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SEAT No._____ No. of Printed Pages : 02

[A-43]

SARDAR PATEL UNIVERSITY

B.Sc. –3rd Semester Examination 2017

SATURDAY,18th November.

2.00 p.m. to 5.00 p.m.

Subject Code: US03CBCH01(2010 NC Batch)

(Basic Biochemistry.)

Total Marks: 70

Q1. Choose the correct option and write it in the answer sheet [10]

1. What are long chains of sugars called?
   a)Monosaccharide b) Disaccharide c) Polysaccharide d) polypeptide.

2. Cellulose and Starch are both polymers of
   a) Fructose b) Galactose c) Ribose d) Glucose

3. The number of isomers of glucose is
   a) Two b) Four c) Eight d) Sixteen

4. Which one of the following is semi essential amino acid in human?
   a) Aspartic acid b) Alanine c) Arginine d) Proline

5. What monomers make up protein?
   a) Monosaccharide b) Fatty acid c) Amino acid d) Ascorbic acid

6. β-oxidation takes place in .....
   a) Nucleus b) Cytoplasm c) Ribosome d) Mitochondria

7. The degradative process are categorized as
   a) Anabolism b) Catabolism c) Metabolism d) None of these

8. Which base is absent in DNA?
   a) Cytosine b) Uracil c) Adenine d) All of these

9. One of the following is not fat soluble vitamin.
   a) Biotin b) Retinol c) Vitamin D d) Vitamin K

10 Sodium is largely associated with ...for regulation of pH.
   a) Iodine b) Chloride c) Zinc d) Boron

Q2. Answer the followings in short (any Six) [12]

1. Draw the Cyclic structures of Lactose,Cellobiose and Isomaltose.
2. Define reducing and non-reducing sugars with examples.
3. Why sucrose is known as Invert sugar?
4. Draw the structures of two basic aminoacids.
5. Define Metabolism and Metabolites.
6. Why amino acids behave as anion in an alkalinemedium?

(P.T.O.)

7. Draw the structures of Uracil and Thymine.
8. What are Nucleotides and Nucleosides?
9. Explain vitamins are accessory food factor.
10. Draw the structer of Vitamin A.
11. Draw the structer of ATP.
12. Explain Minerals are not bio molecules.

Q3. A) Write notes on classification of Carbohydrates with examples. [04]
B) Write about functions of Carbohydrates. [04]

OR

Q3. A) Write about plant structural polysaccharide. [04]
B) Draw the structures of Aldo triose, Ketotriose Aldotetrose and Ketotetrose. [04]

Q4. A) List out all names of Standard Aminoacids and define Essential aminoacid. [04]
B) Draw the structures of any four aliphaticamino acids. [04]

OR

Q4. A) Classify aminoacids on the basis their metabolic fate. [04]
B) Discuss about Ionization in Aminoacids. [04]

Q5. A) Write about Chargaff's rule. [04]
B) Write notes on importance of Nucleic acids. [04]

OR

Q5. A) Write about Organization of DNA. [04]
B) Draw the structures of Purine and Pyrimidine. [04]

Q6. Discuss in detail about Glycolysis. [08]

OR

Q6. Discuss about TCA cycle. [08]

Q7. Define and classify vitamins. [08]

OR

Q7. A) Write notes on Ascorbic acid. [04]
B) Write importance of Vitamin A. [04]

Q8. A) Write biochemical importance of Calcium. [04]
B) Write notes on Importance of Iron. [04]

OR

Q8. A) Write notes on importance of Iodine. [04]
B) Write food sources and functions of Sulphur. [04]

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SARDAR PATEL UNIVERSITY
B.Sc. –3rd Semester Examination 2017
Saturday, 18th November.
2.00 p.m. to 5.00 p.m.
Subject Code: US03CBCH01
(Biochemistry of Biomolecules I.)

Total Marks: 70

Q1. Choose the correct option and write it in the answer sheet [10]

1. Which carbon atom of Glucose is known as anomeric carbon?
   a) C2 b) C3 c) C1 d) C4

2. Starch and Glycogen are both polymers of
   a) Fructose b) Galactose c) Ribose d) Glucose

3. The number of isomers of glucose is -
   a) Two b) Four c) Eight d) Sixteen

4. Which one of the following is semi essential amino acid in human?
   a) Aspartic acid b) Alanine c) Arginine d) Proline

5. Which Amino acid is optically inactive?
   a) Lysine b) Valine c) Tyrosine d) Glycine

6. The limiting amino acid in rice is .....
   a) Glycine b) Valine c) Lysine d) None of these

7. Which of the following types of molecule found in genetic material?
   a) Cellulose b) Lipid c) Enzyme d) Nucleic acid

8. Which base is absent in DNA?
   a) Cytosine b) Uracil c) Adenine d) All of these

9. Haemoglobin formation need
   a) Iodine b) Iron c) Lead d) Kalium

10. Chloride is largely associated with ...for regulation of pH.
    a) Iodine b) Natrium c) Zinc d) Boron

Q2. Answer the followings in short (any ten) [20]

1. Draw the Cyclic structures of Glucose, Galactose and Mannose.
2. Define Isomers, optical activity and mutaraotaion with examples.
3. Why Glucose is known as blood sugar?
4. Draw the structures of two acidic amino acids.
5. Explain Amino acid is monomer unit of protein.
6. Why amino acids behave as cation in an acidic medium?

(P.T.O.)

7. Draw the structures of Uracil and Thymine.
8. What are Nucleotides and Nucleosides?
9. Briefly write about Phoshpodiester bond.
10. Write RDA value for Manganese and Sodium.
11. Define minerals with examples.
12. Explain Minerals are not bio molecules.

Q3. A) Define Epimers,Anomers,Chiral center,Oligosaccharid and Homopolysaccharide with examples.[05]
B) Write about plant storage polysaccharide. [05]

OR

Q3. A) Explain ,reducing sugar reacts with three molecules of Phenyl hydrazine to form osazones [06]
B) Draw the structure of αDRibofuranose, Ketotriose,βDfructofuranaosea,Milksugar. [04]

Q4. A) What are standard amino acids? Classify them with their nutritional quality [06]
B) Draw the structures of acidic and basic amino acids [04]

OR

Q4. A) Write notes on physical properties of amino acids [07]
B) Write about transamination reaction involving NH2 group [03]

Q5. A) Give an account of the structures and functions of nucleotides [06]
B) Write about Chargaff's rules. [04]

OR

Q5. A) Discuss in detail about Watson - Crick Model of DNA [07]
B) Write notes on Organisation of DNA [03]

OR

Q6. Write about biological role, dietary sources and daily requirement of calcium, Phosphorous and Iron. [10]

OR

Q6. Discuss about biochemical role and food sources of Sulphur, Iodine Sodium Chloride and Potassium. [10]

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[124A-10] **SARDAR PATEL UNIVERSITY**

EXTERNAL EXAMINATION– OCT-NOV 2017

B.Sc(BIOCHEMISTRY) III semester

Paper Code No. US03CBCH02

Biophysical& environmental biochemistry

DATE:-30/11/2017 **Total marks:70** **Time:2.0 pm- 5.0pm**

Q.1

Multiple choice Questions: **10 marks**

1. Speed of centrifuge is denoted by ----------

   a) G b) RPM c) RCM d) RCF

2. Bio molecule move from the application point in -----

   a) free electrophoresis b) zone electrophoresis c) paper electrophoresis d) all three

3. Electrophoresis is a technique based on the _____ possess by biomolecules.

   a) Temperature B)Ionic Strength C)Viscocity D] Charge.

4. Field strength is inversely proportional to----------, which is proportional to conc.

   a) Temprature B) Ionic Strength C) Ph D) Conductivity

5. The primary defect in metabolic acidosis is due to

   a) decrease in bicarbonate b) increase in carbonic acid

   c) increase in bicarbonate d) decrease in carbonic acid

6. The chemical formula for water is---------

   a) H_2O b) H_3O_2 c) H_2O_2 d) HO_2

7. Imbibition of water is due to the...

   a) Viscosity b) osmosis c) diffusion d)colloids

8. Size of solutes in crystalloids is ---------

   a) $<1*10^{-7}$ b) $=1*10^{-7}$ c) $>1*10^{-7}$ d)$1*10^{-7}$

9. White arsenic is chemically known as ----------

   a) As_2O_3 b] As_2Cl_3 c] $CH_3AsO(OH]_2$ d] $CHAsCl_2$

10. Alkyl mercury compounds bind to .....

    a) protein b] lipid c] carbohydrate d] all three

C.P.T.O.)

Q.2 .Answer in short. (Two mark each-Attempt any ten) 20

1) Which are the factors affecting on electrophoretic migration.
2) Classify rotors. What is the function of rotor?
3) Explain zone electrophoresis.
4) Define-Acidosis-Alkalosis
5) How buffers resist the pH changes?
6) What is Viscosity
7) What are Lyophilic colloids
8) Why arsenic compounds in small doses are referred as valuable drugs.
9) Write on poisonous effect of cyanide.
10) Explain lifetime accumulation lead in the body by different sources.
11) What are Colloids
12) Define -Hydrogen Bond

LONG QUESTIONS **40 marks**

Q.3 A] Write on - factors affecting on centrifugation. 4]

B] Explain- principle for electrophoresis process and differentiate free and zone electrophoresis. 6]

OR

A] Derive equations for sedimentation rate. 4]
B] Sketch a neat and labelled diagram and explain horizontal paper electrophoresis technique. 6]

Q.4 A] Write a note on Donnan membrane equilibrium. 5]

B] Discuss biological significance for viscosity. 5]

OR

A] Define osmosis and explain it's role in living organisms 5]
B] Write an account on biological significance of colloids. 5]

Q.5 A] Explain –sources and toxic effect for Lead on human 5]
B] Give an account on cyanide as health hazardous element 5]

OR

A] Write note on sources and types for Arsenic 5]
B] Enlist sources and symptoms for mercury inhalation. 5]

Q.6 A] Write note on- distribution of water in our body and Derive –Henderson Hasalbatch equations. 10]

OR

A] Write an account on water imbalance. and explain body buffer systems. 10]

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[A-47]

SARDAR PATEL UNIVERSITY

EXTERNAL EXAMINATION [N.C.2010] (Semester-III)

S.Y.B.Sc. Biochemistry. US03CBCH02

BIOPHYSICAL CHEMISTRY

DATE:- 20/11/17 **Total marks:70** **Time:2:0PM-5:0PM**

Q-1. Answer the following: (1 mark each) (10)

1. Filter as a monochromator is used in----------

a) colorimeter b) Flurometer

c) Spectrometer d) potometer

2. colloids soluble in water are known as----------

a) Lyophobic colloid b) Protective colloid

c) Hydrophilic colloid d) lyophilic colloid

3. oxygen is not required for the growth of ---------- micro-organisms.

a) Pathogenic b) Anaerobic

c) Aerobic d) Acid-fast

4. honey has higher----------than distilled water

a) Osmosis b) Viscosity

c) Diffusion d) Surface tension

5. information collected using direct observation is ----------

a) Secondary data b) Government data

c) Online data d) Primary data

6. presentation of data by diagram is possible using

a) graph b) stub

c) Frequency d) data

7. speed of bench centrifuge is --------RPM

a) 300 b) .>10000

c) 3000-5000 d)<3000

9. Hg lamp is used as radiant energy source for----------

a) centrifuge b) electrophoresis

c) NMR d) colorimeter

10. Electrolytes concentration is important to maintain normal----------

a) water balance b) acid balance

c) base balance d) acid-base balance

Q-2. Short Questions: Answer any six. **(12)**

1. Define and explain radiant energy sources for visual colourimeter.
2. Explain – 'G' in centrifuge techniques.
3. List photosensitive detectors for colorimeter
4. Write on microflora in sewage water.
5. Explain -bowman movement of colloids?
6. Define-surface tension.

