Interface D. Black box

2) Operational evaluation consider _____
   A. Response time B. Easy of use
   C. Reliability of computation D. All of these

3) _____ is defined as the activity that makes possible the transformation of input to output.
   A. Input B. Process
   C. Output D. Goal

4) The _____ is contains a list of terms and their definitions for all data items and data stores of a system.
   A. Data Dictionary B. DFD
   C. Decision Table D. Decision Tree

5) Salary of personnel is called _____.
   A. Recurring Cost B. Tangible Cost
   C. Intangible Cost D. One Time Cost

6) Structure Analysis does not use _____.
   A. Data Dictionary B. Structured Diagram
   C. E – R Diagram D. Decision Tree

7) _____ means reports contain misleading information.
   A. Problem of Reliability B. Problem of Validity
   C. Problem of Timeliness D. Problem of Capacity

8) To conduct a detailed feasibility study, firstly an expert committee called _____.
   A. Steering Committee B. Review Committee
   C. Evaluation Committee D. None of these

9) _____ model provides better risk management and cost of each phase.
   A. Spiral B. Prototype
   C. Iterative enhancement D. Waterfall

10) _____ part requires major efforts.
   A. Testing B. Maintenance
   C. Coding D. Design

[PTO]

Q-2 Give Answers for the following:(Any ten) [20]

1. Draw the general model of a system.
2. List subsystem and interface of computer system.
3. Define System with example.
4. List Input, Process, Output and Feedback of any educational University system.
5. Write difference between natural and artificial system.
6. List methods of feasibility study.
7. What is SSADM? List all methodology of SSADM.
8. Explain system survey.
9. Explain hardware study.
10. Write a short note on maintenance phase.
11. Explain advantages of spiral model.
12. Define: Software, Software Engineering.

Q -3 A) Explain any two Characteristics of System. [5]
B) Explain System analysis. [5]

OR

Q -3 A) Explain role of system analyst. [5]
B) Explain Interface. [5]

Q -4 A) Explain Problem Identification. [5]
B) Write difference between system analysis and system design. [5]

OR

Q -4 A) Explain system design specification and programming. [5]
B) Write difference between technical and operational feasibility. [5]

Q -5 A) Explain need for structured analysis and design(SSADM). [5]
B) Write difference between tangible and intangible benefit. [5]

OR

Q -5 A) Explain structure analysis of SSADM. [5]
B) Write advantages of SSADM. [5]

Q -6 Explain waterfall model in detail. [10]

OR

Q -6 List phases of software development and explain any two in detail. [10]

—X—

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SEAT No._____ No. of Printed Pages: 02

[32]

SARDAR PATEL UNIVERSITY
External Examination (CBCS)
B. Sc. (CA & IT) - V$^{th}$ - Semester
US05CINT06 - Computer Architecture & Microprocessor
17$^{th}$ November, Friday - 2017

Time : 10:00 am to 1:00 pm Total Marks :70

Q-1 Select an appropriate option. 10

1. CPU stands for _____.
   (a) Central Processing Unit (b) Control Processing Unit
   (c) Central Programming Unit (d) Control Programming Unit

2. The _____ store intermediate data used during the execution of instruction.
   (a) Register Set (b) CPU (c) CU (d) ALU

3. RPN Stands for _____.
   (a) Reverse Polish Notation (b) Reverse Programming Notation
   (c) Random Polish Notation (d) None of these

4. The _____ register specifies the number of words that must be transferred.
   (a) Word Count (b) Address (c) Data (d) Control

5. The _____ contains an address to specify the desired location in memory.
   (a) Address Register (b) Word Count Register
   (c) Control Register (d) All of these

6. The memory unit that communicates directly with the CPU is called the ___.
   (a) Main Memory (b) Auxiliary Memory
   (c) Secondary Memory (d) None of these

7. The _____unit provides the necessary timing and control signals to all the operations in the microcomputer.
   (a) Control (b) Input (c) Output (d) ALU

8. The group of eight bit is called _____.
   (a) Bit (b) Byte (c) Nibble (d) Kilo Byte

9. LED Stands for _____.
   (a) Light Energy Data (b) Light Emitting Data
   (c) Light Emitting Diode (d) Liquid Emitting Diode

10. PSW stands for _____.
    (a) Program Status Word (b) Program Store Word
    (c) Program Set Word (d) None of these

(P.T.O.)

Q-2 Answer the following questions. (Attempt any **TEN**) 20

1. Explain PUSH and POP operation of Stack.
2. Define Infix Notation with example.
3. Define I/O command.
4. Explain Bus Request (BR) and Bus Grant (BG).
5. What is Cache memory?
6. Define Multiprogramming.
7. Define Multiprocessor.
8. Define Machine Level Languages.
9. What is Operating System?
10. Define Data Bus.
11. Define Program Counter.
12. Write full form of EPROM and EEPROM.

Q-3
(a) Explain Components of CPU. 5
(b) Explain Two Address Instruction with example. 5

**OR**

Q-3
(a) Explain General Register Organization. 5
(b) Explain RPN with example. 5

Q-4
(a) What is DMA? Explain DMA Controller. 5
(b) Explain Binary Multiplication using Register Method. 5

**OR**

Q-4
(a) What is Memory? Explain memory hierarchy in computer system. 5
(b) Explain Virtual Memory with Address Space and Memory Space. 5

Q-5
(a) Explain characteristics of Multiprocessor. 5
(b) Explain Cross Bar Switch in detail. 5

**OR**

Q-5
(a) Explain Microprocessor in detail. 5
(b) Explain Time Sharing common bus structure. 5

Q-6 Explain Memory Classification in detail. 10

**OR**

Q-6 Write short note on: (i) Internal Data Operation (ii) Input Output Devices 10

X

[44] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

## B.Sc. Fifth semester

### Instrumentation (Vocational)

### US05CINV01

### Process Measurement Techniques-1

### Tuesday, 07/11/2017

**Time: - 10:00AM To 1:00 PM** **Marks: - 70**

**Q.1 Choose the correct answer (Attempt all)** (10)

(1) While measuring temperature which of the following is used to reduce effect of cross temperature condition?
(a) Liquid filled thermometer. (c) Gas filled thermometer.
(b) Vapour filled thermometer. (d) Dual filled thermometer.

(2) What is the principle of operation of Bi Metallic strip type thermometer?
(a) Thermal electricity. (c) Thermal radiation.
(b) Thermal expansion. (d) Thermal conduction.

(3) Which of the following scale is accepted as international scale for temperature measurement?
(a) Fahrenheit. (c) Celsius.
(b) Rankin. (d) Kelvin.

(4) Which of following sensor offers highest linearity?
(a) Thermistors. (c) Thermocouples.
(b) RTD. (d) Bimetallic strip.

(5) Which method is best suited for measurement of temperature of remotely placed object?
(a) Total radiation pyrometer. (c) Mercury thermometers.
(b) Filled system thermometers. (d) Bimetallic thermometers.

(6) What is relationship between The energy emitted by a heated object and its temperature?
(a) Directly proportional. (c) Inversely proportional.
(b) Square of temperature. (d) Forth power of temperature.

(7) Which of the following manometer offers highest sensitivity?
(a) U tube. (c) Inclined U tube.
(b) Inverted U tube. (d) Piezo meter.

(8) What is the principle of operation of the manometer?
(a) Electrostatic balance. (c) Hydrostatic balance.
(b) Electromagnetic balance. (d) Pneumatic balance.

(9) Which of following cannot be used to measure vacuum?
(a) Piezo meter. (c) Pirani gauge.
(b) U tube manometer. (d) Bourdon gauge.

(10) Which type of bourdon gauge has small tip travel?
(a) C type. (c) Spiral.
(b) Helical. (d) Twisted.



(PTO)

Q2 Answer the following questions (Any Ten) (20)

(1) Explain the principle of the liquid in glass thermometer.

(2) Explain why the vapor filled thermometers are better than liquid filled.

(3) Define temperature and explain importance of temperature measurement in industrial processes.

(4) What is the difference between the industrial and Laboratory type RTD sensors?

(5) Discuss the See back's experiment of the thermoelectricity.

(6) Write a note on thermo pile? And list its characteristics features.

(7) Explain the practical setup used to measure the atmospheric pressure.

(8) Differentiate Atmospheric and Absolute pressure.

(9) Calculate the pressure excreted at the bottom of the water tank filled to 1.5 meter level.

(10) List the advantages and disadvantages of the Ring balance pressure gauge.

(11) List the advantages and disadvantages of the bourdon gauge.

(12) List the characteristics features required in materials of the Diaphragm.

Q3 Describe the physical quantity temp. List and discuss the various measurement scales (units) used for the temperature measurement and also write interconversion formulas. (10)

OR

Q3 With necessary circuits explain the principles of working of bi-metallic strip thermometer. (10)

Q4 Write a note on total radiation Pyrometer method for temperature measurement. (10)

OR

Q4 What are thermocouples? Explain construction of thermocouple probe with necessary diagrams and also discuss its characteristics curve. (10)

Q5 With necessary diagrams write a note on Inclined U tube manometers. (10)

OR

Q5 Explain various terms used in the pressure measurements and explain the method for the measurement of atmospheric pressure. (10)

Q6 Explain working principle and construction of Pirani gauge. (10)

OR

Q6 Explain the principles of Bourdon gauge and draw the diagrams of various types of bourdon gauge and discuss their features. (10)

SEAT No._____ No. of Printed Pages : 2

[54/A23]

# SARDAR PATEL UNIVERSITY

**B.Sc. (5TH Sem) Examination - 2017**
09th November, 2017 (Thursday)
10:00 AM - 01:00 PM
**US05CINV02** (Instrumentation - Vocational)
Control Technique - I

**Maximum Marks: 70**

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**Que 1** **Each question below gives a multiple choice of answers. Choose the most appropriate one.** **[10]**

1 _____: Control Mode, the Specific Output of Controller is Not Uniquely Determined by the Error.
**a)** Two - Position **b)** Multiposition
**c)** Floating **d)** None of These

2 _____: The Elapsed Time Between the Instant a Deviation Occurs and the Corrective Action First Occurs.
**a)** Control Lag **b)** Process Lag
**c)** Control Parameter Range **d)** Dead Time

3 _____: Control Mode, the Output of the Control Element Changes at a Fixed Rate when the Error Exceeds the Neutral Zone.
**a)** Multiposition **b)** Single Speed
**c)** Two - Postion **d)** Multi Speed

4 _____: Control Mode Also Referred as Reset Action.
**a)** Proportional **b)** Integral
**c)** Derivative **d)** Two - Position

5 _____: Control Mode Also Reffered as Anticipatory Control.
**a)** Derivative **b)** Proportional - Integral
**c)** Proportional - Derivative **d)** Integral

6 In _____ Control Mode, If the Error is Zero, the Output Stays Fixed at a Value Equal to what It was when the Error went to Zero.
**a)** Proportial **b)** Derivative
**c)** Proportional - Integral **d)** Intergral

7 _____: Criteria not Important while Designing Instrument Air System (IAS).
**a)** pH **b)** Sizing
**c)** Source **d)** Compressor

8 _____ psig: Pressure Level of Liquid Piston Compressor.
**a)** 50 - 100 **b)** 100 - 125
**c)** 125 - 170 **d)** 150 - 200

9 _____: Gas Analyzer Works on the Principle of No Interaction of Intramolecular Energy States.
**a)** Thermal Conductivity **b)** Flame Ionization
**c)** Conductometric Method **d)** Potentiometric Method

10 _____: Gas Analyzer Works on the Principle of Excitation of Intramolecular Energy States.
**a)** Flame Ionization **b)** Pramagnetic Susceptibility
**c)** Thermal Conductivity **d)** Galvanometric



(PTO)

**Que 2 Short Questions (Attempt any TEN)** **[20]**

1. Explain Briefly Process Equation.
2. Define: Transient and Process Lag.
3. The Temperature has a Range 400 to 540 K. Set Point 484 K. Find the Percent of Span Error when the Temperature is 479 K.
4. Enlist Characteristics of Proportional Control Mode.
5. What is Continuous Control Mode?
6. What are the Characteristics of Proportional - Integral Control Mode?
7. Enlist the Characteristics of Air Used in IAS.
8. What are the Important Factors for Designing of IAS.
9. Explain the Need of IAS.
10. What is the Importance of Industrial Gas Analyzer?
11. Give Classificaiton of Gas Analyzer.
12. Explain Principle of Infrared Gas Analyzer.

**Que 3** **[A]** What is Controller? Explain Two - Position Control Mode. What is the Importance of Neutral Zone? **[05]**

**[B]** Write a Note on Single Speed Floating Control Mode. **[05]**

**OR**

**[C]** What is Discontinuous Controller? Explain Multi Position Control Mode. **[05]**

**[D]** A Liquid Level Control System Linearly converts a Displacement of 2 - 3 meters into a 4 - 20 mA Control Signal. A Relay serves as the Two - Position Controller to Open or Close an Inlet Valve. The Relay Closes at 12 mA and Opens at 10 mA. Find **[05]**

**i)** The Relation between Displacement Level and Current, and
**ii)** The Neutral Zone in meters.

**Que 4** **[A]** Write a Note on Proportional Control Mode. **[05]**

**[B]** Give an Account of Proportional - Integral - Derivative (PID) Control Mode. **[05]**

**OR**

**[C]** Explain Integral Control Mode. **[05]**

**[D]** Discuss Proportional - Derivative (PD) Control Mode. **[05]**

**Que 5** **[A]** Wrtie a Note on Reciprocating Type Compressor. **[05]**

**[B]** What is Dryer? Explain Refrigeration Type Dryer. **[05]**

**OR**

**[C]** Explain Sliding Vane Rotary Compressor. **[05]**

**[D]** Give an Account of Compressor Cooling. **[05]**

**Que 6** **[A]** Write a Note on Paramagnetic Oxygen Analyzer. **[10]**

**OR**

**[B]** Discuss Magnetic Wind Instruments. **[10]**

[46/A25] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY V.V.NAGAR

## B.Sc.(V$^{th}$ SEM.) INSTRUMENTATION(V)

## NOVEMBER-2017 EXAMINATION

## CONTROL SYSTEM COMPONENTS

## SUB.CODE-US05CINV03

**DATE:-11/11/2017, Saturday TIME:- 10:00 am to 1:00 pm MARKS-70**

**Q-1 Choose correct answer [10]**

1. Which of the following is not a timing relay?
   (A) OFF-delay relay (C) On-delay relay
   (B) Latching relay (D) none of above
2. Accelerometer is used for measurement of _____.
   (A) velocity (C) acceleration
   (B) position (D) none of above
3. Contactors are proffered in application involving_____.
   (A) Relay logic circuit (C) logic power application
   (B) High switching frequency (D) none of above
4. Which of the valve is used for large flows with low pressure drops?
   (A) Diaphragm valve (C) Butterfly valve
   (B) Globe valve (D) none of above
5. Which of the following is an advantage of stepper motor?
   (A) High accuracy (C) Full torque at standstill
   (B) Open loop control possible (D) all of above
6. _____ Valve is proffered in controlling gas flow.
   (A) Butterfly (C) Diaphragm
   (B) Needle (D) none of above
7. Diaphragm and spring type actuators are example of _____ actuators.
   (A) Hydraulic (C) Electro mechanical
   (B) Pneumatic (D) none of above
8. The dropped level of current after the relay is energized is called _____.
   (A) sealed current (C) Drop out current
   (B) saturation current (D) none of above
9. In velocity servos_____ is used in feedback line.
   (A) Position sensor (C) Accelerometer.
   (B) Tachometer (D) none of above
10. Which of the following is not an advantage of solid state relay?
    (A) Finite on-off resistance (C) Long life
    (B) Higher switching speed (D) none of above

**Q-2 Short answer type question. (any ten) [20]**

1. Explain brief : Relay logic
2. Briefly explain diaphragm valve.
3. List advantage and disadvantage of stepper motor.
4. Draw block diagram of acceleration servo loop and explain in brief.
5. Briefly explain Linear output actuator.
6. List features of single port valve.
7. Draw diagram of relays as AND and OR logic.
8. List requirements of servo amplifiers.
9. Briefly explain potentiometer as a position sensor.
10. Briefly explain term: Rangeability.
11. Enlist advantage and limitations of solid state relay.
12. State features of Butterfly valve.

Q.3(A) Write a detailed note on electromechanical relay. [10]

OR

| | | |
|---|---|---|
| Q.3(A) | Write a detailed note on solid state relay. | [06] |
| Q.3(B) | Explain working of magnetic motor starter with necessary diagram. | [04] |
| Q.4(A) | Explain the working of synchro torque transmitter. | [06] |
| Q.4(B) | Write a note on AC rate generator. | [04] |

OR

| | | |
|---|---|---|
| Q.4(A) | Explain the working of basic servo system. | [06] |
| Q.4(B) | Discuss variable reluctance type stepper motor. | [04] |
| Q.5(A) | Explain flow rate V/s flow characteristics. | [05] |
| Q.5(B) | Write a note on solenoid actuators. | [05] |

OR

| | | |
|---|---|---|
| Q.5(A) | Explain double port globe valve in detail. | [05] |
| Q.5(B) | Explain construction of diaphragm valves with necessary diagram. | [05] |
| Q.6(A) | Explain spring and diaphragm type pneumatic actuators in detail with necessary diagram. | [10] |

OR

| | | |
|---|---|---|
| Q.6(A) | Write a note on hydraulic actuators. | [06] |
| Q.6(B) | Explain piston type actuators in detail. | [04] |

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(2)

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(45 & A-15) SEAT No._____

No. of Printed pages: 2

**SARDAR PATEL UNIVERSITY**
**Vallabh Vidyanagar**

**Examination : B. Sc. Instrumentation (Vocational) -V SEM**
**US05CINV04 – Analytical Instrumentation**

**Monday, 13th November, 2017, 10:00 am – 1:00 pm**

**Total Marks: 70**

*Note: The figures to the right indicate maximum marks.*

Q-1. ***Multiple Choice Questions-*** [10]

(1) Standard buffer tablet of ..... pH is available in the market.
(a) 7 (b) 15 (c) 2 (d) 8

(2) pH value is dependent on .....
(a) Resistance (b) Inductance (c) Voltage (d) Temperature

(3) If identical solutions are placed inside & outside the bulb of glass electrode, there exists an EMF of few mV is called as
(a) symmetric potential (b) asymmetry potential (c) equilibrium (d) none

(4) The term "Plug" is used in ..... process.
(a) detection (b) sample injection (c) heating (d) none

(5) Response time of any detector should be
(a) very High (b) very Low (c) high (d) none

(6) The name of chromatography is defined from its.....
(a) two phases (b) stationary phase (c) three phases (d) mobile phase

(7) TCD is sample ..... technique.
(a) destructive (b) non destructive (c) volatile (d) none

(8) If the molecular weight is < 2000, method selection for liquid chromatography is
(a) Ionic/nonionic (b) soluble/insoluble (c) high/low (d) aqueous/non aqueous

(9) RI detector depends on ..... at the interface between cell wall and the flowing liquid to deflect a light beam.
(a) Fresnel's law (b) Ohms law (c) Snell's law (d) none

(10) Analysis of pharmaceutical products is carried out better by ..... detector.
(a) Refractive Index (b) Fluoresence (c) Conductivity (d) Thermal

Q-2. ***Short answer type (attempt any ten)*** [20]

(1) Why pH 7 is considered as neutral?