(P.T.O.)

7. Write on importance of osmosis.
8. Define –mean and median.
9. Give distribution of the intra and extra cellular fluid..
10. Write on types of water treatment

Long Questions: (8 marks each) **(48)**

Q-3. a) Write note on electrolytes in water balance 4
b) classify and explain types of dehydration. 4

OR

Q-3. a) Discuss-extra cellular buffer system. 5
b) Write a brief account hormones important for water balance. 3

Q-4. a) write an account on biological significance of viscosity 3
b) Give an account on Donnan membrane equilibrium. 5

OR

Q-4. a) Discuss significance for surface tension. 4
b) Discuss physiological role of colloids in the body . 4

Q-5. a) Derive the equation for sedimentation rate. 5
b) Give brief account factors affecting on sedimentation rate of biological molecule. 3

OR

Q-5. a) Classify and draw diagram for centrifuge rotors. 4
b) write application for ultracentrifuge. 4

Q-6. a) Write note on –principle and application of colorimeter. 5
b) Write on application of NMR in developing sciences 3

OR

Q-6. a) write an account on mono-chromatics in spectrometric analysis. 3
b) Derive 'Laws" for colorimetric analysis 5

Q-7. a) explain methods for sludge digestion process. 5
b) explain –methods for water treatment 3

OR

Q-7. a) Write note on –sewage treatment. 5
b) how will you treat impure water. 3

Q-8. Discuss various characteristics of statistical table and give an example. 8

OR

Q-8. Calculate mean, mode and median for the Hb % obtain from two different **Groups** following data was obtained. 8

Categories							
Male	10	13	12	9.8	8.5	9	11
female	8	12	7	11	10	11	9

—X—

SE

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[49]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc.3rd SEMESTER EXAMINATION
18th November 2017,Saturday
02.00 PM to 05.00 PM
Cytology (US03CBIO 01)

Total Marks-70

Q.1 **Multiple Choice Questions (one mark each)** 10

1. _____ is the function of cell wall.
   (a)protection (b)heredity (c)photosynthesis (d)none
2. _____is found in animal cell.
   (a)cell wall (b)cell membrane (c) chloroplast (d) all of the above
3. _____is network from cell membrane to nuclear membrane.
   (a)mitochondria(b)endoplasmic reticulum (c) both a&b (d) none
4. The function of chloroplast is _____ .
   (a)secretion (b)photosynthesis (c)respiration (d)heredity
5. A cell having more activity has _____ number of mitochondria.
   (a)more (b) less (c) same (d)none
6. Which is the suicidal bag of a cell?
   (a) Mitochondria (b)lysosome (c) golgi body (d)chloroplast
7. _____ reaction occurs in grana.
   (a)light (b)dark (c) both (d) none
8. Cristae is a part of_____.
   (a) Mitochondria (b)lysosome (c) golgi body (d)chloroplast
9. _____helps in supporting the nucleus.
   (a)nuclear pore(b)nuclear lamina(c)nucleoplasm(d)nucleolus
10. _____ is hereditary material of nucleus.
    (a)chromatin material (b)nuclear pore(c) nuclear membrane (d)nuclear lamina

Q.2 **Answer any ten** 20

1 Discuss about chemical composition of cell wall.
2 Describe chemical composition of cell membrane.
3 Give an outline of transportation nature of cell membrane.

(P.T.O.)

SC

SEAT No._____ No. of Printed Pages : 02

[59] SARDAR PATEL UNIVERSITY

B.Sc. THIRD SEMESTER EXAMINATION

2017

MONDAY 20th NOVEMBER

02:00 pm to 05:00 pm

USO3CBIO 02

(FUNDAMENTALS OF GENETICS AND EVOLUTION)

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. Mendel carried out his experiments on which plant?

(a) Pea (b) Coconut (c) Cashewnut (d) Apple

2. Dominant epistasis modify the classical dihybrid ratio of 9:3:3:1 into _____

(a) 9:7 (b) 12:3:1 (c) 9:3:4 (d) 9:6:1

3. Which law of Mendel is known as law of purity of gametes?

(a) Independent Assortment (b) Dominance

(c) Segregation (d) All of these

4. When only one chiasma is formed along the length of chromosome pair, it is called _____ cross over

(a) Single (b) Double (c) Triple (d) Multiple

5. As a result of _____ new gene combinations are produced

(a) Linkage (b) Crossing over

(c) Genetic interaction (d) Sex Determination

6. Primary aquatic organisms respire through _____

(a) Gills (b) Fins (c) Lungs (d) Skin

7. In birds forelimbs are modified into _____ for flying

(a) Tail (b) Neck (c) Beak (d) Wings

8. Study of fossils of microorganisms is called _____

(a) Micropalaeontology (b) Palaeoecology

(c) Palaeobotany (d) Palaeozoology

9. Wisdom tooth is an example of _____ organ

(a) Homologous (b) Vestigial (c) Analogous (d) None of these

10. _____ have served as an extensive source of fossil ivory

(a) Iris deer (b) Mastodons (c) Mammoths (d) Rhinosors

(P.T.O.)

Q.2. Answer the following questions in brief (Any 10) [20]

1. Write note on test cross
2. Define the term genotype and phenotype
3. What will be the phenotypic and genotypic ratio of F2 generation when a homozygous tall plant is crossed with homozygous dwarf plant?
4. Define linkage
5. What is crossing over?
6. State the significance of crossing over
7. Write in brief about Darwinism
8. Explain any two volant adaptations
9. Discuss the theory of spontaneous generation in brief
10. Write about connecting link
11. Define the term Palaeozoology
12. What are fossils?

Q.3. (a) State and explain Mendel's law of independent assortment [06]

(b) Explain Mendel's law of dominance [04]

OR

Q.3. Write note on:

(a) Recessive epistasis [06]

(b) Incomplete dominance [04]

Q.4. (a) Explain Batesson and Punnet's hypothesis [05]

(b) Discuss the mechanism of crossing over [05]

OR

Q.4. (a) Write note on complete linkage [05]

(b) Describe the different kinds of crossing over [05]

Q.5. (a) Give an account of Lamarkism [06]

(b) Discuss desert adaptations [04]

OR

Q.5. (a) Describe aquatic adaptations [06]

(b) Explain Millers Experiment [04]

Q.6. Discuss evidence of evolution from comparative physiology and biochemistry [10]

OR

Q.6. Explain the conditions necessary for fossilization and types of fossils [10]

—X—

SEAT No._____
[51 & A-48]

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Sardar Patel University

B.Sc Biotechnology III Semester
Thursday, 16th November 2017
02:00 p.m to 5:00 p.m
US03CBIT01(Fundamentals of Biotechnology-I)

Total Marks: 70

Note: Figures to the right indicates marks.

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

1) Which scientist demonstrated that in DNA, A=T & G=C?
   a) Chargaff b) James Watson
   c) Francis Crick d) Meselson

2) In DNA, glycosidic bond is present between _____.
   a) Base & base b) Sugar & base
   c) Sugar & Phosphate d) Base & Phosphate

3) *Agrobacterium rhizogenes* possess _____ plasmid naturally.
   a) Ti b) Col
   c) Ri d) F

4) Which type of immunity is present right from the birth?
   a) Cell mediated b) Innate
   c) Acquired d) Humoral

5) B cells are developed in the_____.
   a) Bone marrow b) Liver
   c) Spleen d) Thymus

6) _____ blood group is considered as "Universal accepter".
   a) A b) O
   c) B d) AB

7) _____ induces mast cell degranulation.
   a) IgG b) IgM
   c) IgE d) IgA

8) Primosomes is a complex of_____.
   a) Polymerase & Helicase b) Helicase & Primase
   c) Polymerase & Primase d) Primase & SSB

9) The strain imposed by unwinding of DNA is not relieved by the action of _____.
   a) Gyrase b) Superhelix relaxing protein
   c) SSB d) Topoisomerase

10) In _____ mode of DNA replication each old DNA strand of the parent molecule serve as a template for a new strand in a daughter molecule.
   a) Conservative b) dispersive
   c) Semi conservative d) None of these

P.T.O

Q.II	**Answer the following questions in short.**	**(Attempt any 10)**	**[20]**
a)	Differentiate between nucleoside & nucleotide.		
b)	Mention about mRNA.		
c)	What is wobble base?		
d)	Compare between T lymphocyte & B lymphocyte.		
e)	Enumerate various components of innate immunity.		
f)	What is secondary response?		
g)	Write the biological functions of IgA.		
h)	Define the term : Adjuvants		
i)	Give the significance of blood grouping.		
j)	What are templates & oriC?		
k)	Write about tus-ter complex.		
l)	Draw diagram for rolling circle model of replication in φ X174.		

Q.III a)	Discuss in detail structure of DNA proposed by Watson & Crick .	**[06]**
b)	Give the properties of genetic code.	**[04]**
	OR	
Q.III a)	Define plasmid. Give an account on types & properties of plasmid.	**[07]**
b)	Write in brief about tRNA.	**[03]**
Q.IV a)	Define immune response. Explain primary response with diagram.	**[06]**
b)	Write short note on humoral immunity.	**[04]**
	OR	
Q.IV a)	Give an account on acquired immunity with flow chart representation.	**[07]**
b)	Explain in brief cell mediated immunity.	**[03]**
Q.V	Describe the structure, properties & functions of immunoglobulin	**[10]**
	OR	
Q.V a)	Explain in detail structure & biological functions of IgG.	**[06]**
b)	Write short note on ABO blood grouping.	**[04]**
Q.VI a)	"DNA replication is semiconservative " elaborate & prove with the help of experimental evidence.	**[06]**
b)	Give the functions of all the proteins & enzymes involved in the process of initiation in prokaryotic replication.	**[04]**
	OR	
Q.VI	Discuss in detail process of elongation in prokaryotic replication with diagram.	**[10]**

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[67 & A-42]

Sardar Patel University

B.Sc. III Semester Examination
Friday, 17th November 2017
02:00 pm. TO 05:00 pm.
US03CBIT02 (Applications of Biotechnology- I)

Total Marks: 70

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

i) Normal plants synthesize the _____ required for the growth in development.
a) Amino acids c) Vitamins
b) Enzymes d) Hormones.

ii) Cell suspension culture in which cells are growing in a finite volume of nutrient is called _____.
a) Batch culture c) Continuous culture
b) None of these d) None of these.

iii) 4-amino 3, 5, 6 trichloropicolinic acid is the full name of _____.
a) PCPA c) 3,5,6-TCPA
b) Picloram d) IBA.

iv) The process of inoculating cultured cells into fresh culture vessels is termed as_____.
a) Primary culture c) sub culture
b) Secondary culture d) None of these.

v) Fast growing cell lines require a change of medium after 3-4 days; this is called _____.
a) Feeding b) Farming c) transferring d) none of these.

vi) Serum containing media provide _____ to cultured cells.
a) Proteins c) Growth factors
b) Hormones d) All of these.

vii) The fundamental aim to make transgenic are _____.
a) Protection c) Investigation of gene expression
b) Quality enhancement d) All of these.

viii) Microinjection technique is the best suited for _____.
a) Animal cell b) Plant cell c) Fungal cell d) Bacterial cell.

ix) Leghaemoglobin protects nitrogenase enzyme from _____ molecule.
a) Nitrogen b) Carbon dioxide c) Oxygen d) Both a & c.

x) Paddy mushroom is the common name of _____ species mushroom.
a) Pleurotus c) Agaricus bisporus
b) Volvariella d) Agaricus brunnescens.