(2) Enlist different types of pH meter.

(3) What should be the property of carrier gas in GC?

(4) Draw neat labeled diagram of Combination electrode.

(5) What are advantages of helical tube column?

(6) What do understand by Paper Chromatography?

(7) Enlist drawbacks of large diameter column?

(8) What are precautions for sample injection in Chromatography?

(9) Draw neat diagram of Syringe Injector for Liquid Chromatography.

(10) What are limitations of Laser detectors?

(11) Enlist requirements for detectors.

(12) Enlist different types of Laser detectors.

Q-3. (a) Explain Null type pH meter in length. [6]

(b) Give the basic principle of pH measurement and write the Nernst's equation with appropriate interpretation. [4]

**OR**

Q-3. (a) Draw labeled diagram of reference electrode and explain it in detail. [6]

(b) Define Buffer solution. State precautions to be taken to handle it. [4]

Q-4. (a) Draw the block diagram of Gas chromatography (GC) and explain it. [5]

(b) Discuss Temperature control circuit of Oven in Gas Chromatography. [5]

**OR**

Q-4. (a) Discuss Flame ionization detector (FID) used in GC and write its limitations. [5]

(b) Explain working principle of Electron Capture Detector (ECD). [5]

Q-5. (a) Explain HPLC system with flow measurement and control. [6]

(b) Discuss Reciprocating Piston pump used in LC. [4]

**OR**

Q-5. (a) What do you mean by Gradient Elution? Discuss its mode and list sequence of program entries. [6]

(b) Explain Syringe type pump. [4]

Q-6. (a) Describe working of Mass detector. [5]

(b) Explain Fluorescence Detector. [5]

**OR**

Q-6. (a) Discuss UV absorbance detector. [5]

(b) Explain working of Refractive Index detector. [5]

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5C

SEAT No._____ No. of Printed Pages : 02

# SARDAR PATEL UNIVERSITY V.V.NAGAR

[407]

## B.Sc.(V$^{th}$ SEM.) INSTRUMENTATION (VOC.)

## 15$^{th}$ NOVEMBER-2017 EXAMINATION

## 8-BIT MICROPROCESSOR PROGRAMMING AND APPLICATION-1

## SUB.CODE-US05CINV05

**TIME:-10:00 am to 1:00 pm** **MARKS-70**

**Q-1 Choose correct answer** **[10]**

1. The content of accumulator is A5 H, after execution of CMA instruction it becomes _____.
   (A) 55 H (C) A5 H
   (B) AA H (D) none of above
2. _____ Flag is affected during data transfer operation.
   (A) Carry (C) Zero
   (B) Sign (D) none of above
3. In 8085 µp SUB instruction is _____ byte.
   (A) 1 (C) 3
   (B) 4 (D) none of above
4. The address buses of 8085 µp contain _____ bit.
   (A) Four (C) Sixteen.
   (B) Eight (D) none of above
5. _____ is machine control instruction.
   (A) RET (C) JNC
   (B) NOP (D) none of above
6. CALL and RET are ____ type instruction.
   (A) Advance (C) Logical
   (B) Branch (D) none of above
7. JNC is _____ byte instruction.
   (A) One (C) Three
   (B) Two (D) none of above
8. Which of following is two bytes instruction?
   (A) MVI B,0A H (C) JMP 2001 H
   (B) MOV B,A (D) none of above
9. Following instructions transfer the data from memory to microprocessor.
   (A) STA 16-bit (C) DCX, B
   (B) LDAX, B (D) none of above
10. _____ is the 16-bit register in 8085 µp.
    (A) Stack pointer (C) Accumulator
    (B) Flag register (D) none of above

**Q-2 Short answer type question. (any ten)** **[20]**

1. Define static and dynamic debugging.
2. State any 2 byte and 3 byte instructions.
3. State characteristics of logical instruction.
4. State function of ALU.
5. Define programme and software,
6. Define looping and counting technique.
7. Differentiate between DCR and DCX instruction.
8. Why data bus is bi-directional in 8085 µp?
9. List pins of interrupt control section of 8085 microprocessor.
10. State meaning of RRC and RLC with illustration.
11. State different addressing mode of 8085 µp



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12. What do you mean by NOP instruction in 80885up?

Q.3 Draw the architectural block diagram of 8085 µp and discuss function of each section of it. **[10]**

OR

Q.3 Discuss the concept of bus timing and de-multiplexing the bus $AD_0$- $AD_7$ **[10]**

Q.4 Describe classification of instruction according to operation perform and according to word size. **[10]**

OR

Q.4(A) Explain the method of writing, assembling and executing a simple program in 8085 µp. **[07]**

Q.4(B) Differentiate between op-code and operand. **[03]**

Q.5(A) Discuss different logical instructions with suitable illustration. **[06]**

Q.5(B) Write a programme to load two numbers in two registers now subtract one number from other such that carry flag will set and display the answer at output port. **[04]**

OR

Q.5(A) Explain different data transfer instructions with suitable example. **[06]**

Q.5(B) Write a programme: to load 7C H and 3B H in register C and D respectively. Now increment content of C than add both the number and display the sum at output port. **[04]**

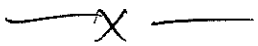
Q.6(A) Discuss different 16 –bit arithmetic instructions with illustration. **[05]**

Q.6(B) Write a program to load 9B H and A7 H in register B and C respectively. Now add both the numbers, if the sum is greater than FF H display 01 at output port 0 otherwise display the sum. **[05]**

OR

Q.6(A) Describe conditional and un-conditional jump instructions giving suitable examples. **[05]**

Q.6(B) Discuss method of static and dynamic debugging a programme. **[05]**



SEAT No._____ No. of Printed Pages : 02

[33]

# SARDARPATEL UNIVERSITY V.V.NAGAR

T.YB.Sc. Sem-V EXAMINATION

SUB. CODE:- USO5CINV06 Signal Conditioning & Communication

DATE:-17/11/2017 TIME:-10:00 am to 1:00 pm MARKS-70

**Q-1** **Choose correct answer** **[10]**

1. Tristate switch has _____ output states.
   (A) 1 (C) 3
   (B) 2 (D) None of these
2. Registers are made of _____.
   (A) Flip-flop (C) Resistor
   (B) Capacitor (D) None of these
3. In ring counter data is _____.
   (A) Rotated (C) Not Rotated
   (B) Steady (D) None of these
4. Flash type A/D Converter is _____ converter.
   (A) Fastest (C) Slow
   (B) Very slow (D) None of these
5. Successive approximation type A/D Converter _____ converter.
   (A) Fast (C) Slowest
   (B) Very fast (D) None of these
6. In V/F type A/D converter _____ is constant.
   (A) Frequency (C) Time
   (B) Voltage (D) None of these
7. Modem is also called _____.
   (A) DCE (C) Capacitor
   (B) DTE (D) None of these
8. The schmitt trigger has U.T.P. and _____.
   (A) L.T.P. (C) No Point
   (B) M.T.P. (D) None of these
9. Schering Bridge is used for the measurement of unknown _____.
   (A) Resistance (C) Inductance
   (B) Capacitance (D) None of these
10. Maxwell bridge is used for measuring _____.
    (A) Resistance (C) Inductance
    (B) Capacitance (D) None of these

**Q-2** **Short answer type question. (any ten)** **[20]**

1. Explain FSK with necessary diagrams.
2. Explain Asynchronous & Synchronous operation.
3. Explain low speed Modem operation.
4. Draw the operation diagram of successive approximation converter.
5. Draw the figure of 3-bit parallel comparator type A/D converter.
6. Draw the inter connecting circuit of samples & hold circuits and A/D converter.
7. Draw the circuit of weighted resistor type -4 bit D/A converter.
8. Write a truth - table tristate switch.
9. Explain linearity, sensitivity and accuracy.
10. Draw the circuit diagram for hay bridge.
11. Draw the circuit diagram for Maxwell bridge.
12. State limitations of whetstone bridge.

CP. T. O.)

| | | |
|---|---|---|
| Q.3 | Explain working of R-2R ladder type D/A converter. | [10] |
| | **OR** | |
| Q.3 | Give an account of Tristate switch. | [10] |
| Q.4 | Give an account of Schmitt trigger as an interface circuit. | [10] |
| | **OR** | |
| Q.4 | Give an account of Modems & interfaces. | [10] |
| Q.5 | Explain in detail voltage to frequency type A/D converter. | [10] |
| | **OR** | |
| Q.5 | Explain in detail working of counter type A/D converter. | [10] |
| Q.6 | Give an account of Wheastone bridge. | [10] |
| | **OR** | |
| Q.6 | Give an account of Wein bridge. | [10] |

—— X ——

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SEAT No._____ No. of Printed Pages : 2

[458A23]

**SARDAR PATEL UNIVERSITY**

**T. Y. B.Sc. (V Semester) Examination**
**TUESDAY, NOV. 7, 2017 Time: 10:00 a.m. to 1:00 p.m.**
**US05CMIC01(MICROBIOLOGY)**
**FUNDAMENTALS OF MOLECULAR BIOLOGY**

**Maximum Marks: 70**

**Q.1. Each question below gives a multiple choice of answers. Choose the most appropriate one. [10]**

1 Which histone is not a part of the nucleosome

(a) H1 (b) H2A

(c) H2B (d) H3

2 Overall conclusion of Hershey & Chase experiment was:

(a) DNA was responsible for heredity (b) Protein & DNA was responsible for heredity

(c) Ratio of Adenine to thymine was always the same (d) Phage DNA was similar to bacterial DNA

3 Which of the following enzyme is not involved in DNA replication?

(a) DNA Polymerase (b)Primase

(c) DNA Helicase (d) Reverse Transcriptase

4 Which of the following eukaryotic DNA polymerase has intrinsic Primase activity

(a) DNA pol β (b) DNA Pol σ

(c) DNA Pol δ (d) DNA Polα

5 What is the function of SSB protein in DNA replication

(a) They unwind a DNA double helix to form a separate single strands (b) They bind to a single stranded DNA & assist in the reformation of double stranded DNA

(c) They bind to single stranded DNA and prevent the single strands from reforming base pairs. (d) None of these

6 Genetic code was deciphered by

(a) Marshall Nirenberg (b) Hargobind Khorana

(c) James D Watson (d) Francis C. Crick

7 The first m RNA codon to specify an amino acid is always

(a) UAA (b) AUG

(c) UAG (d) TAC

8 Translation in prokaryotes begins by the formation of 30 S initiation complex between the:

(a) 30 S ribosomal subunit, mRNA, IF & N-fmet-t-RNA (b) 30 S ribosomal subunit, tRNA, &IF

(c) 30 S ribosomal subunit, & mRNA only (d) 30 S ribosomal subunit, mRNA & IF

9 The lac operon is a cluster of:

(a) Three structural gene (b)Three structural genes &their promoter

(c) A regulator gene, an operator & a promoter (d)A regulator gene, an operator, a promoter & three structural genes



(P.T.O.)

10 The Sigma is a component of :

(a) DNA Polymerase (b) DNA Ligase

(c) RNA Polymerase (d) Endonuclease

**Q. 2 Short Questions (Attempt any TEN)** **[20]**

1 Distinguish between B and Z form of DNA
2 Draw the structure of Adenine and Cytosine
3 What do you mean by the terms Nucleosome and Solenoid?
4 What powers the action of helicase and what is the function of SSB protein?
5 What is θ model of replication?
6 What is Ori C and what is its significance in DNA replication?
7 Define regulon and operon
8 What is the role of gag, pol and env genes in retroviruses?
9 How RNA polymerase recognizes the promoter region of DNA template?
10 Enlist the components and their role involved in initiation of protein synthesis.
11 Enlist the features of Genetic Code.
12 Draw a neat labeled structure of 70 S ribosome and what is its function?

**Q. 3** **[A]** Explain the Watson and Crick Model of DNA **[05]**

**[B]** Explain with the help of an experimental evidence that the use of radioisotopes proved DNA is a genetic material **[05]**

**OR**

**Q.3** **[A]** Explain in detail the organization of Eukaryotic chromosome **[06]**

**[D]** Write an extensive note on t- RNA **[04]**

**Q. 4** [A] Write a note on Rolling Circle model of Chromosome replication **[05]**

[B] Explain the Replication of Eukaryotic DNA **[05]**

**OR**

**Q.4.** [A] DNA replication is Semi-conservative – Justify **[04]**

[B] Explain in detail Initiation and elongation of DNA replication in Prokaryotes. **[06]**

**Q. 5** Discuss the regulation of gene expression (Lac operon) in detail. **[10]**

**OR**

**Q.5.** Explain in detail the molecular mechanism of Transcription **[10]**

**Q. 6** **[A]** Write a note on Wobble hypothesis. **[04]**

**[B]** Explain post translational modification of proteins **[06]**

**OR**

**Q.6.** **[A]** Explain Activation and Initiation and elongation of Protein synthesis **[06]**

**[B]** Explain in detail how genetic code was deciphered **[04]**

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[55/A26] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**
**B.Sc.(5th Semester) EXAMINATION 2017**
**Thursday, November 9th, 2017**
**10:00 a.m. TO 1:00 a.m.**
**SUBJECT: MICROBIOLOGY US05CMIC02**
**(Bioinstrumentation)**

**TOTAL MARKS: 70**

**Note:** (1) All the questions are compulsory.
(2) Figures on the right indicate marks.

**Q-1 Select the correct answer for each question from the option given below** **[10]**

1. **Which of the following spectroscopic technique based on the principle of "Bond Vibration"?**
   (A) UV-Visible (B) Atomic absorption (C) Infrared (D) Nephlometry
2. **Which of the following is NOT a part of monochromatic system?**
   (A)Entrance slit (B) Prizm (C) Exit slit (D) Sample Cell
3. **Which of the following act as a cross linker in PAGE?**
   (A)TEMED (B) Bis acrylamide (C) Ammonium persu;phate (D) Acrylamide
4. **Which centrifugal technique separates analytes with same size but different density?**
   (A) Differential (B) Isopycnic (C) Rate zonal (D) None of these
5. **Which of the following chromatographic technique can be used for the determination of relative molecular size of proteins?**
   (A)Adsorption (B) Ion exchange (C) Gel permeation (D) Affinity
6. **Which of the following detector is used in Gas Liquid Chromatography to detect chlorinated compounds?**
   (A)Nitrogen phosphorous (B) Electron capture
   (C) Thermal ionization (D) Flame ionization
7. **Which of the following tool is an example of homology and similarity?**
   (A)PROSPECT (B) EMBOSS (C) RAMSOL (D) BLAST
8. **An immobilized biological material which can specifically interact with an analyte and produce physical, chemical or electrical signals that can be measured is called _____**
   (A) Transducer (B) Biosensor (C) Thermistor (D) Transponder
9. **Which of the following technique is 'denaturing PAGE' with discontinuous buffer system?**
   (A)Native (B) Pulse Field (C) SDS (D) Agarose
10. **Which of the following is used to deliver mobile phase in the column of HPLC system?**
    (A)Pump (B) Photomultiplier (C) Injector (D) Chopper

**Q-2 Give short answer of the following questions (Any ten)** **[20]**

[1] Write about sequence of events taking place in the flame during flame emission spectroscopy.

[2] Write about quodrupole mass analyser with diagram in mass spectroscopy.

[3] What is nephlometry? How can it be used to analyse suspensions?

[4] Write about the role of (1) Ammonium persulphate and (2) TEMED in electrophoresis.

[5] Write about principle of RNA denaturation during electrophoresis.

[6] Enlist ideal characteristic of gradient material used in density gradient centrifugation.

[7] Write about specific and non specific elution in affinity chromatography.

[8] Define (1) Partition Coefficient (2) Theorytical Plate

[9] What do you mean by column bleeding in Gas Liquid Chromatography? How can it be taken care of during separation of analytes?

[10] Write the working of luminescent biosensor using luciferase enzyme.

[11] Write about the aim of bioinformatics..

[12] Define the terms isotopes and radioisotopes and give one example of each.

Q-3 (A) Discuss principle, sample preparation and applications of Infra Red Spectroscopy. [06]

(B) What are atomizers? Discuss the role of atomizers in Atomic Absorption Spectroscopy. [04]

**OR**

Q-3 Give detail account on principle, working and applications of UV-Vis Spectroscopy. [10]

Q-4 Give detail account on- Poly Acrylamide Gel Electrophoresis (PAGE). [10]

**OR**

Q-4 Discuss in detail about different types of density gradient centrifugations in terms of its principle, working and applications. [10]

Q-5 (A) Discuss about pumping system, sample injection and applications of High Performance Liquid Chromatography (HPLC). [05]

(B) What are the criteria for selection of ion exchanger in ion exchange chromatography? Discuss about various steps involved in the ion exchange chromatography. [05]

**OR**

Q-5 (A) Write a note on- Gel Permeation Chromatography [06]

(B) Draw neat and labeled diagram of Gas Liquid Chromatography (GLC) and write about different types of detectors. [04]

Q-6(A) Discuss about the scope of bioinformatics. [05]

(B) Enlist different type of radioactive decay and discuss any one in detail. [05]

**OR**

Q-6 Define biosensor and giving one example each explain different types of biosensors. [10]

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[47/A27] SEAT No._____ No. of Printed Pages : 3

# SARDAR PATEL UNIVERSITY

B.Sc.-V SEM, NOVE-17 Examination

**Subject Code:US05CMIC03**

**Subject Title:-Microbial physiology & Enzymology**

**Date:** 11/11/2017 **Time:**10.00a.m. to1.00 p.m.

**Day:**Saturday **Total marks:** 70

**N.B:** Figures on the right indicate marks.

Q.1 Answer the following Multiple Choice Questions.**(All questions are compulsory)** 10

1 In which of the following process does not affect Concentration gradient during nutrient transport ?
(a) Facilitated diffusion. (b) Group translocation.
(c) Binding Protein transfer. (d) All of the above.

2 Signal peptide contains cleavage site for peptidase enzyme at which aminoacid location ?
(a) $18^{th}$aminoacid. (b) $17^{th}$aminoacid
(c) 20th aminoacid. (d) None of the above.

3 Polymyxins affects which of the following process ?
(a) Inhibitscellwall synthesis. (b) Inhibits protein synthesis.
(c) Damages cell-membrane. (d) None of the above.

4 Which of the following is an example of semi-synthetic penicillin?
(a) Amphicillin. (b) Amoxycillin.
(c) Oxacillin. (d) All of the above.

5 During germination of endospore, activation process is triggered by_____.
(a) Heat (b) Low $P^H$
(c) By reducing agents (d) All of the above

6 Which of the following bond/s is/are observed in tertiary structure of protein?
(a) hydrogen (b) ionic
(c) disulfide (d) All of these

7 Those enzymes which can catalyse same reaction but having p different properties are known as_____.

(a) Apoenzyme. (b) Coenzyme.
(c) Holoenzyme. (d) Isoenzyme

8 Km values lies in the range of _____mol/lit.

(a) $10^{-1}$ to $10^{-5}$ (b) $10^{-1}$ to $10^{-6}$
(c) $10^{-2}$ to$10^{-6}$ (d) $10^{-3}$ to $10^{-6}$

9 How many digits are there in each enzyme commission number?

(a) 3 (b) 4
(c) 6 (d) 8

10 Which of the following is/are mechanism type of multisubstrate reactions?

(a) Ordered mechanism (b) Random mechanism
(c) Ping pong mechanism (d) All of these

Q.2 Give short answers to the following questions. **(Attempt Any Ten)** 12

1 Write in brief importance of siderophores.
2 Give example of various components involved in group translocation process.
3 Give examples of types of Permeases.
4 Write few drawbacks of Streptomycin.
5 Write mode of action of Tetracycline.
6 Enlist types of Bacterial movement.Also give examples of each.
7 Write about temperature coefficient or $Q_{10}$.
8 List out the bonds/interactions that maintain tertiary structure.
9 Define: Zymogens and allosteric enzyme.
10 Draw the Lineweaver-Burk plot for uncompetitive and mixed inhibition.
11 What are the significance of double reciprocal plot?
12 What is covalent modification?

| | | | |
|---|---|---|---|
| Q.3 | | Write short notes on:- | |
| | (A) | Write note on-Na-K Pump. | 05 |
| | (B) | Siderophores. | 05 |
| | | **OR** | |
| Q.3 | | Write short notes on:- | |
| | (A) | Write short note on:- Signal peptides. | 06 |
| | (B) | Write short note on :- "Group translocation ". | 04 |
| Q.4 | | Write short note on:- | |
| | (A) | Antibiotics causing damage to cell membrane. | 05 |
| | (B) | Sporulation of Endospore. | 05 |
| | | **OR** | |
| Q.4 | (A) | Write mode of action of following antimicrobial agents:- 1. Penicillin. 2. Chloremphanicol. 3.Sulfonamides. | 06 |
| | (B) | Ideal characteristics of Chemotherapeutic agents. | 04 |
| Q.5 | | Write short note on:- | |
| | (A) | Factors affecting enzyme action. | 06 |
| | (B) | Active site of Enzyme. | 04 |
| | | **OR** | |
| Q.5 | | Write short note on:- | |
| | (A) | Mechanism of enzyme action. | 05 |
| | (B) | IUB system of Classification of enzyme. | 05 |
| Q.6 | | Derive Michaelis-Menten equation by using Briggs-Haldane assumption and explain the significance of Km. | 10 |
| | | **OR** | |
| Q.6 | | Describe in detail about enzyme inhibition . | 10 |

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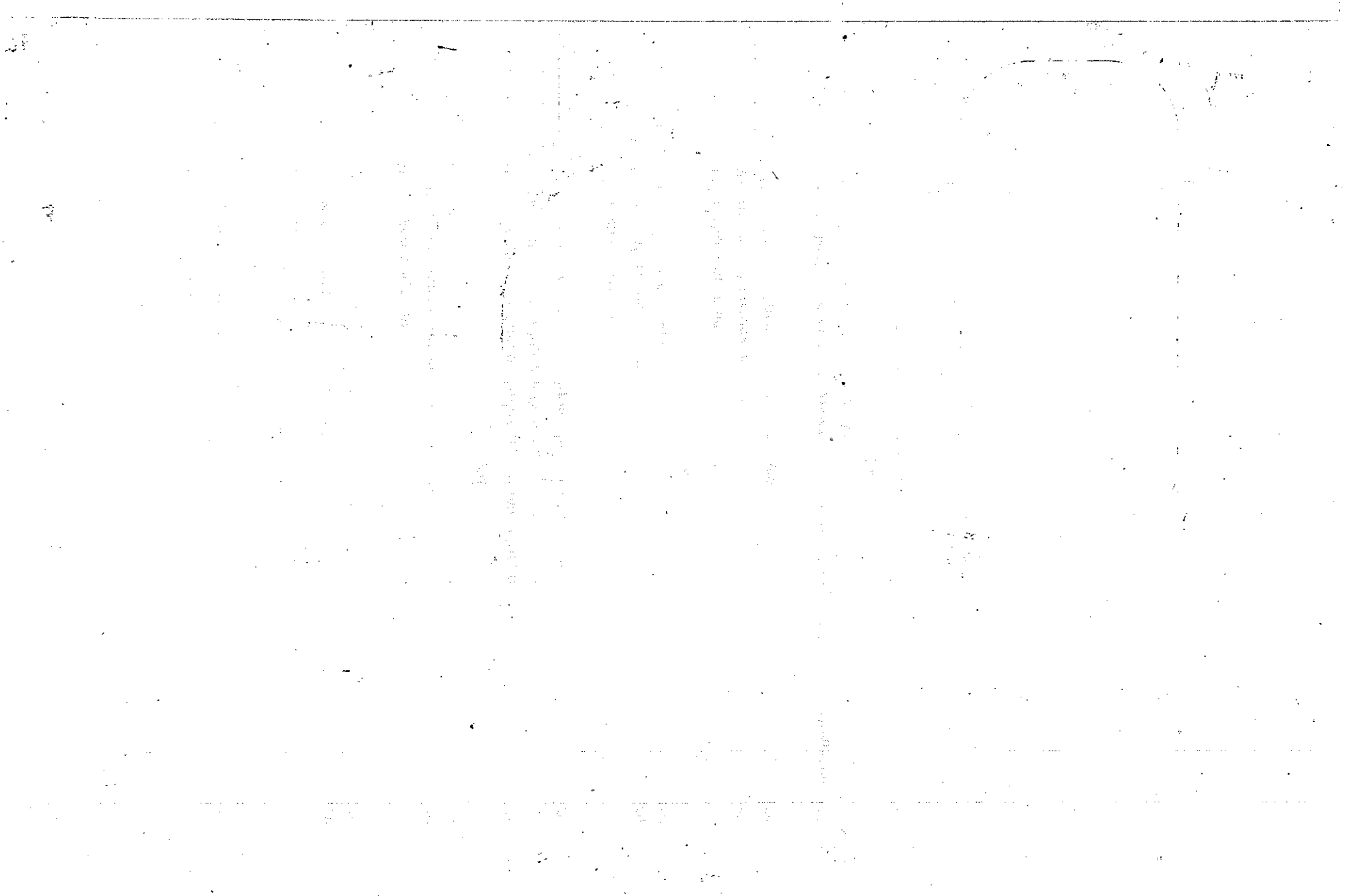

[47/A27] SEAT No._____ No. of Printed Pages : 3

# SARDAR PATEL UNIVERSITY

B.Sc.-II SEM, NOVE-17 Examination

**Subject Code:US05CMIC03**

**Subject Title:-Microbial physiology & Enzymology**

**Date:** 11/11/2017 **Time:**10.00a.m. to1.00 p.m.

**Day:**Saturday **Total marks:** 70

N.B: Figures on the right indicate marks.

Q.1 Answer the following Multiple Choice Questions.**(All questions are compulsory)** 10

1 In which of the following process does not affect Concentration gradient during nutrient transport ?
(a) Facilitated diffusion. (b) Group translocation.
(c) Binding Protein transfer. (d) All of the above.

2 Signal peptide contains cleavage site for peptidase enzyme at which aminoacid location ?
(a) $18^{th}$aminoacid. (b) $17^{th}$aminoacid
(c) 20th aminoacid. (d) None of the above.

3 Polymyxins affects which of the following process ?
(a) Inhibitscellwall synthesis. (b) Inhibits protein synthesis.
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(c) Oxacillin. (d) All of the above.

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(a) Heat (b) Low $P^H$
(c) By reducing agents (d) All of the above

6 Which of the following bond/s is/are observed in tertiary structure of protein?
(a) hydrogen (b) ionic
(c) disulfide (d) All of these



(P.T.O.)

7 Those enzymes which can catalyse same reaction but having p different properties are known as_____.

(a) Apoenzyme. (b) Coenzyme.
(c) Holoenzyme. (d) Isoenzyme

8 Km values lies in the range of _____mol/lit.

(a) $10^{-1}$ to $10^{-5}$ (b) $10^{-1}$ to $10^{-6}$
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9 How many digits are there in each enzyme commission number?

(a) 3 (b) 4
(c) 6 (d) 8

10 Which of the following is/are mechanism type of multisubstrate reactions?

(a) Ordered mechanism (b) Random mechanism
(c) Ping pong mechanism (d) All of these

Q.2 Give short answers to the following questions. **(Attempt Any Ten)** 12

1 Write in brief importance of siderophores.
2 Give example of various components involved in group translocation process.
3 Give examples of types of Permeases.
4 Write few drawbacks of Streptomycin.
5 Write mode of action of Tetracycline.
6 Enlist types of Bacterial movement.Also give examples of each.
7 Write about temperature coefficient or $Q_{10}$.
8 List out the bonds/interactions that maintain tertiary structure.
9 Define: Zymogens and allosteric enzyme.
10 Draw the Lineweaver-Burk plot for uncompetitive and mixed inhibition.
11 What are the significance of double reciprocal plot?
12 What is covalent modification?

Q.3 Write short notes on:-

(A) Write note on-Na-K Pump. 05

(B) Siderophores. 05

**OR**

Q.3 Write short notes on:-

(A) Write short note on:- Signal peptides. 06

(B) Write short note on :- "Group translocation ". 04

Q.4 Write short note on:-

(A) Antibiotics causing damage to cell membrane. 05

(B) Sporulation of Endospore. 05

**OR**

Q.4 (A) Write mode of action of following antimicrobial agents:- 06

1. Penicillin. 2. Chloremphanicol. 3.Sulfonamides.

(B) Ideal characteristics of Chemotherapeutic agents. 04

Q.5 Write short note on:-

(A) Factors affecting enzyme action. 06

(B) Active site of Enzyme. 04

**OR**

Q.5 Write short note on:-

(A) Mechanism of enzyme action. 05

(B) IUB system of Classification of enzyme. 05

Q.6 Derive Michaelis-Menten equation by using Briggs-Haldane assumption and explain the significance of Km. 10

**OR**

Q.6 Describe in detail about enzyme inhibition . 10

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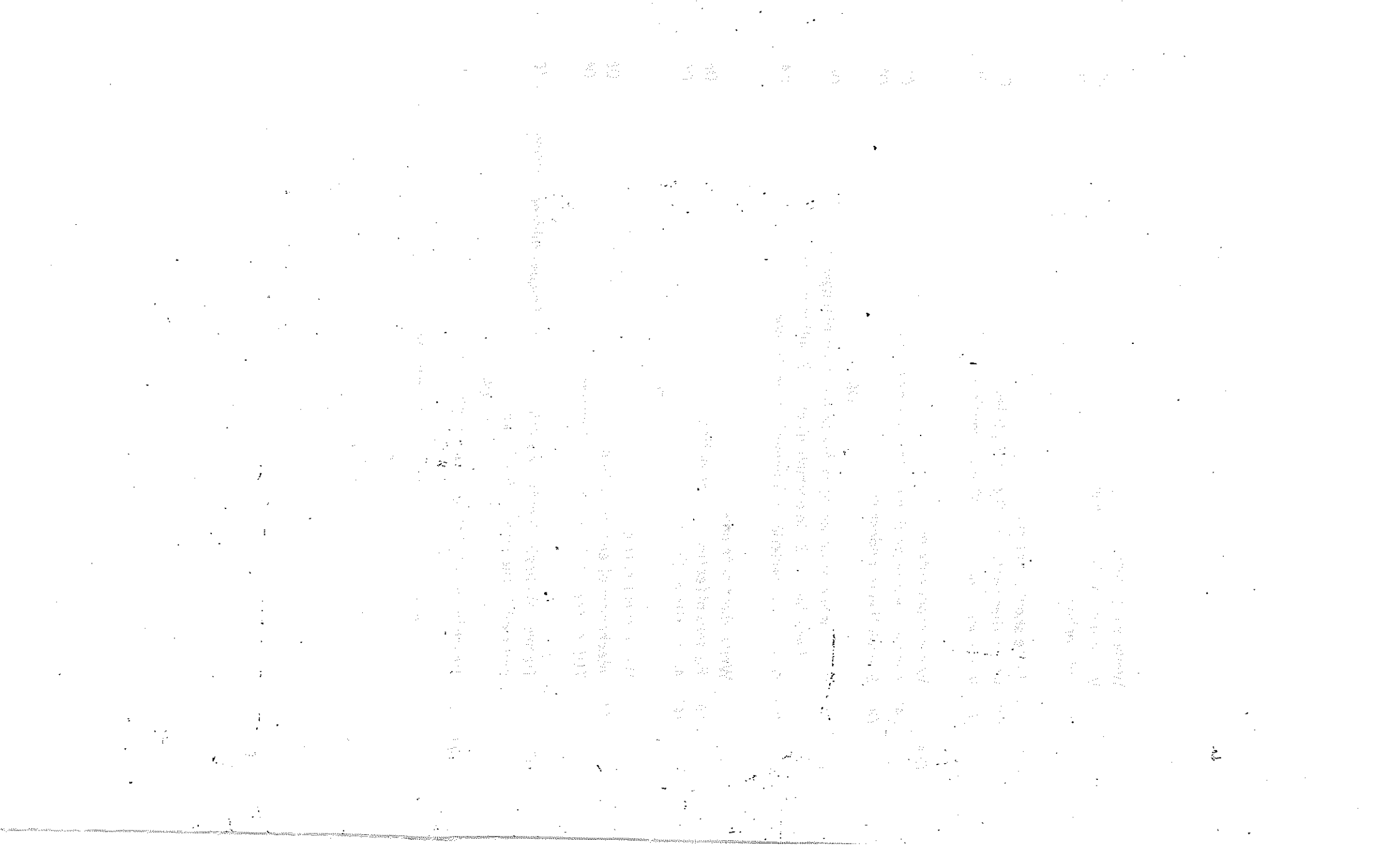

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[46/A17] SEAT No._____ No. of Printed Pages 2

No. of Pages 02

**Sardar Patel University**
**T.Y.B.Sc V$^{th}$Sem Examination - 2017**
**Monday 13$^{th}$ Nov 2017**
**Subject: Microbiology**
**Course Code US05CMIC04 (Immunology)**
**Time:10:00 am – 01:00 pm**

**Total Marks 70**

**Q.1. Select the correct answer for each question from the option given below. [10]**

1. _____among the following is an antigen presenting cell.
   (a) dendritic cell (b) erythrocytes (c) basophils (d) eosinophils
2. Acute phase proteins are produced by _____.
   (a) spleen (b) thymus (c) liver (d) kidney
3. Penicillin is an example of _____.
   (a) antibody (b) CD (c) TLR (d) hapten
4. Fas – FasL pathway is also known as _____ pathway.
   (a) CD95 (b) CD8 (c) CD4 (d) CD28
5. The phenomenon of immune exclusion is exhibited by _____.
   (a) Ig G (b)IG M (c) Ig A (d) Ig E
6. Post zone area in zone phenomenon is an area of _____.
   (a) antigen excess (b) antibody excess (c) both in equal (d) none of these
7. Widal test for typhoid is an example of _____ agglutination test.
   (a) tube (b) slide (c) gel (d) passive
8. In chemically induced tumors the TSTA on the membrane of tumor cells is _____.
   (a) tumor specific (b) virus specific (c) both (a) & (b) (d) none of these
9. Type _____ hypersensitivity is called cytolytic or cytotoxic reaction.
   (a) I (b) II (c) III (d) IV
10. _____ is a systemic autoimmune disease.
    (a) SLE (b) myasthenia gravis (c) Hashimoto's disease
    (d) autoimmune thrombocytopenia



(PTO)

**Q.2.** **Write short answers of the following questions. (Any ten)** **[20]**

1. Write the function of spleen and thymus.
2. What is the roll of NK cells in protecting the host?
3. What is the significance of toll like receptors?
4. Explain what is humoral and cell mediated immunity.
5. Write the structure and function of MHC class I molecule.
6. Explain naturally acquired active and passive immunity.
7. Write the passive agglutination test.
8. Differentiate between precipitation and agglutination reaction.
9. Write the importance of monoclonal antibodies.
10. Explain the terms neoantigens and sequestered antigens.
11. Define hypersensitivity and how is it classified?
12. Which are the different approaches attempted in immunotherapy of cancer?

**Q.3.** Write a detail note on cytokines. **[10]**

**OR**

**Q.3.(a)** Write a note on acute inflammatory response. **[05]**

**(b)** Define complement and explain the alternative complement pathway. **[05]**

**Q.4.** Discuss the activation of T – cells. **[10]**

**OR**

**Q.4.(a)** Define antigens and write a note on properties of antigens. **[06]**

**(b)** What are T independent antigens and write the T independent activation of B – cells. **[04]**

**Q.5.(a)** Explain the structure and functions of different types of immunoglobulin. **(06)**

**(b)** Write a note on general features of antigen antibody reactions. **(04)**

**OR**

**Q.5.(a)** Write a note on precipitation reactions in gel. **(06)**

**(b)** Explain the tenets of clonal selection theory. **(04)**

**Q.6.** Discuss the mechanism of allograft rejection reaction and mention the factors favoring the survival of allograft. **[10]**

**OR**

**Q.6.** Write an essay on immunodeficiency diseases. **[10]**

SC

SEAT No._____

No. of Printed Pages : 02

[41/A-16]

# SARDAR PATEL UNIVERSITY
## T Y B Sc EXAMINATION SEMESTER-5
## MICROBIOLOGY – US05CMIC05
## Microbial Diversity & Ecology

Date: 15/11/2017
Wednesday
Time: 10:00 am to 01:00pm
Total marks: 70

N.B: Figures on the right indicate marks.