(P.T.O.)

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

i) Give the concept of totipotency.
ii) Sketch the graph for batch culture and write in brief about its phases.
iii) Define the terms: Callus and micro propagation
iv) Enlist various applications of animal cell culture.
v) Give the advantages of serum free media.
vi) Write brief note on contamination in animal cell culture
vii) What is the importance of transgenic animals?
viii) Write different lab requirements for animal cell culture.
ix) Enlist objectives of gene transfer.
x) Define SCP and write its applications.
xi) Define: Spawn and Heterocyst.
xii) Write about Bacterioids and Leghaemoglobin.

Q.3 a) Give a detail note on sterilization techniques of PTC. [06]
b) Write pros and cons of PTC. [04]

OR

Q.3 a) Write about the growth regulators used in plant nutrition media. [06]
b) Write in detail about batch culture. [04]

Q.4 a) Explain all the media used for animal cell culture in detail. [10]

OR

Q.4 a) Discuss in detail: Steps of initiation of animal cell line. [06]
b) What is stem cell? Write its potential. [04]

Q.5 a) Explain microinjection technique of transfection for producing transgenic mice. [06]
b) Enlist different transfection methods and explain retroviral infection method for gene transfer. [04]

OR

Q.5 a) Discuss in detail: $CaCl_2$ precipitation technique and Lipofection technique for transfection. [06]
b) Discuss in detail about applications of transgenic animals. [04]

Q.6 a) Write about the nonrenewable carbon resources used for SCP production. [06]
b) Write a note on bacterial biofertilizers. [04]

OR

Q.6 Explain cultivation of Button and Paddy mushroom. Also give the importance of mushroom cultivation. [10]

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SEAT No._____ [50]

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SARDAR PATEL UNIVERSITY

External Examination

Class- S.Y. B.Sc. 3rd Semester

Date: - 18-11-2017, Day: - Saturday,

Time: - 02:00 pm to 05:00 pm

Course: - US03CBNF01 **Subject: Bioinformatics** **Title: - Basics in Bioinformatics**

Total Marks: 70

Q1. Multiple choice questions (**All are compulsory**). **[10X1=10]**

(1) It is a simple type of Database based on ordering and indexing.
a) Flat file indexing system b) RDMS c) Object oriented database d) None

(2) The sequence of the first protein analyzed by F. Sanger was
a) Bovine insulin b) Myosin c) Protease d) Actin

(3) Disease database include:
a) PDB b) OMIM c) MEDLINE d) Genbank

(4) Characterizing the many thousands of proteins expressed in a given cell type at a given time is:
a) Genomics b) Proteomics c) Transcriptomics d) Pharmacogenomics

(5) The phylogenetic lineages of organisms present in
a) MeSH b) OMIM c) Taxonomy d) PMC

(6) MMDB is a part of :
a) EMBL b) NCBI c) DDBJ d) none of the above.

(7) PubMed is a free database accessing primarily information from
a) Genbank b) Google c) Medline d) Internet

(8) Fasta format starts with the sign-
a) < b) > c) @ d) *

(9) Who coined the term Bioinformatics?
a) Paulien Hogeweg. b) Dr Margaret Dayhoff
c) Robert Ledley. d) David W Mount.

(10) Which tool is used in NCBI for submitting any new sequence?
a) Bankit b) sequin C) Bankit & Sequin d) Webin

Q2. Answer the following questions in short. **(Any ten)** **[10X2=20]**

(1) Give the seven major classes of SCOP.
(2) Differentiate between wet lab and dry lab.
(3) Define genomics and proteomics.
(4) Differentiate TrEMBL and EMBL.
(5) Name any two DNA database.
(6) Enlist any four important websites in bioinformatics.
(7) Explain meaning of architecture and homology in CATH database.
(8) Give the name of any two protein structure database.
(9) How protein sequence differ from DNA sequence.
(10) Explain FASTA format.
(11) Give important features of SWISS PROT
(12) Write a short note on PDB

P.T.O

Q3.	(i)	Write the full form of MMDB, NCBI, SCOP, PBD and CATH.	[5]
Q3.	(ii)	Give the brief history of Bioinformatics.	[5]
		OR	
Q3.	(i)	How shareware differ from freeware software.	[5]
Q3.	(ii)	Briefly discuss the different fields of bioinformatics.	[5]
Q4.	(i)	Differentiate Flat file database and RDBMS.	[5]
Q4.	(ii)	Write a note on OMIM database.	[5]
		OR	
Q4.	(i)	What type of information is present in NCBI?	[5]
Q4.	(ii)	Discuss the important features of biological database.	[5]
Q5.	(i)	Give the important feature of GENBANK.	[5]
Q5.	(ii)	Differentiate primary and secondary database.	[5]
		OR	
Q5.	(i)	Give the basic format of EMBL.	[5]
Q5.	(ii)	Which type of information is present in Swiss Prot database? Explain.	[5]
Q6.	(i)	Write a note on MMDB.	[5]
Q6.	(ii)	Give the format for PDB.	[5]
		OR	
Q6.	(i)	Explain the important features of SCOP.	[5]
Q6.	(ii)	Write a short note on CATH database.	[5]

****

SEAT No._____ No. of Printed Pages : 02

[60]

SARDAR PATEL UNIVERSITY
EXTERNAL EXAMINATION

DATE - 20/11/17 DAY-MONDAY TIME 02:00 TO 5:00 pm
Course- US03CBNF02 SUBJECT: BIOINFORMATICS
CLASS- S.Y.B.Sc III Sem TITLE--- Cell Biology and Genetics
TOTAL MARKS: 70

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

(i) Lipid bi layer is
(a) Hydrophilic (b) Hydrophobic (c) a & b both (d) Depend on surrounding medium

(ii) A transmembrane protein differs from other membrane proteins because it:
(a) is covalently linked to the outer surface of the plasma membrane.
(b) is attached to the inside of the membrane by an ionic bond.
(c) completely extends through the membrane.
(d) is completely embedded within the membrane.

(iii) A function of smooth endoplasmic reticulum is to
(a) Form ribosomes (b) Synthesize lipids (c) Store nucleic acid (d) Breakdown carbohydrates

(iv) Lysosomes are reservoir of:
(a) Fats (b) RNA (c) Hydrolytic enzymes (d) Secretory glycoprotein

(v) _____ are alternative forms of a gene that govern the same feature, such as eye colour and occupy corresponding positions on homologous chromosomes.
a) Alleles (b) Loci (c) Homozygotes (d) Coupled traits

(vi) The cross of F1 to homozygous recessive parents are called
a) Test cross C) Back cross
b) F2 cross d) None

(vii) Which of the following represents the possible genotype(s) resulting from a cross between an individual homozygous (BB) and one heterozygous (bb) individual?
(a) BB and Bb (b)BB, Bb, and bb (c) BB only (d) Bb only

(viii) Ration of 9:3:4 is obtained instead of 9:3:3:1 under the condition when there is gene interaction involving
a) Supplementary gene (b) Complementary gene (c) a & b both (d) none

(ix) In a gene interaction the gene that masks the expression of another gene is termed as:
(a) Epistasis gene (b) Duplicate gene (c) Hypostatic gene (d) none

(x) Who proposed the fluid mosaic model of cell membrane structure in 1972?
(a) Davson and Singer (c) Brown and Goldstein
(b) Singer and Nicholson (d) Davson and Danielli

Q2 Answer the following in short (any ten) 2X10 [20]
(i) Differentiate between Simple and Facilitated diffusion.
(ii) What is Active transport? Explain.
(iii) Diagrammatically explain important features of mitochondrial structure.
(iv) Differentiate rough and smooth endoplasmic reticulum.
(v) "Ribosomes called as factories of protein synthesis" Explain.
(vi) Explain Back cross and its significance.
(vii) Why Mendel select pea as an experimental material.
(viii) Define Incomplete dominance.
(ix) Define Supplementary gene
(x) Differentiate between linkage and crossing over.
(xi) Give the brief history of Mendel.

(P.T.O.)

(xii) A woman is homozygous dominant for short fingers (SS). She marries a man who is heterozygous for short fingers (Ss). Will any of their children have long fingers (ss)? Explain the result.

Q3 Explain the structure and function of cell membrane with emphasis on Fluid Mosaic model. [10]

OR

Q3 Give the importance of following in cell membrane (a) lipid (b) protein (c) carbohydrate. [10]

Q4 What are Lysosomes? Describe its structure and function. [10]

OR

Q4 Discuss the important features, structure and function of mitochondria. [10]

Q5 Describe Mendel's laws of inheritance with suitable example. [10]

OR

Q5 (a) Enlist all the seven pairs of contrasting characters of pea studied by the Mendel. [04]

Q5 (b) A pea plant being dominant homozygous for round seed shape and yellow colour was crossed with another plant being recessive homozygous for wrinkled seed shape and green colour. Explain the ratio of the different types expected in the segregating F2 generation with the help of a Punnet's Square. [06]

Q6 Mating between black rodents of the same genotype produced offspring in the ratio of 15 cream coloured: 45 black: 19 albino. (i) Give the phenotypic ratio of these offspring (ii) Give the type of interaction (iii) Give the genotype of parents and the offspring [10]

OR

Q6 (a) Crossing over is an important phenomenon for evolution. Explain [05]

Q6 (b) What are lethal gene and discuss its types. [05]

**********X**********

Seat No._____ No. of Printed Pages : 04

[394 A-32] **SARDAR PATEL UNIVERSITY**

B.Sc. (THIRD SEMESTER) EXAMINATION, 2017

BOTANY (US03CBOT01)

THURSDAY, 23TH NOVEMBER, 2017

LOWER CRYPTOGAMES AND PLANT PATHOLOGY

Time: 2.00To 5.00p.m.Total Marks: 70

Q. 1 Multiple choice question (10)

(1) Generally the heterocyst are _____in position.
(a) Terminal (b) Basal (c) Intercalary (d) None of these

(2) Cystocarpoccur in _____ algae.
(a) Sargassum (b) Polysiphonia (c) Rivularia (d) Cladophora

(3) Conceptacles as reproductive structures are present in_____.
(a) Fucas (b) Polysiphonia (c) Cladophora (d) Sargassum

(4) The body of fungus is called as _____.
(a) Thallus (b) Mycelium (c) Sporangium (d) Conidia

(5) Sexual reproduction in Albugo is _____.
(a) Anisogamous (b) Oogamous (c) Isogamous (d) None of these

(6) Mycorrhiza is a symbiotic relation between _____
(a) Algae (b) Fungi (c) Bacteria (d) None of these

(7) Sickle shaped Spore are found in
(a) Fusarium (b) Alternaria (c) Colletrotrichum (d) Cercospora

(8) The fruiting body of Aspergillus is called_____
(a) Conidia (b) Sporangia (c) Cleistothecium (d) None of these

(9) Chlorophyll containing parts being yellowing:
(a) Chlorosis (b) Hydrolysis (c) Wilting (d) Blotching

(10) Citrus canker is caused by:
(a) Algae (b) Bacteria (c) Fungi (d) Virus

Q. 2 Answer the following in short (any ten). 20)

1. Sketch and label Gloetrichiathallus.
2. Give the classification of Sargassum.
3. Write the name of algae used as food (any four)
4. What is the Dioecious?
5. What is diplantic stage of Saprolegnia?

(P.T.O.)

6. Write any two function of Mycorrhiza.
7. Write the vegetative structure of Peziza.
8. Give the classification of Aspergillus.
9. Write a note on conidia of Alternaria.
10. What is Necrosis?
11. Write the Symptoms of white rust of crucifers.
12. Write the symptoms of rust disease of wheat.

Q. 3 Describe.

1. False branching ofScytonema. (5)
2.Cystocarp of Polysiphonia. (5)

OR

Q. 3 Describe

1. Thallus and cell structure of Cladophora. (5)
2. Female receptacles ofSargassum. (5)

Q. 4Describe

1. Sexual reproduction inPythium. (5)
2.Asexual reproduction in Pernospora. (5)

OR

Q. 4 Describe

1. Thallus structure of Albugo. (5)
2. Sexual reproduction in Saprolegnia. (5)

Q. 5 Describe

1. Apothecium of Peziza. (5)
2. Asexual reproduction in Fusarium. (5)

OR

Q. 5 Describe

1. Sexual reproduction in Aspergillus. (5)
2. Thallus structure of Colletrotrichum. (5)

Q. 6 Give a general account of symptoms of plant diseases. (10)

OR

Q. 6 Write notes on: (i) Late blight of potato (5)
(ii) Citrus canker (5)

—X—

સરદાર પટેલ યુનિવર્સીટી

બી. એસ. સી. સેમેસ્ટર-૩પરીક્ષા ૨૦૧૭

વનસ્પતિશાસ્ત્રવિષય કોડ:US03CBOT01

તારીખ:- 23/11/2017 સમય:-૦૨-૦૦ થી ૫-૦૦ p.m.

કુલમાર્ક:૭૦

સૂચના: ૧.કુલ છ પ્રશ્નોછે.

૨. નવા પ્રશ્ન નો જવાબનવાપેજ થી શરૂ કરો.

૩. તમારાજવાબોનામનિર્દેશન વાળી આકૃતિસહીતઆપો.

પ્રશ્ન ૧. બહુવૈકલ્પીક પ્રશ્નો. (૧૦)

૧. સામાન્ય રીતે અભિકોષ. -----સ્થિતીમાં છે.
(A) ટોચ (B) તલસ્થ (C) આંતરકોષીય (D)આમાંથી કોઇ નહી

૨. ----- લીલમાંકોષ્ટકળ જોવા મળે છે.
(A)સરગાસમ (B)પોલીસાયફોનીયા (C)રીવ્યુલારિયા (D)ક્લેડોફલોરા

૩. પ્રજનનરચનાતરીકે કોન્સેપ્ટીકલસ. ------ માંહાજર છે.
(A)ફાયકસ (B)પોલીસાયફોનીયા (C)ક્લેડોફલોરા (D)સરગાસમ

૪. ફૂગનાકાયાને ------ તરીકે ઓળખવામાંઆવે છે.
(A)સુકાય (B)કવકજાળ (C) બીજાણુધાની (B)બીજાણુધાની

૫. આલ્બ્યુગોમા લીંગી પ્રજનન--------છે.
(A)અસમયુગ્મી (B)) લીંગ જન્યુક (C)સમજન્યુક (D) આમાંથી કોઇનહી.

૬. માઇકોરાઇઝાએ --------નીવચ્ચે નીસહજીવન સંબંધ છે.
(A) લીલ (B)ફૂગ (C) બેક્ટેરીયા (D)આમાંથી કોઇ નહી

૭. દાંતરડા આકારનાબીજાણુમાં જોવા મળે છે.
(A)ફયુસારીયમ (B)ઓલ્ટરનેરીયા (C)કોલેટ્રોટ્રીકમ (D)સરકોસ્પોરા

૮. એસ્પરજીલસનું ફળદ્રુપ શરીરને --------કહેવાય છે.
(A)) કોનીડીયા (B)બીજાણુધાની (C)ક્લેસ્ટોથેસીયમ (D)આમાંથી કોઇનહી.

૯. હરિતદ્રવ્ય ધરાવતા ભાગો પીળા પડે છે.
(A)ક્લોરોસિસ (b) (B)હાઇડ્રોલાયસીસ (C)વિલ્ટીંગ (D)બ્લીચિંગ

૧૦. સાઇટ્રસ કેન્કરનુ કારણ બને છે.
(A)લીલ (B) બેક્ટેરીયા (C) ફૂગ (D) વાયરસ

પ્રશ્ન ૨ . નીચેના પ્રશ્નો ના ટુંક માંજવાબઆપો. (કોઇ પણ દસ) (૨૦)

1. ગ્લીઓટ્રીકીયાસુકાયનીનામઅનેનિર્દેશયુકતઆકૃતિ દારો.
2. સરગાસમનુવર્ગીકરણ આપો.
3. ખોરાકતરીકેવપરાયેલાલીલનુનામલખો.(કોઇ પણ ચાર)
4. દ્વિસદની એટલે શું?
5. સેપ્રોલેગ્નીયાનીડાયપ્લેંટીક અવસ્થા એટલે શુ?

(બાજુ ઉલટાવો)

6. કવકમૂળકોઇપણ બે કાર્યલખો
7. પેઝીઝાનુવાનસ્પતિકરચનાલખો.
8. એસ્પરજીલસનુવર્ગીકરણ આપો.
9. ઓલ્ટરનેરીયાના કોનીડીયાપરનોંધ લખો.
10.નેક્રોસીસ એટલે શું.?
11.ફુસીકરનાશ્વેત ગેરૂના લક્ષણો લખો.
12.ઘઉના રસ્ટ રોગનાલક્ષણો લખો

પ્રશ્ન ૩. વર્ણવો.

૧. સાયટોનેમાની ફૂટ શાખાઓ (૦૫)

૨. પોલીસાયફોનીયાની કોષ્ટફળ (૦૫)

અથવા

પ્રશ્ન ૩.વર્ણવો.

૧. કલેડોફલોરાની સુકાય અને કોષ રચના (૦૫)

૨.સરગાસમનામાદા રીસેપ્ટીકલસ (૦૫)

પ્રશ્ન ૪.વર્ણવો.

૧.પીથીયમમાં લીંગી પ્રજનન (૦૫)

૨.પરનોસ્પોરામા અલીંગી પ્રજનન (૦૫)

અથવા

પ્રશ્ન ૪..વર્ણવો.

૧. આલ્બ્યુગોનુ સુકાય રચના (૦૫)

૨.સેપ્રોલેગ્નીયામાં લીંગી પ્રજનન (૦૫)

પ્રશ્ન ૫.વર્ણવો.

૧. પેઝીઝાનો એપોથીસીયમ (૦૫)

૨.ફયુસારીયમમાં અલીંગી પ્રજનન (૦૫)

અથવા

પ્રશ્ન ૫.વર્ણવો

૧. એસ્પરજીલસમાં લીંગી પ્રજનન (૦૫)

૨.કોલેટ્રોટ્રીકમની સુકાય રચના (૦૫)

પ્રશ્ન ૬. વનસ્પતિ રોગના લક્ષણોનુ સામાન્ય અહેવાલ આપો. (૧૦)

અથવા

પ્રશ્ન ૬.ઉપર નોંધ લખો.

૧. બટાકાના પછીનો સુકારો (૦૫)

૨. સાઇટ્રસ કેન્કર (૦૫)

XXXXX=====XXXXX=====XXXXX

SC

SEAT No._____ No. of Printed Pages : 02

[37 & A-31] SARDAR PATEL UNIVERSITY

B. Sc. (3rd Semester)

BOTANY-US03CBOT02

(Plant Histology, Taxonomy, Economic botany & Plant physiology)

Date-24/11/17 Time: 2.00-5.00p.m.

Day- Friday Marks-70

Q-1Multiple Choice Questions. (10)

(i)Cambium causes growth in:

(a)width (b)length (c)circumference (d)all the above

(ii)Aerenchyma belongs to:

(a)meristematic tissue (b)simple tissue (c)complex tissue (d)sclerenchymatous tissue

(iii)Phloem belongs to:

(a)simple and permanent tissue (b)simple and complex tissue

(c)permanent and complex tissue (d)meristematic tissue

(iv)The placentation in Leguminoseae is:

(a)basal (b)axile (c)parietal (d)marginal

(v)Flower is zygomorphic in:

(a)Papilionaceae (b)Myrtaceae (c)Rubiaceae (d)Cruciferae

(vi)Epipetalous stamens and axile placentation are found in:

(a)Brassicaceae (b)Rubiaceae (c)Myrtaceae (d)Mimosaceae

(vii)Teak wood is obtained from:

(a)Thuja (b)Tamarind (c)Tectona grandis (d)Tamarind

(viii)Tea and Coffee can be classified as:

(a)distilled beverage (b)fermented beverage (c)alcoholic beverage (d)non-alcoholic beverage

(ix)Water of guttation is:

(a)water with dissolved salts (b)solution of organic acid

(c)condensed water vapour (d)pure water

(x)Wilting of plants result from excessive:

(a)respiration (b)transpiration (c)absorption (d)photosynthesis

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

(i)Write the characteristics of parenchyma.

(ii)Name two permanent tissues found in a flowering plant. Write one function of each.

(iii)List different types of secondary wall thickenings found in tracheal elements.

(iv)Give the characteristic features of androecium and gynoecium in Asteraceae.

(v)Describe the floral characters of Annonaceae family.

(vi)Write the identifying characteristics of family Cruciferae.

(vii)What is nutritional value of pulses? Mention two important pulse crops of India.

(viii)Write the botanical name and family of Wheat.

(ix)Write the uses of cotton.

(x)Differentiate between transpiration and guttation.

(xi)Name four micronutrients required by plants.

(xii)Name the internal factors which inhibit transpiration.

(P.T.O.)

Q-3(a)Which tissue contribute to the mechanical strength of the plants? Where do they occur? (06)
(b)What are the functions of parenchyma cells? (04)

OR

Q-3(a) What is tissue? What are the chief features of meristematic tissue? (06)
(b)What ~~are~~ is complex tissue? (04)

Q-4 Give botanical names of any four plants belonging to the family with their economic importance. (10)

OR

Q-4Describe the following in botanical terms with diagrams.
(i)Corolla of Papilionaceae (05)
(ii)Inflorescence of Euphorbiaceae (05)

Q-5Name any two timber yielding plants and describes them. (10)

OR

Q-5Write the economic importance of following:
(a)Groundnut oil (03)
(b)Rice (03)
(c)Jute (04)

Q-6Describe the various external and internal factors that affect photosynthesis. (10)

OR

Q-6Describe: Photoperiodism. (10)

SEAT No._____ [60]

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

S.Y.B.Sc. (Semester-III) EXAMINATION November– 2017

US03CCBI01 : Problem solving methodology & Programming in C

Date:16/11/2017 Time:02:00 to 05:00 Total Marks : 70

Q.1 Multiple choice questions: [10]

1. _____is a step by step approach to solve any problem.
   (a) Process (b) Programming Language
   (c) Algorithm (d) Compiler

2. _____is a pictorial representation of an algorithm.
   (a) Data Diagram (b) Flow Chat
   (c) Pie Chart (d) Program

3. Which of the following section is compulsory in C program?
   (a) Main() (b) Definition
   (c) Documentation (d) None of these

4. The combination of ? and : is known as _____ operator.
   (a) Ternary (b) Arithmetic (c) dot (d) Relational

5. The range of double data type is _____ bytes.
   (a) 2 (b) 4 (c) 8 (d) 16

6. _____ statement terminates the execution of loop
   (a) Continue (b) break
   (c) switch (d) none of these

7. Individual value in array is called _____
   (a) Element (b) Number
   (c) Index (d) Element and number

8. _____function is use to reading the string
   (a) scanf() (b) printf() (c) strrev() (d) strlen()

9. _____function is use for reading the string with the whitespace.
   (a) gets() (b) puts() (c) getc() (d) putc()

10. _____ function count and return the number of character in a string.
    (a) strcpy() (b) strlen()
    (c) strupr() (d) strrev()

(P. T. O.)