**Q.1** M.C.Q. **(01 - mark each)** **10**

1 _____ is used in brewing and baking industries.

(a) *Gibberella fujikuroi* (b) *Aspergillus oryzae*
(c) *Penicillium notatum* (d) *Saccharomyces cerevisiae*

2 _____ is the genetic material of HIV

(a) Two single(+sense)RNA (b) d s DNA
(c) d s RNA (d) Two single(+sense)DNA

3 Mycoplasma are placed in taxonomic class _____

(a) Mollicutes (b) Tenericutes
(c) Gracilicutes (d) Basidiomycetes

4 All of the following are examples of positive interactions among microbes except_____.

(a) Commensalism (b) Mutualism
(c) Synergism (d) Predation

5 _____ are produced within the sac like structures in fungi

(a) Chlamydospores (b) Sporangiospores
(c) Conidiospores (d) Arthrospores

6 _____ are the infectious agents of potato spindle tuberdisease .

(a) Viruses (b) Bacteria
(c) Viroids (d) Algae

7 _____ are Gram Positive filamentous bacteria.

(a) Mycoplasma (b) Actinomycetes
(c) Rickettsia (d) Chlamydia

8 Mycorrhizae is an example of_____ relationship.

(a) Commensalism (b) Amensalism
(c) Mutualism (d) Neutralism

9 The causative agent of small pox is _____

(a) Variola virus (b) Vaccinia virus
(c) Hepatitis virus (d) HIV

10 _____ is the intracellular absorptive structure developed by plant parasitic fungi.

(a) Appressorium (b) Parenthosome
(c) Sclerotium (d) Haustorium



(P.T.O.)

**Q.2** Give short answers to the following questions. **(Answer Any Ten)** **20**

1. What is an appressorium and infection peg in fungi?
2. What are micro and macroelements in the nutrition of fungi?
3. What is conidiophore and conidiospore?
4. Draw neat and labelled diagram of HIV
5. Give the examples of diseases caused by viroids and prions
6. Enlist physical properties of Pox viruses.
7. How does Rickettsia differ from Chlamydia?
8. Give names of four genera that metabolize sulfur compounds.
9. Describe the habitat of anoxygenic phototrophic bacteria.
10. Define the terms synergism and syntrophism.
11. What is rhizosphere effect?
12. Define the terms ecology and ecosystem.

**Q.3** (a) Explain the asexual reproduction in fungi. **(06)**

(b) Explain in short about the three steps plasmogamy, karyogamy and meiosis in sexual reproduction in fungi. **(04)**

**OR**

**Q.3** (a) Explain the types of organic acids produced by fungi with suitable examples. **(04)**

(b) Write a note on modes and mechanism of nutrition in fungi. **(06)**

**Q.4** (a) Describe the structural genes of HIV. **(06)**

(b) Write about the resistance of HIV. **(04)**

**OR**

**Q.4** (a) How does Variola and Vaccinia virus differ? **(06)**

(b) Describe the morphology of pox virus with the help of labeled diagram. **(04)**

**Q.5** (a) Write notes on Mycoplasma. **(06)**

(b) Write names of disease caused by *Rickettsia* spp and arthropod vectors. **(04)**

**OR**

**Q.5** (a) Describe characteristics of purple sulfur bacteria. **(06)**

(b) Write notes on characteristics of genera *Spirocheates* **(04)**

**Q.6** Justify that negative interactions act to maintain ecological balance. **(10)**

**OR**

**Q.6** Write an exhaustive note on commensalism and synergism interaction. **(10)**

— X —

SEAT No._____ 5C

No. of Printed Pages : 02

[34 & A-15] SARDAR PATEL UNIVERSITY

**B.Sc. Examination Semester- 5**

**Microbiology – US05CMIC06**

**Fermentation Technology**

Date: 17/11/2017 Time: 10:00 AM to 1:00 PM

Day: Friday Total marks: 70

N.B: Figures on the right indicate marks.

Q.1 Multiple Choice Questions. **(01 - mark each)** 10

1 Process that produces Single Cell Protein as product is called _____.
(a) Enzyme production (b) Biomass production
(C) Transformation process (d) None of the above

2 A medium lacking growth factors is called
(a) Enrichment medium (b) Minimal medium
(C) Complete medium (d) Complex medium

3 Which of the following compound(s) can provide more energy than Glucose on per weight basis?
(a) Oil & fats (b) Hydrocarbons
(C) Both (a) & ( b) (d) None of the above

4 Phenylacetic acid is a _____ which is used in Penicillin production.
(a) Precursors (b) Inducers
(C) Inhibitors (d) All of the above

5 PEG is used to induce recombination in _____.
(a) Sexual cycle (b) Parasexual cycle
(C) Protoplast fusion (d) None of the above

6 In which of the following reactor, impellers are used?
(a) CSTR (b) Fluidized bed reactor
(C) Air lift fermenter (d) None of the above

7 Oxygen electrodes measure _____ during the fermentation process.
(a) Partial pressure of dissolved oxygen (b) Dissolved oxygen concentration
(C) Mole fraction of oxygen (d) None of the above

8 Which of the following is the most common method used in fermentation industries for air sterilization?
(a) Use of heat (b) Use of chemical
(C) Use of filters (d) None of the above

9 An enhancement of closed batch fermentation process is known as ____.
(a) Solid substrate fermentation (b) Fed batch fermentation
(C) Continuous fermentation (d) None of the above

10 Which of the following factors are considered for scale-up?
(a) Inoculum development. (b) Sterilization.
(c) Environmental parameters. (d) All of the above.

(P. T. O.)

Q.2 Give short answers to the following questions. **(02 - marks each) (Any Ten)** 20

1 Differentiate between Trophophase & Idiophase.
2 Enlist the range of fermentation processes, giving suitable examples.
3 Why, the medium used for screening organic acid producers be sufficiently buffered?
4 Write on the substrates used as nitrogen source in fermentation medium.
5 Enlist the ideal characteristics of a fermentation medium
6 'Strain improvement strategy is an important aspect of a fermentation industry'- justify.
7 Describe in brief on impellers.
8 Write on the control of temperature during a fermentation process.
9 Write on the problems associated with SSF
10 What is Maillard type browning reaction?
11 What is the importance of "sampling" during a fermentation process?
12 Describe scale-up in brief.

Q.3 Write Notes on
a Primary screening of antibiotic producers. 05
b Primary screening of growth factor producers 05

**OR**

Q.3 What is secondary screening? Discuss the significance of secondary screening. 10

Q.4 Write Notes on
a Isolation of auxotrophic mutants for primary metabolite. 04
b Role of X-radiation & UV radiation in strain improvement. 06

**OR**

Q.4 What is recombination? Explain protoplast fusion in detail. 10

Q.5 Write Notes on
a Ideal characteristics of a fermenter. 05
b Air-lift fermenter. 05

**OR**

Q.5 Write Notes on
a Monitoring and control of foam during fermentation. 05
b Enlist the components of fermenter involved in aeration & agitation. Describe in brief spargers. 05

Q.6 What is $K_La$? Describe the factors that affect $K_La$. 10

**OR**

Q.6 Define sterilization. Discuss in detail on the methods of medium sterilization. 10

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SC

[467A22] Seat No._____ No. of Pr... 3

# Sardar Patel University,

B.Sc. Examinations: 2017- Sem.-V

Subject : Mathematics US05CMTH01 Max. Marks : 70

Real Analysis-I

Date: 07/11/2017 ,Tuesday Timing: 10.00 am - 01.00 pm

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**Q: 1.** Answer the following by choosing correct answers from given choices. **10**

[ 1] The infimum of the set $\{x^2 - 1/x \in R\}$ is
[A] 0 [B] 1 [C] -1 [D] none

[ 2] The field which does not have the least upper bound property is
[A] N [B] Z [C] Q [D] R

[ 3] The g.l.b. of $\left\{\frac{(-1)^n}{n+1} / \ n \in N\right\}$ is
[A] 1 [B] 2 [C] 3 [D] none

[ 4] Interior of $R - \{0\}$ is
[A] $R$ [B] $R - \{0\}$ [C] $(-\infty, 0)$ [D] $(0, \infty)$

[ 5] In $(0, \frac{\pi}{2})$ function C(x) is
[A] strictly increasing [B] strictly decreasing [C] stationary [D] none

[ 6] The derived set of $S = \{1, \frac{1}{3}, \frac{1}{3^2}, \frac{1}{3^3}, \frac{1}{3^4}\}$ is
[A] $S$ [B] $Q$ [C] $\phi$ [D] $R$

[ 7] If a function $f(x)$ has a discontinuity of first type at $x = 2$ then $\lim_{x \to 2-} f(x)$ and $\lim_{x \to 2+} f(x)$ both
[A] do not exist [B] exist and they are equal
[C] exist but they are not equal [D] cannot exist togather

[ 8] For a function $f : R \to R$, if $\lim_{x \to 0} f(x) = f(0) + 1$ then $f$ is
[A] continuous at 0 [B] discontinuous at 0 [C] not defined at 0 [D] none

[ 9] If $f$ is continuous on an interval $I$ then
[A] $f$ is uniformly continuous on $I$
[B] $f$ is not necessarily uniformly continuous on $I$
[C] $f$ may have some points of discontinuities in $I$
[D] none

[ 10] The condition that $f$ is monotonic increasing at $c$ is
[A] $f'(c) = 0$ [B] $f'(c) \neq 0$ [C] $f'(c) \geqslant 0$ [D] $f'(c) \leqslant 0$

Q: 2. Answer ANY TEN of the following. 20

[ 1] Prove that supremum of a set S of numbers, if it exists, is unique.

[ 2] Can the greatest and smallest member of a set be same? justify your answer.

[ 3] Find the g.l.b and l.u.b. of $\left\{1+\frac{1}{n^2}\ /n \in N\right\}$ if they exist.

[ 4] Give an example of a set whose derived set and interior are identical.

[ 5] Find the largest open subset of $(1,2) \cup (4,8)$.

[ 6] Prove that intersection of two neighbourhoods is also a neighbourhood

[ 7] Evaluate : $\lim_{x\to 0} \frac{\sqrt{4+x}-2}{x}$

[ 8] Define : (i) Limit of a function (ii) Removable Discontinuity

[ 9] Is the function $f(x) = |x+1|, x \in R$ continuous at x = - 1? Justify.

[ 10] Is the following function derivable at $x = 1$?

$$f(x) = \begin{cases} x & \text{if } 0 \leqslant x < 1 \\ 1 & \text{if } x \geqslant 1 \end{cases}$$

[ 11] Prove that the function $x^2$ is uniformly continuous on $[-1,1]$.

[ 12] Prove that a function which is uniformly continuous on an interval is continuous on that interval.

Q: 3 [A] Prove that none of $\sqrt{2}$ and $\sqrt{8}$ is a rational number. 5

[ B] State and prove the Archimedean property of $R$ and deduce that if $a$ is a positive real number $a$ and $b$ any real number then there exists a positive integer $n$ such that $na > b$ . 5

OR

Q: 3 [A] Is $Q$ an order complete field? Prove your claim. 5

[ B] In usual notations prove that $E(x) = e^x,\ x \in R$. 5

Q: 4 [A] State and prove the *Bolzano-Weiestrass* theorem for sets. 5

[ B] If $S$ and $T$ are sets of real numbers then prove the following 5
(i) $S \subset T \Rightarrow S' \subset T'$ (ii) $(S \cup T)' = S' \cup T'$

OR

Q: 4 [A] Prove that interior of a set $S$ is the largest open subset of $S$. 5

[ B] Prove that derived set of a set is closed. 5

Q: 5 [A] If a function $f$ is continuous on $[a, b]$ and $f(a)$ and $f(b)$ are of opposite signs, then prove that there exists at least one point $\alpha \in (a, b)$ such that $f(\alpha) = 0$. 5

[ B] If a function $f$ is continuous at an interior point $c$ of $[a, b]$ and $f(c) \neq 0$, then prove that, there exists $\delta > 0$ such that $f(x)$ has the same sign as $f(c)$ for every $x \in (c - \delta, c + \delta)$. 5

OR

Q: 5 [A] Show that a function $f : [a, b] \to \Re$ is continuous at point c of [a,b] iff

$$\lim_{n\to\infty} c_n = c \Longrightarrow \lim_{n\to\infty} f(c_n) = f(c)$$

5

[ B] Prove that the function $f$ defined on $\mathbb{R}$ as follows is discontinuous at every point.

$$f(x) = \begin{cases} 1 & \text{when x is irrational} \\ -1 & \text{when x is rational} \end{cases}$$

5

Q: 6 [A] State and prove the Darboux's theorem for derivable function. 5

[ B] Define Uniformly Continuous function and prove that the function $\frac{1}{x}$ is not uniformly continuous on $(0, 1]$. 5

OR

Q: 6 [A] If $f'(c) > 0$, then prove that $f$ is a monotonic increasing function at point $x = c$. 5

[ B] Show that $\log(1 + x)$ lies between $x - \frac{x^2}{2}$ and $x - \frac{x^2}{2(1+x)}$, $\forall x > 0$ 5

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(3)

SC

[56/A25] No. 3

# Sardar Patel University, Vallabh Vidyanagar

B.Sc. Examinations: 2017-18 - V Sem

Subject : Mathematics US05CMTH02 Max. Marks : 70

Real Analysis-II

Date: 09/11/2017, Thursday Timing: 10.00 am - 01.00 pm

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**Q: 1.** Answer the following by choosing correct answers from given choices. **10**

[1] Every convergent sequence is
[A] oscillating [B] bounded [C] unbounded [D] none

[2] The sequene $\{(-1)^{n^2+1}\}$
[A] is convergent [B] diverges to $\infty$ [C] diverges to $-\infty$ [D] oscillates finitely

[3] A sequence $\{S_n\}$ ; where

$$S_n = \begin{cases} 2 & ; \text{ if } n = 1 \text{ or even} \\ p & ; \text{ where } p \text{ is the smallest prime factor of n.} \end{cases}$$

is
[A] convergent [B] divergent [C] oscillates finitely [D] oscillates infinitely

[4] A positive term series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ is convergent if and only if
[A] $p < 1$ [B] $p > 1$ [C] $p \leqslant 1$ [D] $p \geqslant 1$

[5] The positive term series $1 + r + r^2 + r^3 + .... + r^n + ...$ converges for
[A] $r > 1$ [B] $r \geqslant 1$ [C] $r < 1$ [D] $r \leqslant 1$

[6] If $\sum_{i=1}^{\infty} u_i$ is a positive term series and $\sum_{i=1}^{n} u_i < 100, \forall n$ then the series
[A] is convergent [B] diverges to $+\infty$ [C] diverges to $-\infty$ [D] none

[7] $\lim_{x\to 1} \lim_{y\to 1} \frac{x^2+y^2}{x+y} =$
[A] 1 [B] 2 [C] 3 [D] none

[8] $\lim_{(x,y)\to(6,\pi)} x^2 \tan\frac{y}{x} =$
[A] 36 [B] $36\sqrt{3}$ [C] $12\sqrt{3}$ [D] $3\sqrt{12}$

[9] The necessary condition for a function $f$ to have an extreme value at $(2,4)$ is
[A] $f_x(2,4) = 0,\ f_y(2,4) \neq 0$ [B] $f_x(2,4) \neq 0,\ f_y(2,4) = 0$
[C] $f_x(2,4) \neq 0,\ f_y(2,4) \neq 0$ [D] $f_x(2,4) = 0,\ f_y(2,4) = 0$

[10] For a function $f$ whose domain contains a neighbourhood of $(2,-1)$, if $f(x,y) - f(2,-1)$ assumes positive as well as negative signs in every neighbourhood of $(2,-1)$ then at $(2,-1)$, $f$ has
[A] no extreme value [B] a minimum [C] a maximum [D] none



(PTO)

**Q: 2.** Answer ANY TEN of the following. **20**

[1] Define : (i) Monotonic Sequence (ii)Finitely Oscillating sequence

[2] Show that $\lim_{n\to\infty} \frac{3+2\sqrt{n}}{\sqrt{n}} = 2$

[3] Show that $\lim_{n\to\infty} \sqrt[n]{n} = 1$

[4] Show that the necessary condition for convergence of an infinite series $\sum_{n=1}^{\infty} u_n$ is that $\lim_{n\to\infty} u_n = 0$

[5] If $\sum_{n=1}^{\infty} u_n = u$ and $\sum_{n=1}^{\infty} v_n = v$ then prove that $\sum_{n=1}^{\infty}(u_n - v_n) = u - v$

[6] Show that the series $1 + \frac{1}{2!} + \frac{1}{3!} + \ldots$ is convergent.

[7] Show that : $\lim_{(x,y)\to(0,0)} \frac{x\sin(x^2+y^2)}{x^2+y^2} = 0$

[8] Evaluate : $\lim_{(x,y)\to(1,1)} \frac{e^{(x-y)} - 1}{x - y}$

[9] If $f(x,y) = x^2y + e^{xy^2}$, then find $f_x$ and $f_y$

[10] State the necessary conditions for a function $z = f(x,y)$ to attain extreme values at a point $(a,b)$

[11] State Maclaurin's theorem

[12] Show that $y^2 + x^2y + x^4$ has a minimum at $(0,0)$.