Q.2 Write short answer of any ten. [20]

1. List symbols used to draw flow chart. Explain any one.
2. What is an algorithm? List Characteristics of an algorithm.
3. Write an algorithm To find simple interest.
4. Write Rules of variable name.
5. Explain short hand operator in brief.
6. Explain if statement with example.
7. What is an array? List out the type of array use in c programming.
8. Explain structure programming in brief.
9. Write difference between break and continue.
10. Explain strcmp ( ) function with syntax and example.
11. Write deference between user define function and library function.
12. What is string? Write the syntax of declaring string in c.Also give example.

Q.3(a) What is an algorithm? Write advantages and disadvantages of an algorithm. [5]

(b) Explain different generation of computer languages. [5]

OR

Q.3(a) What is flow chart? Write advantages and disadvantages of flowchart. [5]

(b) Write an algorithmTo print N terms of Fibonacci series. [5]

Q.4(a) Explain Basic Structure of C program. [5]

(b) What is operator? Explain different operators with example. [5]

OR

Q.4(a) Explain switch statement with syntax and example. [5]

(b) Explain basic data types used in C language. [5]

Q.5(a) Explain looping statement with syntax and example. [6]

(b) Explain initialization of 1D array with syntax and example. [4]

OR

Q.5(a) Write difference between do-while, while and for loop. [6]

(b) Define array? Also explain declaration of 1D and 2D array with syntax and example. [4]

Q.6 What is user define function? Explain element of user define function. Also explain function definition, call, declaration and return statement in function. [10]

OR

Q.6 Explain following with example: [10]

1. strcat ( ) 2. strcpy ( ) 3. strrev ( ) 4. puts ( ) 5. strlen ( )

— X —

SEAT No._____ No. of Printed Pages : 02

[68]

SARDAR PATEL UNIVERSITY

S.Y.B.Sc (SEMESTER – III) : NOVEMBER-2017

BIO-INFORMATICS

US03CCBI02: COMPUTER FUNDAMENTALS

Date : 17/11/2017 Time: 02:00pm to 05:00pm Max.Marks: 70

Q.1 Multiple choice of Question: 10

1. $1111_2 - 11111_2 =$ _____.
   (a) 101111 (b) 101110
   (c) 111111 (d) 011111
2. The decimal 15 in binary representation is lxyl. The values of x and y are
   (a) X=0, Y=0 (b) X=1, Y=1
   (c) X=1, Y=0 (d) X=0,Y=1
3. The binary language consists of ____ digits.
   (a) 8 (b) 2 (c) 1000 (d) 1
4. Reverse polish notation is the one application of _____
   (a) Indirect (b) Stack
   (c) Index (d) None of the above
5. Reverse polish notation of (A+B)/(C-D)= ____
   (a) AB+/CD (b) AB+-CD/ (c) AB+CD-/ (d) ABCD-/+
6. The form which the operator after the operand is called _____ as in xy+
   (a) Infix notation (b) Reverse polish notation
   (c) Prefix polish notation (d) None of the above
7. Full form of sed is _____
   (a) Sequential Data (b) Sequential Editor
   (c) Stream Editor (d) None of the above
8. _____command copies to output those lines in the input that match a specified pattern.
   (a) cut (b) echo (c) paste (d) grep
9. Attributes are shown in ER- Diagrams.
   (a) Oval (b) Line (c) Diamond (d) Rectangle
10. Rows of the relation are referred as. _____ .
    (a) Relationship (b) Tuples (c) Attributes (d) Record

Q.2 Answer the following questions in short (Any 10) : 20

1. Define Hardware with Example.
2. List application of computer.
3. Explain first generation of computer.
4. Define register addressing
5. What is addressing
6. Define direct addressing
7. Explain cal command in brief.
8. Discuss pwd command in short with example.
9. Explain date command in brief.
10. Define weak and strong entity sets.
11. Write note on database organization.
12. Explain early information system drawback.

(P.T.O.)

Q.3	(a) Draw the block diagram of computer and explain its function	5
	(b) Explain binary number system with example	5
	OR	
Q.3	(a) Explain octal number system with example	5
	(b) Explain hexadecimal number system with example	5
Q.4	(a) Explain BCD and EBCDIC character code	5
	(b) Explain Hamming code method with example	5
	OR	
Q.4	Explain storage representation methods with example	10
Q.5	(a) What is operating system? Explain its function.	5
	(b) Explain feature of unix operating system	5
	OR	
Q.5	(a) Explain chmod command in detail	5
	(b) Explain wc command in detail	5
Q.6	(a) Explain role of database management system in detail.	5
	(b) Explain advantages and disadvantages of DBMS.	5
	OR	
Q.6	(a) Explain Entity-Relationship model in detail.	5
	(b) Explain Hierarchical Data Model in detail.	5

—— X ——

SC

EXAM No. : .....

Total printed pages : 03

[A-52]

SARDAR PATEL UNIVERSITY

B. Sc. III[rd]-SEMESTER (BATCH-2010) EXAMINATION NOVEMBER-2017

SUBJECT : ORGANIC CHEMISTRY

COURSE CODE : US03CCHE01

DATE : 16-11-2017
DAY : THURSDAY

TIME : 02.00 p.m. TO 05.00 p.m.
TOTAL MARKS : 70

Q. 1 Choose the correct option for the following 10

(i) Which of the following is the correct priority order according to R-S nomenclature ?

(a) -OH > $-CH_2OH$ > -CHO > -H (b) -CHO > -OH > $-CH_2OH$ > -H

(c) -OH > -CN > -CHO > -H (d) -CHO > -OH > -CN > $-CH(CH_3)_2$.

(ii) Resolution process is :

(a) Very nearer to racemization (b) Similar to bond rotation in conformation

(c) Similar to optical purity (d) Opposite to racemization.

(iii) Which of the following compound is used as an excellent humectant ?

(a) Ethylene glycol (b) Picric acid (c) Glycerol (d) Nitroglycerine.

(iv) The correct b. p. order of : (i) t-butyl alcohol (ii) ethyl alcohol and (iii) Water is :

(a) (i) > (ii) > (iii) (b) (iii) > (ii) > (i) (c) (ii) > (iii) > (i) (d) (iii) > (i) > (ii).

(v) Claisen condensation give :

(a) β-Keto ester (b) α-Keto acids (c) α-Keto ester (d) β-hydroxy ketone.

(vi) Which of the following compound is chemoselective reagent ?

(a) P/Cl_2 (b) 9-BBN (c) H_2/Ni (d) Fe/conc.HCl.

(vii) The compound have general formula $RCONH_2$ react with Br_2/NaOH to give :

(a) R-COOH (b) R-CONHBr (c) R-CHO (d) $R-NH_2$.

(viii) The nucleophilic attack on a acyl compound involves :

(a) Pentavalent intermediate (b) Tetrahedral intermediate

(c) Carbocation intermediate (d) Carbanion intermediate.

(ix) Which of the following reaction is suitable for the synthesis of salicylaldehyde ?

(a) Kolbe reaction (b) Cumene hydroperoxide rearrangement

(c) Gatterman reaction (d) Reimer-Tiemann reaction.

(x) Dry ice is :

(a) Solid CO_2 (b) Solid NaCl solution (c) Solid water (d) Mixture of gaseous CO_2 and ether solution.

(P.T.O.)

Q. 2 ANSWER THE FOLLOWING (ATTEMPT ANY SIX) 12

(i) In conformational analysis of cyclohexane, tert-butyl group is considered as holding group.

(ii) Staggered conformation of ethane is more stable than eclipsed conformation.

(iii) Give synthesis and uses of ethylene glycol.

(iv) In β-Keto ester, carbonyl groups strengthens the acidity of α-hydrogen atom.

(v) Give mechanism of acid-catalyzed cleavage of epoxide.

(vi) How can you distinguish 1°, 2° and 3° amines.

(vii) Isomers of nitrophenols has different physical properties.

(viii) Acetic acid is exist as a dimer in aqueous state.

Q.3 Answer the following

(a) Trans-1,2-dimethylcyclohexane exist as a pair of configurational enantiomer but its cis isomer is exist as a pair of conformational enantiomer. 4

(b) Comment on the statement : "A molecule having two chiral carbons may not show optical activity". How are such molecules describe ? 4

OR

Q.3 Answer the following

(a) Draw all Newmann formulae resulting from rotation along C_2-C_3 bond of n-butane through 60^0. Name all the conformations and arrange them into increasing order of their stability with potential energy diagram. 4

(b) Cis-1,2-cyclopentanediol cannot be resolved whereas trans-1,2-cyclopentanediol is resolvable. 4

Q. 4 Answer the following

(a) Give the synthesis of 3-methyl-2-pentanol from ethanol by Grignard synthesis route. 4

(b) Draw at least EIGHT isomeric structures of alcohols having molecular formula $C_5H_{12}O$ and give their IUPAC name. 4

OR

Q. 4 Answer the following

(a) Arrange the relative acidity order of following molecules and give detail explanation for your answer. 4

(a) R-OH (b) H_2O (c) NH_3.

(b) Justify: Periodic acid is used as powerful tool in structure determination of polyhydroxy alcohols. 4

Q. 5 ANSWER THE FOLLOWING

(a) Complete the following reaction and give appropriate detail stepwise mechanism. 4

Benztaldehyde + Acetic anhydride $\xrightarrow{NaoAc}$?

(b) During the addition of ammonia derivatives to carbonyl compounds, reaction medium is adjusted to right choice of acidity. 4

OR

Q. 5 ANSWER THE FOLLOWING

(a) Complete the following reaction and give appropriate detail stepwise mechanism. 4

$$\text{Two moles of ROH} + \text{RCHO} \xrightleftharpoons{\text{Dry HCl}} ?$$

(b) Write a note on Iodoform test with its importance in carbonyl compound. 4

Q. 6 ANSWER THE FOLLOWING

(a) What is ammonolysis reaction? Give advantages and disadvantages of this reaction. 4

(b) Arrange the increasing basicity order of following molecules and give detail explanation for your answer. 4

(a) Ammonia (b) Methyl amine (c) Aniline.

OR

Q. 6 ANSWER THE FOLLOWING

(a) Draw at least **SIX** isomeric structures of aliphatic amine having molecular formula $C_4H_{11}N$ and also classified them as 1^o, 2^o and 3^o. 4

(b) Give all the steps involving in synthesis of m-bromotoluene from toluene. 4

Q. 7 ANSWER THE FOLLOWING

(a) What is transesterification ? Give mechanism of acid catalyzed transesterification. 4

(b) Arrange the decreasing acidity order of following molecules and give detail explanation for your answer. 4

(a) Acetic acid (b) Chloroaceticacid (c) Formic acid.