**Q: 3** [A] If $\{a_n\}$ and $\{b_n\}$ are two sequences such that $\lim_{n\to\infty} a_n = a$ and $\lim_{n\to\infty} b_n = b$, then prove that $\lim_{n\to\infty} (a_n b_n) = ab$ **5**

[B] Prove that a sequence $\{S_n\}$ defined by the recursion formula $S_{n+1} = \sqrt{7+S_n}$, where $S_1 = \sqrt{7}$, converges to the positive root of $x^2 - x - 7 = 0$ **5**

OR

**Q: 3** [A] If a sequence of closed intervals $[a_n, b_n]$ is such that each member $[a_{n+1}, b_{n+1}]$ is contained in the preceeding one $[a_n, b_n]$ and $\lim_{n\to\infty} (b_n - a_n) = 0$ then prove that there is one and only one point common to all the intervals of the sequence. **5**

[B] State and prove the Bolzano-Weierstarss theorem for sequence **5**

**Q: 4** [A] State and prove the comparision test of first type in limit form. **5**

[B] State and prove *Cauchy's* general principle for convergence of a series. and prove that the series $\sum \frac{1}{n}$ does not converge. **5**

OR

Q: 4 [A] State and prove *Cauchy's* root test. 5

[B] Test the series $\sum \frac{n^2-1}{n^2+1}x^n$ for convergence. 5

Q: 5 [A] Define Limit of a function and by using the definition of limit prove that : 5

$$\lim_{(x,y)\to(1,2)}(x^2+2y)=5$$

[B] For the following function show that the repeated limits exist but the double limit does not when $(x,y)\to(0,0)$ 5

$$f(x,y)=\begin{cases}\frac{x^2-y^2}{x^2+y^2} & \text{, when } x\neq y\\ 0 & \text{, when } x=y\end{cases}$$

OR

Q: 5. If $z=f(x,y)$ is a function of independent variables $x,y$ and if $x,y$ are changed to new independent variables $u,v$ by the substitution $x=\phi(u,v)$; $y=\psi(u,v)$, then express the derivatives of $z$ with respect to $x,y$ in terms of $u,v$ and the derivatives of $z$ with respect to $u,v$. 10

Q: 6 [A] State and prove Taylor's theorem 5

[B] show that $2x^4-3x^2y+y^2$ has neither a maximum nor a minimum at $(0,0)$. 5

OR

Q: 6 [A] Prove that the first four terms of Maclaurin's expansion of $e^{ax}\cos by$ are 5

$$1+ax+\frac{a^2x^2-b^2y^2}{2!}+\frac{a^3x^3-3ab^2xy^2}{3!}.$$

[B] Define Extreme Value and investigate the maxima and minima of the function 5

$$f(x,y)=x^3+y^3-63(x+y)+12xy$$

— X —

(3)

S.E

SEAT No._____ No. of Printed Pages : 3

[48/A26]

**SARDAR PATEL UNIVERSITY**

**B.S. SEM-V EXAMINATION**

**11th November 2017, Saturday**

**US05CMTH03/Metric Space**

**Time: 10:00 TO 01:00 P.M** **Maximum Marks: 70**

**Q.1 Answer the following by selecting correct answer from the options.** **[10]**

1 The set of all cluster points of $\mathbb{Q}$ is _____
(a) $\mathbb{N}$ (b) $\mathbb{Q}$ (c) $\mathbb{R}-\mathbb{Q}$ (d) $\mathbb{R}$

2 Let $d: M \times M \to \mathbb{R}$ be a metric on $M$. Then which of the following is also a metric on $M$ ?
(a) $d_1(x,y) = min\{1,\ d(x,y)\}$ (b) $d_1(x,y) = max\{1,\ d(x,y)\}$
(c) $d_1(x,y) = min\{0,\ d(x,y)\}$ (d) $d_1(x,y) = max\{0,\ d(x,y)\}$

3 In $R^1$ the set _____ is disconnected.
(a) $(0,1)$ (b) $(1,2)$
(c) $(0,1) \cup (1,2)$ (d) $[0,1] \cup [1,2]$

4 In the metric space $M = [0,1]$ with usual metric , $B\left[\frac{1}{7}, 30\right] =$ _____
(a) [0,1] (b) $[\frac{1}{4}, 1]$ (c) $[0, \frac{1}{4}]$ (d) (0,1)

5 $A_1$ and $A_2$ are two connected subset of a metric space M. $A_1 \cup A_2$ is connected if_____
(a) $A_1 \cap A_2 = \emptyset$ (b) $\overline{A_1} \cap A_2 = \emptyset$
(c) $A_1 \cap \overline{A_2} = \emptyset$ (d) $A_1 \cap A_2 \neq \emptyset$

6 $M = R_d$ and $A = (0, \infty)$ then diameter of A=_____
(a) 0 (b) 1 (c) -1 (d) $\infty$

7 Subset $(0, \infty)$ of $\mathbb{R}^1$ is
(a) bounded (b) totally bounded
(c) neither bounded nor totally bounded (d) none

8 Image of Cauchy sequence under uniform continuous function is _____sequence
(a) a Cauchy (b) not a Cauchy
(c) converges to two distinct point (d) none

9 Metric space _____ with absolutes value metric is compact.
(a) [0,1] (b) [0, 1) (c) (0,1] (d) (0,1)

10 $f: R_d \to d$ defined by $f(x) = x$ all $x$ in R then _____ function
(a) f is not a continuous (b) $f^{-1}$ is a continuous
(c) $f^{-1}$ is not a continuous (d) f is a continuous

**Q.2 Answer ANY TEN of the following.** **[20]**

1 If ρ is a metric for a set M, then show that 2ρ is metric on M.
2 Let $(M, d)$ be a metric space. Then $\emptyset$ and $M$ are open set in $(M, d)$.
3 Every function from Rd (into a metric space) is continuous on Rd
4 In usual notations prove that $E \subset \bar{E}$.
5 Is arbitrary union of closed set is closed? Justify!



(PTO)

6 Let $M$ a metric space and let $A \subset B \subset M$. If $A$ is a dense in $B$ and if $B$ is dense in $M$, then prove that $A$ is dense in $M$.

7 Show that every subset of $R_d$ is bounded.

8 Prove or disprove that the empty set ϕ and singleton set are assumed to be connected

9 Let T: [0, 1/3] → [0, 1/3] be defined byT (x) = $x^2$, ∀x∈ [0, 1/3]. Prove that T is a contraction on [0, 1/3].

10 Any compact subset A of a metric space $(M, d)$ is closed and bounded.

11 Let f be a real valued continuous function on [a, b]. Then prove that f is bounded.

12 Show that $f: \mathbb{R} \to \mathbb{R}$ *defined by* $f(x) = x$ is uniformly continuous.

**Q-3**

[A] Let (M, ρ) be a metric space. If $\{S_n\}$ is a convergent sequence of points of M, then $\{S_n\}$is Cauchy. Is converse true? Justify! **[5]**

[B] The inverse image under f of any open ball B[f (a); ε ] about f (a) contains an open ball B[a; δ] about a. **[5]**

**OR**

[C] Let (M, d) be a metric space. Show that a function defined by $d_1(x,y) = \frac{d(x,y)}{1+d(x,y)}$ is a metric for M. **[5]**

[D] Let M be a metric space, and let f and g be real valued functions which are continuous at a ∈ M and g(a) ≠0. Prove that $\frac{f}{g}$ is continuous at a. **[5]**

**Q-4**

[A] Prove that f is continuous iff the inverse image of every open set is open. **[5]**

[B] The subset $A$ of $\mathbb{R}$ is connected iff whenever $a \in A$, $b \in B$ with $a < b$, then $c \in A$ for any $c$ such that $a < c < b$. **[5]**

**OR**

[C] Let $(M, \rho_1)$ and $(M, \rho_2)$ be metric spaces and let $f: M_1 \to M_2$. Then $f$ is continuous on $M_1$ if and only if $f^{-1}(F)$ is closed subset of $M_1$ whenever $F$ is a closed subset of $M_2$. **[5]**

[D] Let $E$ be any subset of the metric space $M$, then show that $\bar{E}$ is closed. **[5]**

**Q-5** Let (M, ρ) be a metric space. The subset A of M is totally bounded iff every sequence of points A contains a Cauchy sequence. **[10]**

**OR**

Define: Complete metric space. State and prove generalized nested interval theorem. **[10]**

**Q-6**

[A] If the metric space M has the Heine- Borel property, then M is compact. **[5]**

[B] Let f be a continuous real valued function on the compact metric space M, then f attains a maximum value at the same point of M. Also f attains a minimum value at some points of M. **[5]**

**OR**

[C] Prove that continuous image of compact metric space is compact. **[5]**

[D] If f is a one- one continuous function form the compact metric space $M_1$ onto a metric space $M_2$ then prove that f is a homeomorphism of $M_1$ onto $M_2$. **[5]**

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(47 & A-16)

# SARDAR PATEL UNIVERSITY

B.Sc.SEM-V EXAMINATION

$13^{th}$ November 2017 , Monday

10.00 a.m. to 01.00 p.m.

US05CMTH04 (Abstract Algebra-I) Maximum Marks: 70

**Q.1** Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

(1) $O(2)$ in $\mathbb{Z}$ is .....
(a) 3 (b) 0 (c) infinite (d) 2

(2) Additive inverse of 2 in $\mathbb{Z}_6$ is .....
(a) 4 (b) 2 (c) 3 (d) 1

(3) Every cyclic group of ..... order is simple group
(a) 4 (b) prime (c) 6 (d) 1

(4) Every infinite cyclic group has exactly ..... generators .
(a) 3 (b) 1 (c) 2 (d) 4

(5) A permutation $\sigma$ is said to be odd permutation if signature of $\sigma$ is .....
(a) 2 (b) $-1$ (c) 1 (d) $-2$

(6) In Klein 4-group $G = \{e, a, b, c\}$ , $ab =$ .....
(a) $a$ (b) $b$ (c) $c$ (d) $e$

(7) Centre of $\mathbb{Z}$ is .....
(a) $\mathbb{Z}$ (b) 2 (c) $\mathbb{N}$ (d) 1

(8) ——— is generator of group $\{...\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8, ...\}$
(a) $\frac{1}{6}$ (b) 2 (c) 1 (d) $\frac{1}{4}$

(9) Signature of every transposition is .....
(a) 1 (b) $-1$ (c) 2 (d) $-2$

(10) Every group has atleast ..... normal subgroups.
(a) 3 (b) 4 (c) 2 (d) 1

Q.2 Attempt the short questions. **[any ten]** [20]

(1) Define: Group and Cyclic group.
(2) Let $G$ and $G'$ be two isomorphic groups, $G$ is abelian then prove that $G'$ is also abelian.
(3) In group $G$, prove that every element of $G$ has unique inverse.
(4) Prove that product of two permutation need not be commutative.
(5) State Euler's theorem.
(6) Let H be any subgroup of group G. Then prove that $aH = H \Leftrightarrow a \in H$.
(7) Prove that every subgroup of abelian group G is normal in G.
(8) Express the inverse of cycle (1 2 4 5 3) as a product of transpositions.
(9) Define Simple group and Quotient group.
(10) Let $S_n$ be a group of all permutations. Prove that order of $S_n$ is $n!$ .
(11) Define signature of the permutation. [PTO]

(P.T.O)

(12) Find generators of $\mathbb{Z}$.

Q.3(a) Let G be a semigroup. Assume that, for all a,b$\in G$, the equations $ax = b$ and $ya = b$ have unique solutions in G. Then prove that G is a group. [5]

(b) Prove that group G is abelian iff $G = Z(G)$. [5]

**OR**

Q.3(c) Let $H$ and $K$ be finite subgroups of group G such that $HK$ is a subgroup of G. Then prove that $O(HK) = \frac{O(H)O(K)}{O(H \cap K)}$. [5]

(d) Prove that a non-empty subset H of a group G is subgroup iff $ab^{-1} \in H \ \forall \ a, b \in H$. [5]

Q.4(a) Let G be a finite cyclic group of order n, then prove that G has $\phi(n)$ generators iff $(m, n) = 1$. [5]

(b) Let $G$ be a group and $a, b \in G$ such that $ab = ba$. If $O(a) = n$ , $O(b) = m$ with $m, n$ relatively prime, then prove that $O(ab) = mn$. [5]

**OR**

Q.4(c) Prove that any subgroup of an infinite cyclic group is also an infinite cyclic group. [5]

(d) If $G$ is cyclic group of order n and $a^m = e$ for some $m \in \mathbb{Z}$ then prove that $n/m$ . [5]

Q.5(a) Let $G = (a)$ be a finite cyclic group of order n. Then prove that the mapping $\theta : G \to G$ defined by $\theta(a) = a^m$ is an automorphism of $G$ iff m is relatively prime to $n$. [6]

(b) Prove that a homomorphism $\theta : G \to G'$ of $G$ to $G'$ is one-one iff $Ker\theta = \{e\}$. [4]

**OR**

Q.5(c) State and Prove First isomorphism theorem. [6]

(d) Prove that a subgroup $H$ is normal in group $G$ iff $xH = Hx \ \forall \ x \in G$. [4]

Q.6(a) Prove that G is direct product of subgroups H and K iff (i) every $x \in G$ can be uniquely expressed as $x = hk$ , $h \in H$ , $k \in K$ (ii) $hk = kh$ , $h \in H$ , $k \in K$. [6]

(b) Prove that the external direct product of two cyclic groups each of order 2 is the Klein 4-group. [4]

**OR**

Q.6(c) State and prove Cayley's theorem. [6]

(d) Prove that the set $S_n$ of all permutation on $n$ symbols forms a non-commutative group. [4]

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[42/A-15]

**SARDAR PATEL UNIVERSITY**
**B.Sc. SEM-V EXAMINATION**
**15th November 2017,Wednesday**
**US05CMTH05/Number Theory**

No of printed pages:02

**Time: 10:00 TO 01:00 P.M** **Maximum Marks: 70**

**Q.1 Answer the following by selecting correct answer from the options.** **[10]**

1 $(5^7-1, 5^{34}-1)$ = _____.
(a) 1 (b) 4 (c) 5 (d) 25

2 If 'n' is an even integer then $3^n+1$ is divisible by _____.
(a) 5 (b) 2 (c) 3 (d) 4

3 The number of multipliers of 7 among the integers from 200 to 500 is_____.
(a) 71 (b) 28 (c) 43 (d) 63

4 The highest power of 2 in 50! is _____.
(a) 47 (b) 23 (c) 15 (d) 22

5 If 'a' is a square number then S(a) is _____.
(a) even (b) odd (c) prime (d) zero

6 If $ca \equiv cb(\text{mod } n)$ then $a \equiv b(\text{mod } n)$ only if _____.
(a) (c,a)=1 (b) (c,a)=b (c) (c,b)=1 (d) (c,n)=1

7 Prove that every number containing more than two digits can be divided by 4 iff the number formed by _____ digits can be divided by 4.
(a) last two (b) last three (3) first two (d) first three

8 If (m,n)=_____ then $\emptyset(mn) \neq \emptyset(m)+\emptyset(n)$.
(a) (3,6) (b) (2,2) (c) (3,4) (d) (4,3)

9 If m is not prime then $\emptyset(m)$ _____m-1.
(a) > (b) < (c) = (d) ≠

10 $\sum_{d/m} \emptyset(d)\mu(d) = 0$ iff m is _____.
(a) even (b) odd (c) prime (d) 1

**Q.2 <u>Answer ANY TEN of the following.</u>** **[20]**

1 Prove that $[a,b,c] = \frac{abc}{(ab,bc,ca)}$ ; $\forall a,b,c > 0$.

2 If (a-s) / (a b + s t). Then prove that (a-s) / (a t+ b s).

3 Every square number is of the form 9k or 3k+1;where k is any integer.

4 Prove that any two distinct Mersenne numbers are relatively prime.

5 If m is a composite number then prove that $2^m-1$ is also composite.

6 Prove that [x]+[y]≤ [x+y]≤[x]+[y]+1.

7 Find the positive integer solution of the Indeterminate equation $x^2 + xy - 6 = 0$.

8 If $a_1 \equiv b_1(modn)$ & $a_2 \equiv b_2(modn)$ then ${a_1}^m \equiv {b_1}^m(modn)$; $\forall m \in N$ by using mathematical induction method.

9 Find all relatively prime solutions of the equation $x^2 + y^2 = z^2$ with $0 < z < 30$.

10 If $(a,p) = 1$ ; $p$ is prime then $a^{p-1} \equiv 1(mod\ p)$.

11 Prove that $\emptyset(p^k) = p^k\left(1 - \frac{1}{p}\right)$; where $p$ is prime.

12 Find order of 2 modulo 7.

**Q-3**

[A] State and Prove Unique factorisation theorem . **[5]**

[B] If 'm' is a composite integer and $n_m$=111.....(m-times) then prove that $n_m$ is also composite number. **[5]**

**OR**

[C] State & prove fundamental theorem of Divisibility. **[5]**

[D] Prove that the prime numbers of the form (4n-1) is infinite. **[5]**

**Q-4**

[A] Prove that Möbious function is multiplicative function. **[5]**

[B] Prove that $\sum_{i=1}^{n} u_i^2 = u_n u_{n+1}$ **[5]**

**OR**

[C] Prove that every prime factor of $F_n$(n>2) is of the form $2^{n+2}t+1$ ; for some $t \in Z$. **[5]**

[D] Prove that any prime factor of $M_p$(p>2) is greater than p. **[5]**

**Q-5**

[A] Prove that the positive integer solution of the equation $x^{-1} + y^{-1} = z^{-1}$; $(x, y, z) = 1$ has and must have the form $x = a(a+b);\ y = b(a+b);\ z = ab$ ; where $a, b > 0$ & $(a, b) = 1$. **[10]**

**OR**

[B] Prove that the linear indeterminate equation $ax + by = c$ has solution iff $d/c$ ; where $(a, b) = d$ . If $x = x_0$ & $y = y_0$ is a particular solution of $ax + by = c$ . Then prove that general solution can be written as $x = x_0 + \frac{b}{d}t\ ;\ y = y_0 - \frac{a}{d}t\ ; t \in Z$. Find the positive integer solution of the indeterminate equation $7x + 19y = 213$. **[10]**

**Q-6**

[A] If $a^n \equiv 1(mod\ m)$ and $d$ is the order of $'a'$ modulo $m$. Then prove that $/n$ .

[B] Solve the system of Congruences **[5]**

$$x \equiv 2(mod 3)$$
$$x \equiv 3(mod 5)$$
$$x \equiv 2(mod 7)$$

**OR**

[C] Show that the sum of $\phi(m)$ positive integers less than $m(m > 1)$ and relatively prime to $m$ is $\frac{m}{2}\phi(m)$. **[5]**

[D] State & Prove Chienese – Remainder Theorem. **[5]**

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[35 & A-14]

**SARDAR PATEL UNIVERSITY**
**B.Sc. SEM-V EXAMINATION**
**17th November 2017, Friday**
**US05CMTH06/Mechanics - I**

No of printed pages:02

**Time: 10:00 TO 01:00 P.M** **Maximum Marks: 70**

**Q.1 Answer the following by selecting correct answer from the options.** **[10]**

1 Acceleration = _____
(a) $\frac{d^2s}{dt^2}$ (b) $\frac{dv}{dt}$ (c) $v\frac{dv}{ds}$ (d) all of above

2 Dimension of angular velocity is _____
(a) $M^0L^1T^{-1}$ (b) $M^0L^0T^{-1}$ (c) $M^1L^{-3}T^0$ (d) $M^0L^0T^1$

3 1 pound =_____ grams.
(a) 465.3 (b) 435.6 (c) 456.3 (d) 453.6

4 Three equal forces acting at a point are in equilibrium then angle between any two forces are _____
(a) zero (b) equal (c) different (d) none of these

5 In moment of a vector negative sign is taken for _____direction.
(a)cyclic (b) clockwise (c) circular (d) anti-clockwise

6 Lamina is the _____ of a rigid body.
(a)section (b) particle (c) portion (d) part

7 The mass centre of the particle is denoted by
(a) $(x, y)$ (b) $(\bar{x}, \bar{y})$ (c) $(x_0, y_0)$ (d) $(x_m, y_m)$

8 The mass centre of the area in the first quadrant of the curve $x^2 + y^2 = a^2$ is _____
(a) $(\frac{4a}{3\pi}, \frac{4a}{3\pi})$ (b) $(\frac{4a}{\pi}, \frac{4a}{\pi})$ (c) $(4a, 4a)$ (d) $(\frac{3a}{4\pi}, \frac{3a}{4\pi})$

9 Intrinsic equation for common catenary is _____
(a) $S = c\tan\theta$ (b) $S = \tan\theta$ (c) $S = c^2\tan\theta$ (d) $S^2 = c\ \tan\theta$

10 The tangential component of the reaction for a cable in contact with a smooth curve is _____
(a) $k$ (b) $N$ (c) $\frac{N}{k}$ (d) $\frac{N}{\rho}$

**Q.2 Answer ANY TEN of the following.** **[20]**

1 Define gradient of vector.
2 Explain additions of vectors.
3 State newton's third law with illustration.
4 When a particle said to be in equilibrium?
5 State lamy's theorem.
6 Define equipollent system of forces.
7 Define work done.
8 Describe forces which do not work.
9 Define potential energy.