OR

Q. 7 ANSWER THE FOLLOWING

(a) Carboxylic acids are stronger acid than phenol. 4

(b) Give the synthesis of citric acid from glycerol. 4

Q. 8 ANSWER THE FOLLOWING

(a) Give reaction mechanism of Gatterman synthesis. 4

(b) Give the evidence that phenyl group migrates much faster than methyl group in cumene hydroperoxide rearrangement. 4

OR

Q. 8 ANSWER THE FOLLOWING

(a) Phenol is stronger acid than alcohol. 4

(b) Complete the following reaction and give appropriate detail stepwise mechanism. 4

$$\text{Cumene} \xrightarrow[\text{(ii) } H^+/H_2O]{\text{(i) } O_2} ? + ?$$

Sc

Seat No._____ 03

[614 A-47]

SARDAR PATEL UNIVERSITY
THIRD SEMSESTERY B.Sc. EXAMINATION- 2017
COURSE NO: US03CCHE01
SUBJECT: ORGANIC CHEMISTRY

Date: 16/11/2017 Time: 02:00 P.M. to 05:00 P.M.
Day: Thursday Total Marks: 70

Que 1. સાચો વિકલ્પ પસંદ કરી નીચેના પ્રશ્નોના જવાબ આપો. 10

1. વસ્તુ-પ્રતિબિંબ સ્વરુપના પ્રકાશ સમઘટકોને શું કહેવાય ?
(a) ટોટોમર (b) ડાયાસ્ટીરીયોમર (c) ઈનાંશીયોમર (d) મેટામર

2. મેસો સંયોજન એટલે :
(a) કિરાલ કાર્બન ધરાવતો અકિરાલ અણુ, (b) તે સંમિતિ કેંન્દ્ર અથવા સંમિતિ સમતલ ધરાવતો હોય. (c) તે પ્રકાશ અક્રિયાશીલ હોય. (d) તે ઉપરના બધાજ ગુણધર્મો ધરાવતો હોય.

3. રેકટીફાઈડ સ્પીરીટ એટલે :
(a) 100% Ethanol (b) 90% Ethanol (c) 100% Methanol (d) 95% Ethanol

4. લ્યુકાશ પ્રક્રિયક જણાવો :
(a) HCl/$NaNO_2$ (b) H_2 /Pd (c) HCl/$ZnCl_2$ (d) H_2 /Pd /$BaSO_4$

5. ત્રણ સભ્યો ધરાવતું ચક્રિય ઈથર સંયોજનને શું કહેવાય ?
(a) લેકટોન (b) ઓક્સિરેન (c) આલ્કેલોઈડ (d) ઈપોકસી રેઝીન

6. હિન્સબર્ગનો પ્રક્રિયક જણાવો :
(a) KOH/NH_2 NH_2 (b) બેંઝીન સલ્ફોનાઈલ ક્લોરાઈડ (c) HCl/$ZnCl_2$ (d) Pd /$BaSO_4$

7. કયું સંયોજન રજત-દર્પણ કસોટી આપે છે.?
(a) એસિટોન (b) એસિટાલ્ડીહાઈડ (c) બેંઝોફીનોન (d) પ્રોપેનોન

8. ડાયબેઝીક એસિડ કયો છે.?
(a) એસિટીક એસિડ (b) ઓકઝેલિક એસિડ (c) બેન્ઝોઈક એસિડ (d) સિન્નામિક એસિડ

9. વધુ બાષ્પશીલ ફિનોલ કયો છે,?
(a) p-નાઈટ્રો ફિનોલ (b) 0- નાઈટ્રો ફિનોલ (c) પિક્રિકએસિડ(d) રિસોર્સિનોલ

10. ફિનોલ ની રીમર-ટીમાન સાથેની પ્રક્રિયામાં કઈ નીપજ મળે છે.?
(a)સેલિસિલીક એસિડ b) સેલિસાલ્ડીહાઈડ (c) બેંઝોઈક એસિડ (d) સિન્નામિક એસિડ

(પાછળ જુઓ)

Que.2	નીચેના પ્રશ્નોના જવાબ આપો. (ગમે તે દશ)	20
1.	વ્યાખ્યા આપો : ગોઠવણી અને સંરૂપણ	
2.	નૉર્મલ-બ્યુટેનમાં ઈક્લીપ્સ્ડ સંરૂપણ કરતાં સ્ટેગર્ડ સંરૂપણ વધુ સ્થાયી છે.સમજાવો.	
3.	સંરૂપણની સ્થિરતા ને અસરકર્તા બે પરિબળો લખો.	
4.	ઈથીલીન ગ્લાયકોલના ઉપયોગો જણાવો.	
5.	ઈથાઈલ આલ્કોહોલનું ઓક્સિડેશન સરળતાથી થાય છે પણ તૃતીયક આલ્કોહોલનું થતું નથી. સમજાવો.	
6.	સંશ્લેષણ આપો. : બેંઝીન માંથી 1- ફિનાઈલ ઈથેનોલ	
7.	સંશ્લેષણ આપો. : બેંઝાલ્ડીહાઈડ માંથી મેન્ડેલિક એસિડ	
8.	સંશ્લેષણ આપો. : બેંઝીન માંથી આયોડો- બેંઝીન	
9.	આયોડોફોર્મ ટેસ્ટ ઉદાહરણ સાથે આપો.	
10.	કાર્બોક્ઝિલીક એસિડના ગલનબિંદુ અથવા ઉત્કલનબિંદુ આલ્કોહોલ કરતાં ઉચાં હોય છે. સમજાવો.	
11.	સંશ્લેષણ આપો. : o-ટોલ્યુડીન માંથી o-ટોલ્યુઈક એસિડ	
12.	$C_6 H_6 O_2$ અણુસુત્ર ધરાવતા ફિનોલના બધા જ બંધારણીયસુત્ર દોરો.તથા તેના નામ જણાવો.	
Que.3	ચક્રિય સંયોજનોમાં અવકાશીય સમઘટકતા ઉદાહરણ સાથે સમજાવો.2,3 ડાયબ્રોમો બ્યુટેનમાં ઈનાંશીયોમર,ડાયાસ્ટીરીયોમર અને મેસો સંયોજનો સમજાવો.	10
	OR	
Que.3	સંયોજનનો પ્રકાશીય ગુણધર્મ નક્કી કરવાનો પોલરીમીટરનો પ્રયોગ સમજાવો. R-S નામકરણ સમજાવો.	10
Que.4	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	પિનાકોલ- પિનાકોલોન પુન:વિન્યાશ ક્રિયાવિધિ સાથે સમજાવો..	04
2.	વિલિયમસન ઈથર સંશ્લેષણ પ્રક્રિયા તૃતીયક બ્યુટાઈલ ઈથર સાથે અસરકારક નથી. સમજાવો.	03
3.	આલ્કોહોલ ઉભયગુણધર્મી સ્વભાવ ધરાવે છે. સમજાવો.	03
	OR	
Que.4	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	ઈથીલીન ગ્લાયકોલની ઓક્સિડેશન અને ડિહાઈડ્રશન પ્રક્રિયા સમજાવો.	04

2.	ઈપોકસાઈડમાં એસિડ-ઉદ્દીપકીય વિભાજનપ્રક્રિયા ક્રિયાવિધિ સાથે સમજાવો.	03
3.	આલ્કોહોલનું ઓક્સિડેશન સમજાવો.	03
Que.5	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	"વીટીંગ પ્રક્રિયા" ક્રિયાવિધિ સાથે સમજાવો.	04
2.	$C_4H_{11}N$ અણુસુત્ર ધરાવતા એમાઈનના બધા જ સમઘટકોના બંધારણીયસુત્ર દોરો તેમને $1^0, 2^0$ અને 3^0 એમાઈનમાં વર્ગીકૃત કરો.	03
3.	આલ્ડોલ સંઘનનનો સંશ્લેષણમાં ઉપયોગ સમજાવો.	03
	OR	
Que.5	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	"ક્લેઝન સંઘનન" પ્રક્રિયા સમજાવો.	04
2.	એમોનીયા કરતાં એરોમેટીક એમાઈન નિર્બળ બેઈઝ છે. સમજાવો.	03
3.	"હોફમેન પુનઃવિન્યાશ પ્રક્રિયા" ક્રિયાવિધિ સાથે સમજાવો.	03
Que.6	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	ફીનોલમાં ઈલેકટ્રોન અનુરાગી વિસ્થાપન પ્રક્રિયાઓ સમજાવો. . [નાઈટ્રેશન,સલ્ફોનેશન,હેલોજીનેશન,ફીડલ-ક્રાફ્ટ આલ્કાઈલેશન]	04
2.	સંશ્લેષણ આપો. : મેલોનિક એસ્ટર માંથી α- મિથાઈલ બ્યુટરીક એસિડ.	03
3.	ફીનોલના ઔધોગિક ઉત્પાદનની ક્યુમીન પધ્ધતી સમજાવો.	03
	OR	
Que.6	નીચેના પ્રશ્નોના જવાબ આપો.	
1.	"ગટરમેન સંશ્લેષણ પ્રક્રિયા" ક્રિયાવિધિ સાથે સમજાવો.	04
2.	આલ્કોહોલ કરતાં ફીનોલ વધું એસિડીક છે. સમજાવો.	03
3.	α,β,γ – કલોરો બ્યુટરીક એસિડને કારણો આપીને એસિડીકતાંના ચડતાં ક્રમમાં ગોઠવો.	03

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Seat No._____ 02

[614 A-45]

SARDAR PATEL UNIVERSITY

THIRD SEMSESTERY B.Sc. EXAMINATION- 2017

COURSE NO: US03CCHE01

SUBJECT: ORGANIC CHEMISTRY

Date: 16/11/2017 Time: 02:00 P.M. to 05:00 P.M.

Day: Thursday Total Marks: 70

Que 1. Choose the correct option and rewrite the answer of the following. 10

1. Optical isomers that are mirror images are called :
   (a) Tautomers (b) Diastereomers (c) Enantiomers (d) Metamers
2. A meso compound :
   (a) is an achiral molecule which contains chiral carbons (b) contain a plane of symmetry or a centre of symmetry (c) is optically inactive (d) is characterised by all of the above
3. Rectified spirit is :
   (a) 100% Ethanol (b) 90% Ethanol (c) 100% Methanol (d) 95% Ethanol
4. Lucas reagent is :
   (a) HCl/$NaNO_2$ (b) H_2 /Pd (c) HCl/$ZnCl_2$ (d) H_2 /Pd /$BaSO_4$
5. Cyclic ethers with three- membered ring are called :
   (a) Lactones (b) Oxirane (c) Alkoxides (d) Epoxy resins
6. Hinsberg's reagent is :
   (a) KOH/NH_2 NH_2 (b) benzene Sulphonyl Chloride (c) HCl/$ZnCl_2$ (d) Pd /$BaSO_4$
7. Which compound gives Silver-mirror test?
   (a) Acetone (b) Acetaldehyde (c) benzophenone (d) propanone
8. Dibasic acid is :
   (a) Acetic acid (b) Oxalic acid (c) benzoic acid (d) Cinnamic acid
9. High volatile phenol is :
   (a) p-nitro phenol (b) o-nitro phenol (c) picric acid (d) Resorcinol
10. Phenol with Reimer-Tiemann Reaction gives :
    (a)Salicylic acid (b) Salicylaldehye (c) benzoic acid (d) Cinnamic acid

Que.2 Answer the following questions (Any Ten) 20

1. Define the terms : Configuration and Conformation
2. Staggered conformer of n-butane is more stable with compare to eclipsed. Explain.
3. Write any two factors affecting stability of conformations.
4. Give the use of ethylene glycol.
5. Ethyl alcohol undergoes oxidation reaction easily but tetary butyl alcohol does not. Explain.
6. Give the synthesis of 1- phenyl ethanol from benzene.
7. Give the synthesis of mandelic acid from benzaldehyde.
8. Give the synthesis of iodo benzene from benzene.
9. Define iodoform test with illusration.