(P.T.O.)

10 For catenary prove that $S^2 = y^2 + 2yc$

11 In usual notations prove that $S = c \sinh\frac{x}{c}$

12 Explain the term Hodograph.

**Q-3**

[A] State & prove Equation of motion of a particle moving in a straight line. **[5]**

[B] If two forces of magnitude $\vec{P}$ & $\vec{Q}$ makes an angle $\theta$ then prove that the magnitude of resultant is given by $R^2 = P^2 + Q^2 + 2PQ\cos\theta$ **[5]**

**OR**

[C] Two forces acting in opposite direction on a particle have resultant 34lbwt if they act at right angle to each other their resultant would have magnitude of 50 lbwt find magnitude of the forces. **[5]**

[D] A scalar field v is given by over a plane & v = $\frac{x^2+y^2}{2x}$ then what are the level curves? Show that at the point with polar co-ordinates $(r, \theta)$, grad v is inclined to the x-axis at an angle $2\theta$ and its magnitude is $\frac{1}{2}\sec^2\theta$. **[5]**

**Q-4**

[A] Find condition for the equilibrium of the body. **[5]**

[B] State & prove theorem of triangle of forces. **[5]**

**OR**

[C] In usual notations prove that $M = xY - Xy$. **[5]**

[D] If point '$O$' is the circum center of $\Delta ABC$ & the forces $\overrightarrow{P}$, $\overrightarrow{Q}$, & $\vec{R}$ are acting along $\overrightarrow{OA}$, $\overrightarrow{OB}$, & $\overrightarrow{OC}$ respectively. If $\overrightarrow{P}$, $\overrightarrow{Q}$, & $\vec{R}$ are in equilibrium then show that $\frac{P}{a^2(b^2+c^2-a^2)} = \frac{P}{b^2(a^2+c^2-b^2)} = \frac{P}{c^2(a^2+b^2-c^2)}$ **[5]**

**Q-5**

A light rigid rod of length $2b$ terminated heavy particles of weight w and W is placed inside a smooth hemispherical bowl of radius '$a$' which is fixed with its own rim horizontal. If particle of weight 'w' is just rest below the rim then prove that $wa^2 = W(2b^2 - a^2)$. **[10]**

**OR**

Show that there exist mass centre of a system of particles and it is unique. **[10]**

**Q-6**

[A] Derive the general formula for the cable hanging free. **[5]**

[B] Show that the equation of suspension bridge represents a parabola. **[5]**

**OR**

[C] For common catenary prove that $y = c(\cosh\left(\frac{x}{c}\right) - 1)$ where $c = \frac{H}{w}$ **[5]**

[D] Find tangential and normal component of the reaction for a cable in contact with rough curve. **[5]**

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[478 A24] SARDAR PATEL UNIVERSITY

**Fifth Semester B. Sc. Examination – 2017**

Tuesday, 7th Nov. 2017

Time: 10:00 AM to 1:00 PM

**PHYSICS: US05CPHY01 (Classical Mechanics)**

**N. B. All the notations and symbols have their usual meanings.** **Total Marks: 70**

**Que-1** **Choose correct option to answer the question.** **[10]**

**(1)** According to Newton's law of gravitational force $F_g \alpha$ _____.

(a) $m_1^2$ (b) $q_1 q_2$ (c) $1/r^2$ (d) $m_1 r_1$

**(2)** A conservative force field $\vec{F}$ = _____.

(a) $\vec{\nabla} g$ (b) $\Delta F$ (c) $-\vec{\nabla} V$ (d) $-V^2$

**(3)** Generalized coordinates may have _____.

(a) any dimensions (b) always dimensions of length (c) always have the dimensions time (d) always have the dimensions of time and length.

**(4)** Force of friction is _____ force.

(a) non-conservative (b) linear (c) conservative (d) always constant

**(5)** Virtual work done by applied forces is ___.

(a) infinite (b) imaginary (c) zero (d) negative

**(6)** Frames of reference moving with constant velocity with reference to each other are called _____frames of reference.

(a) non-inertial (b) active (c) rotational (d) inertial

**(7)** The distance between any two particles of a _____is constant.

(a) rigid body (b) flexible body (c) liquid (d) gas

**(8)** In a _____ space system of N particle is denoted by single points.

(a) configuration (b) momentum (c) velocity (d) mass

**(9)** According to variational principle, the integral $J = \int_{x_1}^{x_2} f(y, y', x)$ should have _____ value.

(a) infinite (b) neither minimum nor maximum (c) extremum (d) always minimum

**(10)** Newton formulation is equivalent to _____ formulation.

(a) Einstein (b) Jacobian (c) Schrodinger (d) Lagrangian



(P.T.O.)

**Que-2** Answer briefly **any ten** of the following questions. **[20]**

**(1)** State Coulomb's law of electrostatic force and write down its equation. Also give an equation for electric field in terms of a scalar potential.
**(2)** In the case of two electrons, compare electrostatic and gravitational forces.
**(3)** What are lines of force and equipotential surfaces?
**(4)** What are advantages of Lagrangian formulation over Newtonian formulation?
**(5)** Define cyclic coordinate and show that the linear momentum conjugate to cyclic coordinates is constant.
**(6)** Explain the following terms;
(i) Constraints (ii) degree of freedom.
**(7)** What is meant by pseudo force? Give an example.
**(8)** Explain briefly weightless condition of an observer in a satellite.
**(9)** Is it possible to have a perfectly rigid body? Why?
**(10)** Briefly explain configuration space.
**(11)** State Hamilton's principle.
**(12)** Explain briefly advantages of Hamilton's formulations over Newtonian formulations.

**Que-3** **(a)** For equivalent one body problem obtain, $\mu\ddot{\vec{r}} = \vec{F}^{int}$ for a two particle system. **[06]**

**(b)** State Kepler's three laws of planetary motion and prove the third law. **[04]**

**OR**

**Que-3** **(a)** Derive Gauss' law (field equation) as; **[06]**

$$\int \vec{E} \cdot d\vec{\sigma} = 4\pi\gamma q$$

Where $\gamma = \frac{1}{4\pi\epsilon_0}$. Also write down Poisson's and Laplace's equations.

**(b)** Give the defining equations of center of mass and reduce mass. Show that if mass of the one body is very greater than mass of the other body then the center of mass of the system coincides with the center of mass of the heavier body. **[04]**

**Que-4** **(a)** Obtain Lagrange's equation of motion from D' Alembert's principle as; **[06]**

$$\frac{d}{dt}\left(\frac{\partial L}{\partial \dot{q}_j}\right) - \frac{\partial L}{\partial q_j} = 0$$

Also modify the equation when potential energy is zero.

**(b)** Derive equation of motion of a bead sliding along a uniformly rotating wire. **[04]**

**OR**

**Que-4** **(a)** Define Rayleigh dissipation function and equation of motion as; **[06]**

$$\frac{d}{dt}\left(\frac{\partial L}{\partial \dot{q}_j}\right) - \frac{\partial L}{\partial q_j} + \frac{\partial \mathcal{F}}{\partial \dot{q}_j} = 0$$

**(b)** Discuss Atwood machine and obtain an expression for the positions of masses. **[04]**

**Que-5** For rotating and fixed coordinate system obtain the relation; **[10]**

$$\left(\frac{d\vec{V}}{dt}\right)_{fix} = \left(\frac{d\vec{V}}{dt}\right)_{rot} + \left(\vec{\omega} \times \vec{V}\right) \quad \text{for } \vec{V}.$$

Also obtain the relation;

$$\left(\frac{d\vec{r'}}{dt}\right)_{fix} = \left(\frac{d\vec{R}}{dt}\right)_{fix} + \left(\frac{d\vec{r}}{dt}\right)_{rot} + (\vec{\omega} \times \vec{r})$$

When origin $O$ of rotating coordinate system is moving with respect to origin $O'$ of fixed coordinate system. $\vec{R}$ is the distance between $O$ and $O'$. $\vec{r'}$ and $\vec{r}$ are the position vectors drawn from $O'$ and $O$.

**Que-5** State Euler's and Charles' theorems. Obtain the expression; **[10]**

$$T = \frac{1}{2} I\omega^2$$

Where $T$ is the kinetic energy and $I$ is the angular momentum.

**Que-6 (a)** Obtain Euler – Lagrange's equation. **[06]**

**(b)** Discuss brachistochrone (shortest time) problem. **[04]**

**OR**

**Que-6 (a)** Using Hamilton's principle, obtain Lagrange's equation of motion. **[06]**

**(b)** Using variational principle show that the shortest distance between two points is a straight line. **[04]**

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No. of Printed Pages : 4

[57/A27]

# SARDAR PATEL UNIVERSITY

**BSc Examination 2017**

**Semester: V**

**Subject: Physics Course: US05CPHY02**

**Mathematical Physics**

**Thursday, Date: 09-11-2017** **Time: 10.00 am to 1.00 pm** **Total Marks: 70**

**INSTRUCTIONS:**

1 Attempt all questions.
2 The symbols have their usual meaning.
3 Figures to the right indicate full marks.

**Q-1 Multiple Choice Questions: [Attempt all]** **10**

**(i)** A square matrix $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$ is called _____ matrix.

(a) Unit (b) Null
(c) Symmetric (d) Skew-symmetric

**(ii)** For matrices A and B, product AB is possible only if two matrices are_____.

(a) $A_{m\times n}$ and $B_{m\times n}$ (b) $A_{m\times n}$ and $B_{n\times p}$
(c) $A_{m\times m}$ and $B_{n\times n}$ (d) $A_{m\times n}$ and $B_{m\times p}$

**(iii)** For position vector $r$ of any point P in curvilinear coordinates $\frac{\partial r}{\partial u}\times\frac{\partial r}{\partial v} =$ _____.

(a) $\frac{h_1h_3}{h_2}\frac{\partial r}{\partial w}$ (b) $\frac{1}{h_3}\frac{\partial r}{\partial w}$
(c) $\frac{h_2h_3}{h_1}\frac{\partial r}{\partial w}$ (d) $\frac{h_1h_2}{h_3}\frac{\partial r}{\partial w}$

**(iv)** $\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2vy = 0$ is called _____. (Here $v$ is a parameter)

(a) Legendre's differential equation (b) Bessel's differential equation
(c) Hermite differential equation (d) None of these

**(v)** For Legendre's equation, _____.

(a) $k = 1$ or $k = -1$ (b) $k = n$ or $k = -n$
(c) $k = n$ or $k = n - 1$ (d) $k = n$ or $k = -n - 1$

(PTO)

**(vi)** $P_n(-\mu) =$ _____ $P_n(\mu)$.

(a) $1$ (b) $-1$

(c) $(-1)^n$ (d) $(-\mu)^n$

**(vii)** In complex representation of a Fourier series, $\alpha_n =$ _____.

(a) $(a_n + a_{-n})$ (b) $(a_n - a_{-n})$

(c) $i(a_n + a_{-n})$ (d) $i(a_n - a_{-n})$

**(viii)** The heat equation is

(a) $\frac{\partial u}{\partial t} = h^2 \nabla u$ (b) $\frac{\partial u}{\partial t} = h \nabla^2 u$

(c) $\frac{\partial u}{\partial t} = h^2 \nabla^2 u$ (d) $\frac{\partial^2 u}{\partial t^2} = h^2 \nabla^2 u$

**(ix)** $y = ax^2 + bx + c$ is the equation of _____.

(a) Parabola (b) Ellipse

(c) Straight Line (d) None of these

**(x)** The shift operator E is defined as

(a) $Ef(x) = f(x)$ (b) $Ef(x) = f(x + h)$

(c) $Ef(x) = f(x - h)$ (d) $Ef(x) = f(h - x)$

**Q-2** **Answer the following questions in short. (Attempt any ten)** **20**

**(1)** Define curvilinear co-ordinates.

**(2)** Write condition of orthogonality for curvilinear coordinates.

**(3)** Define transpose of a matrix and inverse of a matrix.

**(4)** For Legendre's function, prove that: $nP_n(\mu) = (2n-1)\mu P_{n-1}(\mu) - (n-1)P_{n-2}(\mu)$.

**(5)** For Bessel's function, prove that: $xJ_n'(x) = nJ_n(x) - xJ_{n+1}(x)$.

**(6)** Write generating function for Hermite polynomials $H_n(x)$.

**(7)** Write sine series for $f(x)$ when $0 \le x \le \pi$. (Note: derivation is not required)

**(8)** Give any two physical applications of Fourier series. (Note: derivation is not required)

(9) Write telegraphy equation.

(10) Convert $y = ax^b$ in to equivalent equation of a straight line.

(11) Define and discuss interpolation.

(12) For shift operator $E$, prove that $\Delta = E - 1$.

Q-3 (a) Derive expression of divergence in terms of orthogonal curvilinear system. 6

(b) If $u = x + 4; v = 3y + 1; w = 2z - 3$, show that $u, v, w$ orthogonal and find $ds^2$ and the metrical coefficients: $h_1, h_2, h_3$. 4

OR

Q-3 (a) Discuss cylindrical co-ordinates as a special curvilinear system. 6

(b) If $x = uv\cos w, y = uv\sin w, z = \frac{1}{2}(u^2 - v^2)$; find $h_1, h_2, h_3$ and show that $ds^2 = (u^2 + v^2)(du^2 + dv^2) + uv\, dw^2$. 4

Q-4 (a) Derive the series solution of Legendre differential equation in the form of descending power of $x$. 6

(b) Derive the generating function for Legendre's polynomials using relation $V = (1 - 2\mu h + h^2)^{-\frac{1}{2}}$. 4

OR

Q-4 (a) Derive the series solution of Bessel's differential equation in the form of ascending power of $x$. 6

(b) For Hermite polynomial using equation $H_n(x) = e^{x^2}(-1)^n \frac{d^n}{dx^n}(e^{-x^2})$, calculate Hermite polynomials $H_0(x)$, $H_1(x)$. 4

Q-5 (a) Write the Fourier series for a periodic function $f(x)$ defined in the interval $[-\pi, \pi]$. Derive the coefficients $a_0, a_n$ and $b_n$ of the series. 6

(b) For one dimensional flow of electricity in a long insulated cable, derive one dimensional diffusion equation. 4

OR

Q-5 (a) Find the Fourier series for a function $f(x)$ in the interval $(-\pi, \pi)$. 6

Where $f(x) = \pi + x \text{ when } -\pi < x < 0$,

$f(x) = \pi - x \text{ when } 0 < x < \pi$.

(b) Discuss Fourier series involving phase angles. 4

**Q-6** Derive Newton's backward difference interpolation formula for interpolation of any function $y = f(x)$ with equal spaced values of $x$. **10**

Evaluate $f(45)$ from the following table of values.

| $x$ | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| $y = f(x)$ | 46 | 66 | 81 | 93 | 101 |

**OR**

**Q-6** Write Simpson's 1/3 rule for integration. **10**

Using Simpson's 1/3 rule, find the approximate value of $y = \int_0^{\pi} \sin x \, dx$ by dividing the range of integration into ten equal parts.

What is the analytical value of $y = \int_0^{\pi} \sin x \, dx$.

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(4)

SC

[49/A26]

SEAT No._____

No. of Printed Pages : 2

Sardar Patel University, Vallabh Vidyanagar – 388120
B Sc [Semester- V$^{th}$ ]
Subject Physics Course Code No: US05CPHY03
Subject/Course Title: Solid State Physics

Saturday, Date 11-11-2017 Time: 10.00 am to 01.00 pm
Total Marks-70

---

**Q-1 Multiple Choice Question [Attempt all]** 10

1 What is the wavelength of X-ray?
(a) 1 A (c) 1cm
(b) 1m (d) 1nm

2 Electron diffraction are used to determine_____
(a) Structure properties (c) Surface properties
(b) Strength (d) Color of the material

3 When the crystal is made rotate the direct and reciprocal lattice _____
(a) Rotates (c) Not rotate
(b) One rotates while other not rotates (d) Both are stationary

4 Drude model of free electron theory cannot explain
(a) thermal conductivity (c) Not sure
(b) Electrical conductivity (d) Electron heat capacity & paramagnetic susceptibility

5 Type – II superconductor are known as
(a) Soft superconductors (c) No name
(b) Hard superconductors (d) Only the name

6 Fermi-Dirac distribution function is applicable to _____
(a) Spin particle (c) Spin with half integral
(b) Spin with opposite sign (d) Zero spin

7 At a equilibrium conditions, the rate of generation of electron-hole pair and rate of recombination are _____?
(a) Unpredictable (c) Infinite
(b) Same (d) Zero

8 p-type semiconductors can be made using _____ impurity
(a) Tetravalent (c) Pentavalent
(b) Divalent (d) Trivalent

9 Nanotechnology is the engineering of the structure less than _____ size
(a) 100 nm (c) 100 Amp
(b) 100 Cm (d) 100 C

10 The colour of the nano materials changes with the thickness because of
(a) Surface to volume ratio (c) Density to volume ratio
(b) mass to electron ratio (d) Gravity to volume ratio

**Q-2 Attempt any ten questions in brief.** 20

1. When electron diffraction techniques are used.
2. When neutron diffraction techniques are used.
3. What is studied in powdermethod?
4. What is band–effective mass?