(P.T.O)

10. M.P or B.P of carboxylic acids are higher than alcohols. Explain.
11. Give the synthesis of o-toluic acid from o-toluidine
12. Give the structural formula and name of the phenols having molecular formula $C_6H_6O_2$.

Que.3 Discuss Stereoisomerism of cyclic compound with illustrations. Explain Enantiomers,Diastereomers and meso compounds in 2,3 dibromo butane. 10

OR

Que.3 Explain optical nature of compound by polarimeter experiment. Discuss R-S nomenclature. 10

Que.4 Answer the following questions

1. Give the detailed mechanism of Pinacol-Pinacolone Rearrangement. 04
2. Williamson's ether synthesis is not effective with tert. Butyl ether.Explain. 03
3. Alcohols are amphoteric in nature. Explain. 03

OR

Que.4 Answer the following questions

1. Explain oxidation and dehydration reaction of Ethylene glycol. 04
2. Give the detailed reaction mechanism for the acid-catalyzed cleavage of epoxide. 03
3. Explain oxidation of alcohols. 03

Que.5 Answer the following questions

1. Discuss the detailed "Witting Reaction" 04
2. Draw the structure of all isomeric amines having molecular formula $C_4H_{11}N$.Classify them as 1^0, 2^0 and 3^0 amines. 03
3. Explain uses of aldol condensation in synthesis. 03

OR

Que.5 Answer the following questions

1. Discuss the detailed " Claisen Condensation " 04
2. Aromatic amines are weaker base than ammonia. Explain. 03
3. Explain Hoffman rearrangement with mechanism. 03

Que.6 Answer the following questions

1. Give the electrophilic substitution reaction of phenol. 04
   [Nitration, Sulphonation, Halogenation, Fridel-Craft alkylation]
2. Give the synthesis of α-methyl butyric acid from malonic ester. 03
3. Explain industrial production of phenol by Cumene process. 03

OR

Que.6 Answer the following questions

1. Give the detailed mechanism of "Gattermann synthesis " 04
2. Phenols are much more acidic than alcohol. Explain. 03
3. Arrange the α,β,γ – Chlorobutyric acid in increasing order of acidity. 03

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SC

SEAT No._____

[A-42]

No. of printed pages: 03

SARDAR PATEL UNIVERSITY

B.Sc. (Sem. - III) EXAMINATION (2010 Batch)

Saturday, 18th November 2017

Time: 2:00 p.m. to 5:00 p.m.

Physical Chemistry (US03CCHE02)

Maximum Marks: 70

Q-1. Choose the correct option (Multiple choice questions). (10)

(i) The first law of thermodynamics say that _____.
(a) energy can be created but not destroyed
(b) energy can be created and destroyed
(c) one usable form of energy can be completely converted into another usable form
(d) energy can neither be created nor be destroyed.

(ii) The process of condensation of vapour is accompanied by _____ of entropy.
(a) decrease (b) increase (c) no change (d) none of these

(iii) The unit of conductivity is _____.
(a) ohm (b) Siemens (c) S cm (d) 1/mho

(iv) Which of the following is not a colligative property?
(a) elevation of boiling point (b) osmotic pressure
(c) freezing point (d) lowering of vapor pressure

(v) Which of the following particles can pass through semi-permeable membrane?
(a) molecules of solute (b) complex ions only
(c) molecules of solvent (d) none of the above

(vi) Which one has the minimum freezing point?
(a) one molal NaCl solution (b) one molal KCl solution
(c) one molal $CaCl_2$ solution (d) one molal urea solution

(vii) The degree of dissociation α = _____.
(a) Λ_c / Λ_m (b) Λ^0 / Λ (c) Λ / Λ^0 (d) Λ_m / Λ_c

(viii) The arrangement Pt /H_2 (P_1) / HCl (solution) / H_2 (P_2) /Pt refers to the _____.
(a) calomel electrode (b) electrode concentration cell
(c) electrolyte concentration cell (d) hydrogen electrode

(ix) The fraction of the current carried by ions is _____.
(a) 1 (b) 2 (c) 4 (d) 8

(x) For a cell reaction to be spontaneous: _____.
(a) E° is +ve (b) E° is –ve (c) ΔG is +ve (d) both ΔG and E° are +ve

(P.T.O.)

Q- 2. Answer the following questions (Any six). (12)

(i) Define specific conductivity. Give its relation with cell constant and also mention its units.

(ii) Write the cell reaction for:

(a) Zn/Zn^{+2} // Fe^{+3}, Fe^{+2}/Pt (b) Cd, $CdCl_{2(aq)}$ / $HNO_{3(aq)}$, $H_{2(g)}/Pt$

(iii) Define electrolyte concentration cell. Give one example.

(iv) What are the limitations of first law of thermodynamics?

(v) State Raoult's law with its mathematical equation.

(vi) Name the methods used for the measurement of vapour pressure lowering and elevation of boiling point.

(vii) State and explain the Arrhenius theory.

(viii) Why vapour pressure of liquid decreases when a non-volatile solute is added into it?

Q-3 (a) Write short note on Trouton's rule. (04)

(b) Calculate the change in the entropy for the reaction $Ag_2O \rightarrow 2Ag + ½O_2$ at 25°C. (ΔH_f° = -31.05 KJ $mole^{-1}$), V P of O_2 is 1.2 x 10^{-4} bar. (04)

OR

Q-3 (a) Does the gas spontaneously expand to vacuum or does it collect itself into part of container that holds it. (04)

(b) Write short note on molecular basis of third law. (04)

Q-4 (a) What is depression of freezing point? Derive the relation between depression of freezing point and molality. (04)

(b) Explain the Static and Dynamic method to determine vapour pressure lowering. (04)

OR

Q-4 (a) Show that $M_2 = \frac{W_2RT}{V\pi} = C_2\left(\frac{RT}{\pi}\right)$ (04)

(b) A Solution containing 0.450 g of a solute and 22.5 g of water, showed a boiling point elevation of 0.170°C. Calculate the molecular weight of the solute. K_b = 0.512 K Kg mol^{-1}. (04)

Q-5 (a) Define: (04)

i. Electrolytes ii. Metallic conductor iii. Degree of dissociation

iv. molar conductance.

(b) The resistance of 0.01 M solution of an electrolyte was found to be 200 Ω at 25°C. Calculate the molar conductance of the solution at 25°C. Cell constant = 0.84 cm^{-1}. (04)

OR

Q-5 (a) Explain the variation of molar conductance with dilution for strong and weak electrolytes. (04)

(b) The molar conductance of CH_3COONa, HCl and NaCl at infinite dilution are 91.0 x 10^{-4}, 426.16 x 10^{-4} and 126.45 x 10^{-4} ohm^{-1} m^2 mol^{-1} resp. at 25°C. Calculate the molar conductance at infinite dilution for CH_3COOH. (04)

Q-6 (a) Discuss the conductometric titration of: (04)

i. HCl → NaOH ii. CH_3COOH → NaOH

(b) What is ionic mobility? Derive an expression for the determination of ionic mobilities of ions in solution from the measurement of conductance at an applied voltage V. (04)

OR

Q-6 (a) Write short note on Debye Huckel limiting law. (04)

(b) State the application of conductance measurement and explain any one. (04)

Q-7 (a) Define the reversible electrode. Write the symbolic representation as well as electrode reaction for various types of electrodes with suitable example. (04)

(b) For the cell reaction $AgCl + ½ H_2 = Ag + H^+ + Cl^-$ standard emf is 0.2223 V. Calculate free energy change and explain whether the reaction is spontaneous or not. (04)

OR

Q-7 (a) For the cell reaction $aA + bB = cC + dD$ derive the relation between emf and activities of reagents. (04)

(b) Derive the relation showing effect of temperature on emf. (04)

Q-8 (a) What is concentration cell? Derive an expression for electrolyte concentration cell without liquid- junction potential with suitable example. (04)

(b) Calculate the cell emf of the concentration cell as given below: (04)

Cu/Cu^{+2} ($a_1 = 0.01$) // Cu^{+2} ($a_2 = 0.05$) /Cu

OR

Q-8 (a) Giving suitable example show how, solubility product k_{sp} are determine from emf measurements? (04)

(b) How will you determine the pH of the solution using (04)

a) Hydrogen electrode.

b) Quinhydrone electrode.

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SC

SEAT No._____

No. of Pages: 04

[51 & A-37] (Eng.) SARDAR PATEL UNIVERSITY, VALLABH VIDYANAGAR

B.Sc. (SEMESTER-III) EXAMINATION

Saturday, 18th November 2017

2.00 pm – 5.00 pm

PHYSICAL CHEMISTRY: US03CCHE02

Marks:70

Q - 1 Select one most appropriate response out of the four provided to you. (10)

(i) Which of the following is always true for an isothermal process of an ideal gas?

(a) the pressure doesn't change (b) no heat flows into or out of the system

(c) the volume doesn't change (d) the internal energy doesn't change

(ii) Which of the following condition is necessary for a reaction to be spontaneous ?

(a) $\Delta S_{sys} + \Delta S_{surr} < 0$ (b) $\Delta S_{sys} + \Delta S_{surr} = 0$ (c) $\Delta S_{sys} + \Delta S_{surr} > 0$ (d) All are wrong

(iii) When muscles contract, chemical energy is converted into mechanical energy with the loss of heat. This is the example of which law of thermodynamics?

(a) first (b) second (c) third (d) fourth

(iv) As a result of osmosis, the volume of the solution

(a) gradually increases (b) gradually decreases

(c) suddenly increases (d) shows no signs of change

(v) The vapor pressure of a dilute solution of a non-volatile solute is not influenced by

(a) melting point of solute (b) temperature of solution

(c) degree of dissociation of solute (d) mole fraction of solute

(vi) At high altitudes the boiling point of water decreases because

(a) temperature is low (b) atmospheric pressure is low

(c) atmospheric pressure is high (d) water is cold

(vii) Conductivity is directly proportional to the area of the vessel and the concentration of the solution in it and is inversely proportional to the length of the vessel, then the unit of constant of proportionality is

(a) S m mol^{-} (b) S m^{-2} mol^{-} (c) S m^{2} mol^{-} (d) S^{-2} m^{2} mol^{-}

(viii) Effect of dilution on conductance is as follows:

(a) both specific and molar conductance increase with dilution

(b) both specific and molar conductance decrease with dilution

(P. T. O.)

(c) specific conductance increases, molar conductance decreases
(d) specific conductance decreases, molar conductance increases

(ix) The reference electrode is made by using
(a) $ZnCl_2$ (b) $CuSO_4$ (c) $AgNO_3$ (d) Hg_2Cl_2

(x) What is indicated when a chemical cell potential (E°) has dropped to zero?
(a) the concentration of the reactants has increased
(b) the concentration of the reactants has decreased
(c) the cell reaction has reached equilibrium
(d) the cell reaction has completely stopped

Q-2 Give answers of any ten questions given below. **(20)**

(i) Discuss about the Carnot theorem.