(P T O)

5. What is type-I superconductor?
6. What is Fermi energy?
7. What are extrinsic semiconductors?
8. What is photoelectric effect?
9. What is photovoltaic effect?
10. What is Nano technology?
11. State Moore's first and second law.
12. Define: Self-Healing Structures.

| | | | |
|---|---|---|---|
| Q-3 | (a) | Describe rotating crystal method for determination of crystal structure in detail. | 6 |
| | (b) | Explain the geometrical construction of reciprocal lattice. | 4 |

**OR**

| | | | |
|---|---|---|---|
| Q-3 | (a) | Discuss the Ewald construction of X-ray diffraction. | 6 |
| | (b) | When X-ray diffraction techniques are used? | 4 |
| Q-4 | (a) | What is Wiedmann-Franz law, derive it. | 6 |
| | (b) | Discuss the effect of temperature on Fermi-Dirac distribution function. | 4 |

**OR**

| | | | |
|---|---|---|---|
| Q-4 | (a) | Derive the energy levels of free electron using Schrodinger equation in three dimensions. | 6 |
| | (b) | Explain the effect of heat capacity on superconductors. | 4 |
| Q-5 | (a) | Discuss in detail intrinsic and extrinsic semiconductors. | 10 |

**OR**

| | | | |
|---|---|---|---|
| Q-5 | (a) | Derive necessary equation for free carrier concentration in semiconductors. | 10 |
| Q-6 | (a) | What is dip pen lithography. | 5 |
| | (b) | What is atomic force microscopy? | 5 |

**OR**

| | | | |
|---|---|---|---|
| Q-6 | (a) | What are smart materials? | 5 |
| | (b) | What are nano sensors? | 5 |

-X-

(2)

C48 & A-18)

SC (1)

**SARDAR PATEL UNIVERSITY**

No. of Printed Pages : 2

**T.Y.B.Sc EXAMINATION, 5TH SEMESTER**

SEAT No._____

**Subject: PHYSICS**

**Sub.Code: US05CPHY04**

**Thermodynamic & Statistical physics**

**Date: 13/11/2017** **Session: Morning**

**Day: Monday** **Time:10.00am TO 1.00pm**

**Total marks: 70**

**Q-1. Multiple choice questions** **10**

1. In first order phase transition process
   (A) No change in heat entropy & volume
   (B) Change in heat entropy & volume
   (C) Change in heat but no change in entropy & volume
   (D) No change in heat but change in entropy & volume
2. Ehrenfest's equation is.....
   (A) $\frac{dP}{dT} = \frac{\alpha_2 - \alpha_1}{K_2 - k_1}$ (B) $\frac{dP}{dT} = \frac{K_2 - K_1}{\alpha_2 - \alpha_1}$ (C) $\frac{dP}{dT} = \frac{K_1 - \alpha_1}{K_2 - \alpha_2}$ (D) $\frac{dP}{dT} = \frac{K_2 - \alpha_2}{K_1 - \alpha_1}$
3. Gibbs function is given by
   (A) H=U+W (B) G=h-TS (C) h=U+PV (D) F=U-TS
4. The stirling formula is $\ell n\ N! =$
   (A) N $\ell n \left(\frac{e}{N}\right)$ (B) N $\ell n$ N-N (C) N $\ell n$ n (D) e $\ell n \left(\frac{N}{e}\right)$
5. Which is the factor for Gibbs paradox
   (A) PNK $\ell n$ (P) (B) PK $\ell n$ (N) (C) PN $\ell n$ (K) (D) None of above
6. Mean Kinetic energy of a particle is $< E \geq$ .....
   (A) $\frac{3}{2} KT$ (B) $\frac{5}{2} KT$ (C) $\frac{1}{2} KT$ (D) $\frac{7}{2} KT$
7. Which of the three physical parameters remain constant in the system of interest in canonical ensemble
   (A) N,V,T (B) E,P,$\mu$ (C) N,P,S (D) None of above
8. In Fermi-Dirac system constituent particle of the gas are ..... From one another
   (A) Distinguishable (C) Fixed
   (B) Indistinguishable (D) None of above
9. When constituent particle of a gas ..... With one another, it terms as an ideal gas
   (A) Interact (C) Highly interact
   (B) Do not interact (D) None of above
10. Most probable velocity of particle is.....
    (A) $\vartheta_{mp} = \sqrt{\frac{2KT}{m}}$ (B) $\vartheta_{mp} = \sqrt{\frac{3KT}{m}}$ (C) $\vartheta_{mp} = \sqrt{\frac{5KT}{m}}$ (D) None of above

**Q-2. Short Questions (Any ten)** **20**

1. Explain ferromagnetic material.
2. Give the relation between Helmholtz function, Gibbs function & Enthalpy.
3. State second law of thermodynamic in terms of entropy.
4. Define : $\mu$-space & $\Gamma$-space.
5. State Nernst's heat theorem.

(P.T.O)

6. Explain Macroscopic and microscopic state.
7. Define : Degeneracy & chemical potential.
8. Show that mean kinetic energy of a particle per degree of freedom is $\frac{1}{2} KT$ .
9. Explain canonical ensemble.
10. State the Pauli exclusion principle.
11. What is Fermi Dirac gas and Einstein Boltzmann gas.
12. In which category, constituent particle of the gas are distinguishable from one another

**Q-3(a)** Obtain the clausius Clapeyron's latent heat equation for first order phase transition. $\frac{dP}{dT} = \frac{L}{T(V_2 - V_1)}$ **7**

**(b)** Explain first and third law of Thermodynamics. **3**

**OR**

**(a)** Obtain Maxwell's thermodynamical equations. **7**
**(b)** Explain Enthalpy with necessary formula. **3**

**Q-4(a)** State and prove Liouville's theorem **7**

**(b)** Show that in a steady state probability density is independent of the coordinates of the phase space **3**

**OR**

**(a)** What is Gibbs paradox in microcanonical ensemble? How it is removed? **7**
**(b)** Show that Sackur-Tetrode formula for entropy of a perfect gas is
(1) Free from the Gibbs paradox and
(2) It violates the third law of thermodynamics. **3**

**Q-5(a)** Derive formulas for thermodynamical quantities for an ideal gas in canonical ensemble. **7**

**(b)** Discuss equivalence of microcanonical and canonical ensemble. **3**

**OR**

**(a)** Obtain an expression for Maxwell's distribution of velocities of the particle. **7**
**(b)** Obtain the formula for the most probable velocity of particle. **3**

**Q-6(a)** For the M.B. distribution of the particles obtain formula $ni = gi\, e^{-\alpha - \beta Ei}$ .In M.B. distribution gas has two particles in the $i^{th}$ state whose degeneracy is three. Find out the number of independent ways of selecting the particles in the state. **10**

**OR**

**(a)** Obtain the expression for the F.D. distribution of particle among various states. A Fermi-Dirac gas has two particles in the $i^{th}$ state whose degeneracy is three. Find the number of independent ways of selecting the particle in the state. **10**

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SC

SEAT No._____

No. of Printed Pages : 03

# Sardar Patel University

[43/A-17]

**Vallabh Vidyanagar – 388120**

**BSc [Semester-V]**

**Subject Physics Course Code No: US05CPHY05**

**CBCS (Regular and NC All)**

**Subject: Physics** **Title of the Paper: Analog Devices and Circuits**

**Wednesday, Date 15-11-2017** **Time: 10.00 am to 01.00 pm**

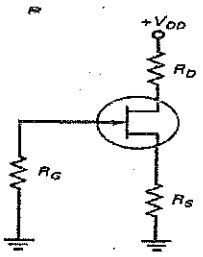
**Total Marks-70**

**Q-1 Multiple Choice Questions: [Attempt all]** **10**

**(1)** A JFET has $I_{DSS}$ = 10 mA and $V_P$ = 4 V, then $V_{GS\,(off)}$ = ____.
(a) 4 V (b) -4 V (c) 40 V (d) -40 V

**(2)** A JFET has $I_{DSS}$ = 10 mA and $V_P$ = 4 V, then $R_{DS}$ = _____.
(a) 400 Ω (b) 500 Ω (c) 600 Ω (d) 700 Ω

**(3)**



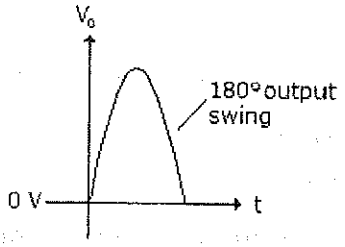

This circuit diagram shows _____of FET.
(a) Gate bias
(b) voltage divider bias
(c) Two supply source bias
(d) Self bias

**(4)** The correct sentence is
(a) For CE configuration, $h_{fe}$ is always negative and $h_{ie}$ is always positive.
(b) For CE configuration, $h_{ie}$ is always negative and $h_{fe}$ is always positive.
(c) For CE configuration, $h_{ie}$ and $h_{fe}$ both are always positive.
(d) For CE configuration, $h_{ie}$ and $h_{fe}$ both are always negative.

**(5)** The lower cut off frequency of the CE transistor amplifier ($f_l$) will be the highest if we select $C_e$= _____ μF.
(a) 10 (b) 20 (c) 30 (d) 40

**(6)** If $r_{bb'}$=800 Ω and $r_{b'e}$=200 Ω then according to hybrid π-model to study the high frequency response of CE amplifier $h_{ie}$= _____Ω
(a) 700 (b) 800 (c) 900 (d) 1000

**(7)**




This is an example of the output swing for a _____ push pull amplifier.
(a) Class A (b) Class B (c) Class C (d) Class AB

**(8)** In _____ push pull power amplifiers, the output signal varies for a full 360° of the cycle.
(a) Class A (b) Class B (c) Class C (d) Class AB

**(9)** For an ideal inverting amplifier using OpAmp given that $R_1$=2KΩ and $R_f$=20KΩ. Voltage gain of the OpAmp is _____.

(a) 10 (b) -10 (c) 11 (d) -11

**(10)** For an ideal non-inverting amplifier using OpAmp given that $R_1$=2KΩ and $R_f$=20KΩ. Voltage gain of the OpAmp is _____.

(a) 10 (b) -10 (c) 11 (d) -11

**Q-2 Answer any TEN questions in short.** **20**

**(1)** Draw schematic symbols of (i) n-channel JFET and (ii) p-channel JFET.

**(2)** Compare construction of the depletion-mode MOSFET and the enhancement-mode MOSFET.

**(3)** What are the advantages of JFET compared to a BJT?

**(4)** What are the factors on which high frequency response of transistor amplifier depend?

**(5)** What is the difference between ordinary amplifier and tuned amplifier? Discuss classification of small signal tuned amplifier.

**(6)** Discuss the effect of an emitter bypass capacitor on low frequency response of transistor amplifier.

**(7)** What is the main drawback of class B amplifier? How it is going to overcome using class AB push pull amplifier?

**(8)** Define conversion efficiency of an amplifier. What is the maximum conversion efficiency of class B push pull amplifier?

**(9)** What is complementary symmetry?

**(10)** Why an Op-amp is called as operational amplifier? Draw the schematic symbol for Op-amp.

**(11)** Calculate the output voltage of an OpAmp inverting adder for the following sets of input voltages and resistors. In all cases $R_f$ = 500 kΩ $V_1$=3 V, $V_2$= 1 V, $R_1$ = 250 kΩ and $R_2$ = 500 kΩ.

**(12)** Draw the diagram of integrator and differentiator using OpAmp.

**Q-3** **(a)** Draw and discuss the drain curves and transconductance curves of JFET. **7**

**(b)** Define transconductance of FET. Calculate transconductance of the FET in the following cases: **3**
(i) If $i_d$ = 0.2 mA pp when $v_{gs}$ = 0.1 V pp and
(ii) If $i_d$ = 1 mA pp when $v_{gs}$ = 0.1 V pp.
Comment on the result.

**OR**

**Q-3** **(a)** Discuss two types of JFET analog switch. **7**

**(b)** Draw the circuit diagram of current-source biasing of JFET and describe it. **3**

**Q-4** **(a)** Derive the following amplifier equations: **7**

(1) Current gain $A_i = \frac{-h_f}{1+h_0 R_L}$ (2) Input resistance $R_i = h_i + h_r A_i R_L$

(3) Voltage gain $A_v = \frac{A_i R_L}{R_i}$.

**(b)** Discuss effect of coupling capacitor on low-frequency response of CE transistor amplifier. **3**

**OR**

**Q-4** **(a)** Discuss high frequency response of CE transistor amplifier. Draw diagram, which shows (i) α cut of frequency (ii) β cut off frequency and (iii) gain bandwidth product ($f_T$). **7**

**(b)** List four h-parameters. Define and explain any one. **3**

**Q-5** **(a)** Write a note on harmonic distortion. How even harmonics is eliminated using Class A push-pull circuit, derive the expression. **7**

**(b)** What is the importance of transistor phase inverter? Draw the circuit diagram and describe it. **3**

**OR**

**Q-5** **(a)** Explain the classification of push pull power amplifiers based on class of operation and compare them. **7**

**(b)** List the criteria for designing power amplifier. **3**

**Q-6** Drawing AC equivalent circuit of differential amplifier and hence derive expressions for gain of the amplifier in difference and common mode configurations. **10**

**OR**

**Q-6** Define and explain the following Op-Amp parameters and describe universal balancing techniques to determine such parameters: **10**
(i) Input offset voltage (ii) PSRR and (iii) Input bias current.

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[ ] SEAT No._____ SC

No. of pages: 2

[36 & A-16]

**SARDAR PATEL UNIVERSITY**
**B. Sc, 5th Semester (Under CBCS)**
**Friday, 17th November 2017**
**Session: Morning, Time: 10:00 AM to 01:00 PM**
**Subject Code: (PHYSICS) US05CPHY06**
**Course Title: Astronomy and Astrophysics**

**Max Marks: 70**

NB: i All symbols have their usual meaning.
ii Figure at the right side of the question indicates full marks.

**Que: 1 Write correct answer for each of the following MCQs.** **[10]**

1 Diffraction grating is a surface consisting of large number of finely placed closed _____lines.

a) Transmission b) Equidistance
c) Dispersion d) None of above

2 Photometry is used for recording the _____of stars and heavenly objects.

a) Image b) Brightness
c) Spectrum d) Photograph

3 Projected chromospheric streamers are normally called____.

a) Spicules b) Faculae
c) Plages d) Filaments

4 _____ prominence is not a type of prominence.

a) Quiescent b) Eruptive
c) Inactive d) Sunspot type

5 _____is not a type of binary stars.

a) Eclipsing b) Spectroscopic
c) Visual d) Spectrometric

6 The thermal ionization process in stars does not depend on_____.

a) Mass b) Density
c) Pressure d) Temperature

7 The Hertzsprung-Russell diagram represent variation of_____.

a) Temperature vs. Intensity b) Intensity of balmer lines vs. Temperature
c) Absolute magnitude vs. Spectral type for all stars d) none of these

8 The principal 'actors' of highly interesting galactic drama are_____.

a) Galaxies b) Comets
c) Stars d) Cosmic rays

9 The line absorption is produced by the interstellar gas in the spectra of distant_____.

a) Hot stars b) Galaxies
c) Granules d) Clusters

10 Positive radial velocities are observed in stars at_____ galactic longitudes.

a) 90°and 270° b) 45°and 255°
c) 135° d) 315°

[20]

**Que 2 Write answers of any ten questions in brief.**

1 What is f/a ratio of telescope?
2 What is stellar magnitude sequence?
3 What do you mean by astronomical spectrograph?
4 With the help of graph explain the temperature distribution near the photosphere boundary.
5 Define Plages and Filaments.
6 Define solar wind.
7 Write notes on optical double stars and binary stars.
8 Draw light curves from different binaries.
9 Write a note on Sirius.
10 Define 'hyperfine splitting'.
11 Draw a diagram explaining the structure of our galaxy.
12 What is REDDENING EFFECT of distant stars in the plane of galaxy?

**Que 3** [A] What is optical telescope? Discuss various factors of optical telescope. [06]
[B] Write a note on Photoelectric photometry. [04]

**OR**

**Que 3** [A] Write short notes on earth's atmosphere and electromagnetic radiation. [06]
[B] Explain only construction and working of slit spectrograph and slit less spectrograph. [04]

**Que 4** [A] Classify prominence and discuss any two prominences in detail. [06]
[B] Write a detail note on 'Chromosphere'. [04]

**OR**

**Que 4** [A] Write a note on 11 year cycle of sunspots. [06]
[B] How are various forms of solar activities related to sun's magnetic field? [04]

**Que 5** Explain in detail H-R diagram of stars. [10]

**OR**

**Que 5** Derive Boltzmann's formula in logarithmic form for $r^{th}$ level. [10]

**Que 6** [A] Explain in brief the radio observation of galaxy at 21-cm wavelength. [06]
[B] What is a rotational curve of galaxy? [04]

**OR**

**Que 6** [A] Enlist the rotational parameters of galaxy and discuss them. [06]
[B] Write a short note on 'cosmic rays'. [04]

Sc

[48] SEAT No._____ No. of Printed Pages: 02

**SARDAR PATEL UNIVERSITY**

**B. Sc. (ZOOLOGY) – Fifth Semester Examination**

**Tuesday, 7th November, 2017**

**10:00 a.m. to 1:00 p.m.**

**US05CZOO01: INVERTEBRATA**

**Note: 1)** Figures to the right indicate marks

**2)** Draw diagram wherever necessary

**Total marks: 70**

**Q-1 Multiple Choice Questions: 10**

1. Aristotle is the father of _____ classification?

a) biological b) animal c) plant d) none

2. The Greek word –taxi means....

a) taxology b) taxies c) taxonomy d) All

3. Scientific name of plant and animal is written in..... language

a) English b) French c) Latin d) All

4. What type of asexual reproduction is found in porifera?

a) by budding b) Fertilization c) a & b d) none

5. Coral polyps secrete .....

a) Mgso4 b) $H_2SO_4$ c) $CaCO_3$ d) CuSO4

6. Which of the following is a acoelomate and triblobIstic animal?

a) porifera b) protozoa c) coelentrata d) all of these

7. _____ is found in male Ascaris.

a) copulatory setae b) pectin c) setae d) none

8. Book lung is found in....

a) ascaris b) sea anemone c) scorpion d) none

9. Ink gland is found in...

a) Limulus b) Spider c) Starfish d) Sepia

10. Torsion found in _____phylum

a) protozoa b) mammals c) arthropod d) mollusks

(P.T.O.)

| | | |
|---|---|---|
| **Q-2** | **Short Questions: [any TEN]** | **20** |

1. Write the contributions of Lamarck in animal taxonomy
2. Draw Linnaeus animal classification
3. Write importance of classification
4. Draw diagramme of coral polyps
5. Write characters of metazoan
6. Define coelenterate with example
7. Write only name of sensory organs of scorpion
8. Write characters of Annelid
9. Classify scorpion giving reasons
10. Write characters of crustaceans.
11. Classify Limulus giving reasons
12. Write characters of mollusk

| | | |
|---|---|---|
| Q-3 | a) Explain animal Taxonomic Hierarchy with suitable example. | 06 |
| | b) Write characters of protozoa. | 04 |
| | OR | |
| Q-3 | a) Write detail note on history of animal taxonomy. | 07 |
| | b) Use of Electron microscopy in taxonomy. | 03 |
| Q-4 | Describe Polymorphism in coelenterate. | 10 |
| | OR | |
| Q-4 | a) Reproduction in Porifera. | 05 |
| | b) Economic importance of corals. | 05 |
| Q-5 | Explain reproductive system of Ascaris. | 10 |
| | OR | |
| Q-5 | Describe digestive system of scorpion with digestion. | 10 |
| Q-6 | Write detail note on Digestive system of Sepia | 10 |
| | OR | |
| Q-6 | a) Write a note on zoological importance of peripatus. | 05 |
| | b) Write note on pedicelaria in star fish. | 05 |

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SC

SEAT No._____ No. of Printed Pages : 2

[56]

**SARDAR PATEL UNIVERSITY**

**B.Sc. SEMESTER-V, EXAM-2017**

**ZOOLOGY, US05CZOO02 (COMPARATIVE ANATOMY OF CHORDATES)**

**DATE: 9-11-2017** **TIME: 10 am TO 1pm**

**DAY: THURSDAY** **MARKS: 70**

**Q-1. MULTIPLE CHOICE QUESTIONS.** **(10)**

1. The cells die & are discharged their secretion is known as _____ glands.

   (a) Holocrine (b) Apocrine (c) Merocrine (d) Endocrine

2. Most teleost fishes contained which type of scales?

   (a) Placoid (b) Ganoid (c) Cycloid (d) Ctenoid

3. Which feather usually forms a worm insulating layer?

   (a) Contour (b) Down (c) After shaft (d) Hair

4. In_____, the tongue is attached anteriorly at the margin of the jaw.

   (a) Frog (b) Snakes (c) Turtle (d) Salamander

5. Oral hood is the characteristic of

   (a)Amphibians (b) Amphioxus (c) Fishes (d) Birds

6. The crop glands are present in

   (a) Cyclostomes (b) Fishes (c) Amphibians (d) Birds

7. The ruminant stomach is the characteristic of

   (a) Amphibians (b) Reptiles (c) Aves (d) Herbivorous mammal

8. In the_____ pyloric caeca is present.

   (a) Shark (b) Mackerel (c) Sting ray (d) Sea horse

9. Azygos vein is present in

   (a)Amphioxus (b) Cyclostomes (c) Reptiles (d) Mammals

10. Name the second aortic arch

    (a) Systemic (b) Mandibular (c) Hyoid (d) Pulmonary



(PTO)

Q-2. **ANSWER IN SHORT (ANY TEN).** (20)

1. Classify the glands according to type of secretions they produce.
2. Write about the carapace and plastron of Turtle.
3. Write about unicellular glands.
4. Comment upon the epidermal teeth.
5. Draw and labeled the diagram of Premolar tooth.
6. Write about the lips of vertebrate.
7. Write about intestine of Amphibians.
8. Explain the structure of pancreas.
9. Write about the stomach of Fishes.
10. Explain the working of heart in Human.
11. Write about veins of Amphioxus.
12. Explain the terms hepatic portal and renal portal circulation.

Q-3. (a) Write about types of dermal scales found in Fishes. (5)

(b) Describe the structure of contour feather. (5)

**OR**

Q-3. (a) Write about the comparative account of glands of Mammals. (5)

(b) Describe the types of beaks. (5)

Q-4. (a) Describe the comparative anatomy of glands of oral cavity. (7)

(b) Describe the tongue of Reptiles. (3)

**OR**

Q-4. (a) Describe the comparative account of teeth of Mammals. (7)

(b) Explain the types of attachment of teeth. (3)

Q-5. (a) Describe the comparative anatomy of Mammalian stomach. (7)

(b) Describe the structure of Human liver. (3)

**OR**

Q-5. (a) Write about the comparative anatomy of vertebrate oesophagus. (7)

(b) Describe the intestine of Fishes. (3)

Q-6. Describe the comparative anatomy of heart with labeled diagrams. (10)

**OR**

Q-6. Describe the comparative anatomy of aortic arches with labeled diagrams. (10)

SC

[50] SEAT No._____ No. of Printed Pages : 2

# SARDAR PATEL UNIVERSITY

B.Sc. -V Semester, NOVEMBER-2017

CELL BIOLOGY

US 05 CZOO 03

TIME: 10.00 AM -1.00 PM DATE: 11/11/2017, SATURDAY MARKS: 70

Q-1 MULTIPLE CHOICE QUESTIONS: [10]

1. GENERALLY LIGHT MICROSCOPE IS USE TO OBSERVE
   A, CELL B, CELL ORGANELLES C, CELL DIVISION D, ALL
2. ACIDOPHILIC TISSUE HAVE AFFINITY TO
   A, BASIC STAIN B, ACIDIC STAIN C, NEUTRAL STAIN D, NONE
3. FLUID- MOSAIC MODEL OF PLASMA MEMBRANE CONSTITUENTS
   A, LIPID B, EXTRINSIC PROTEIN C, INTRINSIC PROTEIN D, ALL
4. ENDOPLASMIC RETICULUM IS ABSENT IN
   A, RBC B, WBC C, PLATELETS D, NEURON
5. WHICH IS GIANT CHROMOSOME
   A, LAMP SHADE B, LAMP GLASS C, LAMP STAND D, LAMP BRUSH
6. ANEUPLOIDY IS THE VARIATION OF CHROMOSOMES IN
   A, n B, n-n C, n+2n D, n+2
7. CISTERNAE IS A PART OF
   A, RIBOSOME B, NUCLEUS C, GOLGI BODY D, CENTRIOLE
8. CILIA ORIGINS FROM
   A, CENTRIOLE B, BASAL BODY C, RIBOSOME D, MICROBODIES
9. PROKARYOTIC RIBOSOMES ARE KNOWN AS
   A, 50S B, 60S C,70S D,80S
10. RIBOSOME IS MAINLY
    A, DNA B, PROTEIN C, RNA D, LIPID

Q-2 ANSWER IN SHORT [ANY TEN] [20]

1. WRITE DEHYDRATION METHOD IN MICROTOME
2. WRITE ABOUT LEEUWENHOEK MICROSCOPE
3. WRITE ABOUT HPLC
4. DRAW A LABELED DIAGRAM OF PLASMA MEMBRANE
5. STRUCTURE OF CISTERNAE IN ENDOPLASMIC RETICULUM
6. WRITE ABOUT ACTIVE PERMEABILITY
7. DRAW A STRUCTURE OF METACENTRIC CHROMOSOME
8. WRITE ABOUT TRISOMY IN HUMAN
9. WRITE ABOUT DELETION IN CHROMOSOMAL VARIATIONS
10. STRUCTURE OF FLAGELLA
11. WRITE ABOUT NUCLEUS
12. WRITE FUNCTIONS OF PEROXISOMES

—X—



(P.T.O.)

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|---|---|---|
| Q-3 | A, DESCRIBE SECTIONING AND STAINING IN MICROTOME | [05] |
| | B, DESCRIBE TYPES OF LIGHT MICROSCOPES | [05] |
| | OR | |
| Q-3 | A, EXPLAIN RADIO IMMUNO ESSAY | [05] |
| | B, EXPLAIN METHODS OF CELL FRACTIONATION | [05] |
| Q-4 | A, EXPLAIN STRUCTURE AND FUNCTIONS OF LYSOSOME | [05] |
| | B, EXPLAIN FUNCTIONS OF PLASMA MEMBRANE | [05] |
| | OR | |
| Q-4 | A, EXPLAIN FUNCTIONS OF MITOCHONDRIA | [05] |
| | B, EXPLAIN STRUCTURE AND FUNCTIONS OF ENDOPLASMIC RETICULUM | [05] |
| Q-5 | DESCRIBE GIANT CHROMOSOMES | [10] |
| | OR | |
| Q-5 | DESCRIBES NUMERIC ABNORMALITIES IN CHROMOSOMES | [10] |
| Q-6 | EXPLAIN STRUCTURE OF BASAL BODY AND CILIA | [10] |
| | OR | |
| Q-6 | DESCRIBE STRUCTURE OF RIBOSOMES AND ITS FUNCTIONS | [10] |

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(49) SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**B.Sc., SEMESTER-V EXAMINATION-2017**

**ZOOLOGY, US05CZOO04 (ANIMAL PHYSIOLOGY)**

**DATE: 13-11-2017** **TIME: 10am to 1pm**

**DAY: MONDAY** **MARKS: 70**

**Q-1. MULTIPLE CHOICE QUESTIONS.** **(10)**

1. The structural and functional unit of skeletal muscle is known as

   (a) Sarcolema (b) Sarcomere (c) Sarcoplasm (d) SR

2. Name the sheath of connective tissue that wraps around individual skeletal muscle fiber.

   (a)Endomysium (b) Epimysium (c) Perimysium (d) Tendon

3. Intercalated discs are present in_____ muscle fiber.

   (a) Smooth (b) Skeletal (c) Cardiac (d) All of these

4. Gaps in the myelin sheath on an axon is Known as

   (a) Neurolemma (b) Nissl bodies (c) Synapse (d) Node of Ranvier

5. Which component of the brain regulates posture & balance of body?

   (a)Pons (b) Cerebellum (c) Hypothalamus (d) Diencephalon

6. Pancreas is a _____ gland.

   (a) Endocrine (b) Exocrine (c) Heterocrine (d) None of these

7. The main function of bile juice is

   (a)Dig.of lipids (b) Emulsification of lipids (c)Dig.of protein (d) All of these

8. Which one of the followings salivary gland is present in Human?

   (a)Parotid (b)Submaxillary (c) Submandibular (d)All of these

9. Which hormone is responsible for maintain calcium & phosphate level in the blood?

   (a) Parathormone (b)Thyroid (c) Epinephrine (d)GH

10. Oxytocin hormone is Synthesis from

    (a) Neurohypophysis (b) Adenohypophysis (c) Thyroid (d) Pancreas

(P.T.O.)

**Q-2. ANSWER IN SHORT (ANY TEN).** **(20)**

1. Name the properties of muscle fiber.
2. Explain the term oxygen debt.
3. Draw & labeled the diagram of cardiac muscle fiber.
4. Write about the morphological classification of nerve fiber.
5. Name the different neurotransmitters.
6. Explain the term conditional reflex with example.
7. Write about any four functions of saliva.
8. Explain the phases of gastric juice secretion.
9. Write about the composition of bile.
10. Define the term tropic hormone and name the pituitary tropins.
11. Write about the functions of oxytocin hormone.
12. Explain the role of hormone receptors.

Q-3. (a) Write a note on proteins of skeletal muscle fiber. (5)

(b) Explain the neuromuscular junction (NMJ) with labeled diagram. (5)

OR

Q-3. Describe the muscle metabolism. (10)

Q-4. (a) Explain the impulse transmission on non-myelinated nerve fiber. (6)

(b) Write about structure and functions of fore brain. (4)

OR

Q-4. (a) Write about number, name & function of human cranial nerves. (6)

(b) Describe the structure of reflex arc. (4)

Q-5. (a) Write a note on composition & functions of gastric juice. (5)

(b) Describe the functions of liver. (5)

OR

Q-5. Explain the absorption of food from gastrointestinal tract. (10)

Q-6. Describe the secretion, functions & abnormalities of thyroid hormone. (10)

OR

Q-6. (a) Explain the action of lipid soluble hormone. (5)

(b) Describe the hormones & their functions from adrenal cortex. (5)

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SEAT No._____

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No. of Printed Pages : 02

[447]

# SARDAR PATEL UNIVERSITY

B.S.C. (V-Sem) November-2017

## Genetics

US 05 CZOO 05

TIME: 10:00 AM-1.00 PM | DATE: 15/11/2017 WEDNESDAY | MARKS: 70

**Q-1 MULTIPLE CHOICE QUESTIONS:** [10]

1. IN GENETIC INTERACTION F IS STAND FOR.
   A, PARENT B, GENERATION C, GAMETE D, ALLELE
2. 1:2:1 IS ..... CROSS
   A, DIHYBRID B, MONOHYBRID C, BACK D, TEST
3. WHICH CHARACTER IS CHOSEN BY MENDEL IN MONOHYBRID CROSSES?
   A, SEED COLOUR B, ROOT COLOUR C, STEM COLOUR D, NONE
4. ALLELES FOR BLOOD GROUP "B" ARE
   A, $I^AI^O$ B, $I^BI^O$ C, $I^AI^B$ D, $I^OI^O$
5. ANTIGENS ARE PRESENT IN BLOOD GROUP O
   A, NONE B, AB C, A D, B
6. BACK CROSS IS THE CROSS WITH
   A, FIRST GENERATION B, ANY ONE PARENT C, RECESSIVE PARENT D, DOMINANT PARENT
7. CHIASMATA TAKES PLACE DURING
   A, PROPHASE B, METAPHSE C, ANAPHASE D, TELOPHASE
8. IN PEDIGREE ◯ SYMBOL IS FOR
   A, MALE B, FEMALE C, CARRIER D, CHILD
9. FRATERNAL TWINS ARE PRODUCED FROM
   A, TWO ZYGOTE B, TWO SPERMATOZOON C, ONE ZYGOTE D, ALL POSSIBILITIES
10. DIAGRAM CHART OF CHROMOSOMES IS
    A, PEDIGREE B, IDEOGRAM C, KARYOTYPE D, NONE

**Q-2 ANSWER IN SHORT [ANY TEN]** [20]

1. DEFINE LAW OF SEGREGATION
2. WRITE REASONS FOR SELECTION OF PEA PLANT BY MENDEL
3. WRITE ABOUT F1 FOR AA X AA
4. DEFINE EPISTASIS?
5. WHAT IS MONO HYBRID TEST CROSS
6. WRITE ABOUT CONGENITAL ICHTHYOSIS
7. WRITE ABOUT COMPLETE LINKAGE
8. WRITE ABOUT CHROMOSOMAL MECHANISM IN DROSOPHILA
9. WRITE ABOUT DOUBLE CROSSING OVER
10. EXPRESS MUTATION
11. HARMFUL EVOLUTIONARY EFFECT OF EUPHENICS
12. WRITE ABOUT DELETION MUTATION



(P.T.O.)

| | | |
|---|---|---|
| Q-3 | A, WHAT IS CO- DOMINANCE? EXPLAIN | [05] |
| | B, EXPLAIN MONOHYBRID CROSS IN DROSOPHILA | [05] |
| | OR | |
| Q-3 | A, EXPLAIN 9:3:3:1 RATIO | [05] |
| | B, EXPLAIN LETHAL GENES AND SUB LETHAL GENES IN HUMAN | [05] |
| Q-4 | EXPLAIN NON EPISTATIC GENETIC REACTION | [10] |
| | OR | |
| Q-4 | EXPLAIN ALLELES OF SKIN COLOUR AND EXPLAIN WITH SUITABLE EXAMPLE | [10] |
| Q-5 | A, EXPLAIN HETEROGAMETIC SEX DETERMINATION | [06] |
| | B, EXPLAIN EXPRESSIONS OF X LINKED GENES IN MAN | [04] |
| | OR | |
| Q-5 | A, EXPLAIN MECHANISM ABOUT CROSSING OVER | [06] |
| | B, EXPLAIN ENVIRONMENTALLY SEX DETERMINATION | [04] |
| Q-6 | DESCRIBE SUBSTITUTION MUTATION | [10] |
| | OR | |
| Q-6 | DESCRIBE SEX CHROMOSOMAL ABNORMALITIES | [10] |

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SEAT No._____ No. of Printed Pages : 02

[37]

**Sardar Patel University**
**B. Sc. Semester V Examination 2017**
**ZOOLOGY**
**US05CZOO06 (Environmental Biology)**
**17th November 2017, Friday**
**10:00 am to 1:00 pm**

**Total Marks: 70**

**Q I. Multiple Choice Questions.** **[10]**

1. Hyena plays the role of _____ in ecosystem.
   A. Producers B. Decomposers
   C. Scavengers D. All of these
2. In ecology, human is_____.
   A. Herbivorous B. Carnivorous
   C. Omnivorous D. None of these
3. _____ are primary producers.
   A. Phytoplanktons B. Zooplanktons
   C. Grass D. Both A & C
4. Which pyramid is not included in ecological pyramids?
   A. Pyramid of number B. Pyramid of energy
   C. Pyramid of biomass D. Pyramid of territory
5. Which of the following is the full name of GAP?
   A. Ganga agricultural plan B. Ganga action plan
   C. Ganga actual plan D. none
6. Due to agricultural development, we lost our _____.
   A. Forest B. Food
   C. Rocks D. None of these
7. Which type of adaptations are shown by camel ?
   A. Desert B. Arboreal
   C. Terrestrial D. Aquatic
8. Which of the following shows hibernation behavior?
   A. Lion B. Rat
   C. Fly D. Snake
9. Which of the following is an air pollutant?
   A. Sulfur B. Lead
   C. Carbon dioxide D. All of these
10. The animal responsible for overgrazing is_____.
    A. Tiger B. Lion
    C. Rabbit D. None of these

**[P.T.O]**

**Q II. Answer the following in short.(Attempt any Ten)** [20]

1. Give the importance of ecology.
2. Write a short note on land ecosystem.
3. Define primary consumers with suitable examples.
4. Write a short note on energy flow.
5. Explain secondary consumers with examples.
6. Define overgrazing.
7. Write names of ecosystems.
8. Draw a neat and labeled diagram of Nitrogen cycle.
9. List the important causes of ecosystem degradation.
10. What is radioactive pollution? Write names of radioactive pollutants.
11. Draw a neat and labeled diagram of pyramid of biomass.
12. Write a short note on noise pollution.

**Q III.** (a) Explain fresh water ecosystem with a labeled diagram. [05]
(b) Describe the role of bacteria in ecosystem. [05]

OR

**Q III.** What is ecosystem? Mention the types of ecosystems and describe forest ecosystem in detail. [10]

**Q IV.** (a) Describe water cycle in detail. [07]
(b) Draw a neat and labeled diagram of food web. [03]

OR

**Q IV.** Explain ecological pyramids with suitable examples. [10]

**Q V.** Write short notes on:
(a) Prevention of deforestation [06]
(b) Effects of mining on natural habitats [04]

OR

**Q V.** Describe intra and inter specific animal relationships. [10]

**Q VI.** How can we save our rivers against pollution? Explain. [10]

OR

**Q VI.** Write an essay on effects of global warming on ecosystem. [10]

X