(ii) What are the limitations of first law of thermodynamics?

(iii) "Entropy is a measure of probability of the system." Explain.

(iv) What would be the vapor pressure of 0.5 molal solution of a non-volatile solute in benzene at 30 °C ? The vapor pressure of pure benzene at 30 °C is 119.6 torr (at.wt. C = 12, H = 1 gm/mol).

(v) Describe the static method for the measurement of vapor pressure lowering.

(vi) State Raoult's law with its mathematical statement.

(vii) Define specific conductivity. What are its units?

(viii) Define molar conductance and degree of dissociation.

(ix) Define Van't Hoff factor (i).Give the relation between Van't Hoff factor and degree of dissociation(α).

(x) Write the cell reaction for the following electrochemical cells.
(a) $Zn / Zn^{+2} // Fe^{+3}, Fe^{+2} / Pt$ (b) $Pt / H_{2(g)} / HCl / AgCl / Ag$

(xi) E° for the cell $Zn / Zn^{+2}_{(aq)} // Cu^{+2}_{(aq)} / Cu$ is 1.10 V at 25 °C. What is the equilibrium constant for the cell reaction $Zn + Cu^{+2}_{(aq)} = Cu + Zn^{+2}_{(aq)}$?

(xii) Give type of the following electrodes.
(a) quinhydrone electrode (b) Zn-Zn ion electrode
(c) Fe^{+2}, Fe^{+3} ion electrode (d) standard H_2 electrode

Q-3 (a) Discuss in detail the Carnot cycle and hence show that the net work done is equal to the net heat absorbed for a cyclic process. **(05)**

(b) One mole of an ideal gas is heated from 100 K to 300 K. Calculate change in entropy if (i) the volume is kept constant,(ii) the pressure is kept constant. (C_v = 1.5 R and R = 8.314 $JK^{-}mol^{-}$). **(05)**

OR

Q-3 (a) Describe about entropy changes in reversible and irreversible processes. **(05)**

(b) Derive an expression for entropy of a mixture of ideal gas and calculate the entropy of mixing of one mole of oxygen gas and two moles of hydrogen gas, assuming that no chemical reaction occurs and the gas mixture behaves ideally. **(05)**

Q- 4 (a) Derive an expression correlating the molal elevation constant and elevation in boiling point when non-volatile solute is added to pure solvent. **(06)**

(b) Calculate the molar mass of a non-volatile solute if, at 25 °C, its solution containing 1.6 gm per dm^3 has an osmotic pressure of 83 torr. (R = 0.08214 dm^3 atm $K^{-}mol^{-}$) **(04)**

OR

Q- 4 (a) Describe Morse-Frazer and Berkeley-Hartley methods for the measurement of osmotic pressure. **(06)**

(b) Certain solution of benzoic acid in benzene boils at 82.6 °C and freezes at 3.1 °C. What information about the number of particles and the structure of benzoic acid at the two temperatures can be deduced from the above data? The boiling point of pure benzene is 80.1 °C and freezing point is 5.5 °C. (K_f = 5.12 K Kg mol^{-}, K_b = 2.67 K Kg mol^{-}). **(04)**

(P.T.O.)

Q-5 (a) What is electrolysis? Explain electrolysis of HCl solution by considering three compartments. **(06)**

(b) The resistance of 0.01 M solution of an electrolyte was found to be 210 ohm at 25 °C. Calculate the molar conductance of the solution at 25 °C. Cell constant is 0.88 cm^{-}. **(04)**

OR

Q-5 (a) Define ionic mobility. Derive an expression for the determination of ionic mobility of ions in an aqueous solution at voltage V through the conductance measurements. **(06)**

(b) The molar conductances of sodium acetate, hydrochloric acid and sodium chloride at infinite dilution are 91.0×10^{-4}, 426.16×10^{-4} and 126.45×10^{-4} Sm^2 mol^{-} respectively at 25 °C. Calculate the molar conductance at infinite dilution for acetic acid. **(04)**

Q-6 List the applications of emf measurements. Discuss any two in detail. **(10)**

OR

Q-6 Define different types of concentration cell. Derive an expression for the emf of an electrolyte concentration cell without liquid junction potential with suitable example. **(10)**

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SET No._____

[514A-37] સરદાર પટેલ યુનિવર્સીટી,વલ્લભવિદ્યાનગર

(ઉમું) બી.એસસી.(સેમિસ્ટર-III) પરીક્ષા

શનિવાર, ૧૮ નવેમ્બર ૨૦૧૭

૨.૦૦ pm – ૫.૦૦ pm

ભૌતિક રસાયણશાસ્ત્ર : US03CCHE02

marks -૭૦

પ્રશ્ન-૧ યોગ્ય વિકલ્પ પસંદ કરો. (૧૦)

(i) આદર્શ વાયુની સમતાપી પ્રક્રમ માટે નીચેનામાંથી હંમેશા શું સાચું છે?

(a)દબાણમાં ફેરફાર થતો નથી (b) પ્રણાલીમાંથી અથવા પ્રણાલીની અંદર ઉષ્માનું વહન થતુ નથી

(c) કદમાં ફેરફાર થતો નથી (d) આંતરીક શક્તિમાં ફેરફાર થતો નથી

(ii) આપમેળે થતી પ્રક્રમ માટે કઈ શરત જરૂરી છે?

(a) $\Delta S_{sys} + \Delta S_{surr} < 0$ (b) $\Delta S_{sys} + \Delta S_{surr} = 0$ (c) $\Delta S_{sys} + \Delta S_{surr} > 0$ (d) ઉપરનું એકપણ નથી

(iii) જયારે માંસપેશી સંકોચાય ત્યારે રાસાયણીકશક્તિનુ રૂપાંતર યાંત્રિકશક્તિમાં થઈને ઉષ્માનુ ઉત્સર્જન થાય છે. આ ઘટના ઉષ્માગતિશાસ્ત્રના કયા નિયમનું પાલન કરે છે?

(a) પ્રથમ (b) દ્વિતીય (c) તૃતીય (d) ચતુર્થ

(iv) અભિસરણ ની પ્રક્રિયા ના લીધે દ્રાવણનું કદ

(a) ધીમે ધીમે વધે છે (b) ધીમે ધીમે ઘટે છે

(c) ત્વરિત વધે છે (d) કોઈ પણ પ્રકારનો ફેરફાર જોવા મળતો નથી

(v) અબાષ્પશીલ દ્રાવ્ય પદાર્થના મંદ દ્રાવણના બાષ્પદબાણ ઉપર શાની અસર થતી નથી?

(a) દ્રાવ્ય પદાર્થનું ગલનબિંદુ (b) દ્રાવણનુ તાપમાન

(c) દ્રાવ્યની વિયોજનમાત્રા (d) દ્રાવ્યના મોલ-અંશ

(vi) ઉંચાણવાળા પ્રદેશમાં પાણીનું ઉત્કલનબિંદુ ઘટે છે,કારણ કે

(a) તાપમાન ઓછુ હોય છે (b) વાતાવરણનું દબાણ ઓછુ હોય છે

(c) વાતાવરણનું દબાણ વધારે હોય છે (d) પાણી ઠંડુ હોય છે

(vii) વાહકતા પાત્રના ક્ષેત્રફળ અને દ્રાવણની સાંદ્રતા સાથે ચલે,અને તે પાત્રની લંબાઈના વ્યસ્ત પ્રમાણ માં હોય ત્યારે,સપ્રમાણ અચળાંકનો એકમ_____ .

(a) S m mol^{-} (b)S m^{-2} mol^{-} (c) S m^{2} mol^{-} (d)S^{-2} m^{2} mol^{-}

(પાનું ઉલટાવો)

(viii) વાહકતા ઉપર મંદનની અસર નીચે પ્રમાણે છે.

(a) વિશિષ્ઠ અને મોલર વાહકતા બન્ને મંદન સાથે વધે છે

(b) વિશિષ્ટ અને મોલર વાહકતા બન્ને મંદન સાથે ઘટે છે

(c) વિશિષ્ટ વાહકતા વધે, પરંતુ મોલર વાહકતા ઘટે છે

(d) વિશિષ્ટ વાહકતા ઘટે, પરંતુ મોલર વાહકતા વધે છે

(ix) સંદર્ભ ધ્રુવ બનાવવામાં કયો પદાર્થ વપરાય છે ?

(a) $ZnCl_2$ (b) $CuSO_4$ (c) $AgNO_3$ (d) Hg_2Cl_2

(x) રાસાયણીક કોષનો પ્રમાણિત કોષ પોટેન્શીયલ (E°) નુ મુલ્ય શુન્ય થાય તે શું સુચવે છે?

(a) પ્રક્રીયાની સાંદ્રતામાં વધારો (b) પ્રક્રીયાની સાંદ્રતામાં ઘટાડો

(c) કોષ પ્રક્રીયામાં સંતુલન સ્થપાવું (d) કોષ પ્રક્રીયા સંપૂર્ણપણે સ્થગિત થવી

પ્રશ્ન-૨ નીચે આપેલ પ્રશ્નોમાંથી ગમે તે દસ પ્રશ્નોના જવાબ આપો. (૨૦)

(i) કાર્નોટ પ્રમેયની ચર્ચા કરો.

(ii) ઉષ્માગતિશાસ્ત્રના પ્રથમ નિયમની મર્યાદાઓ જણાવો.

(iii) "એન્ટ્રોપી એ પ્રણાલીની સંભાવનાનું માપ છે." સમજાવો.

(iv) 30 °C તાપમાને અબાષ્પશીલ દ્રાવ્ય પદાર્થના બેંઝિનમાં બનાવેલા ૦.૫ મોલલ દ્રાવણનું બાષ્પદબાણ ગણો. 30 °C તાપમાને શુદ્ધ બેન્ઝીનનું બાષ્પદબાણ ૧૧૯.૬ ટોર (torr) છે. (પરમાણુભાર C = ૧૨, H = ૧ ગ્રામ/મોલ).

(v) બાષ્પદબાણમાં ઘટાડો માપવા માટેની સ્થાયી (static) પધ્ધતિનું વર્ણન કરો.

(vi) રાઉલ્ટનો નિયમ લખો.અને તેનું ગણિતીય સ્વરૂપ આપો.

(vii) વિશિષ્ટ વાહકતાની વ્યાખ્યા આપો,અને તેના એકમો લખો.

(viii) મોલર વાહકતા અને વિયોજનઅંશની વ્યાખ્યાઓ આપો.

(ix) વેન્ટ હોફ અંશ (i) ની વ્યાખ્યા આપો. વેન્ટ હોફ અંશ અને વિયોજનઅંશ વચ્ચે સંબંધ દર્શાવતુ સુત્ર આપો.

(x) નીચેના વિદ્યુતરાસાયણીક કોષ માટે કોષ પ્રક્રિયા લખો.

(a) $Zn \,/\, Zn^{+2} \,//\, Fe^{+3}, Fe^{+2} \,/\, Pt$ (b) $Pt \,/\, H_{2(g)} \,/\, HCl \,/\, AgCl \,/\, Ag$

(xi) 25 °C તાપમાને કોષ $Zn \,/\, Zn^{+2}_{(aq)} \,//\, Cu^{+2}_{(aq)} \,/\, Cu$ માટે E° નુ મુલ્ય 1.10 V છે.કોષ પ્રક્રિયા $Zn + Cu^{+2}_{(aq)} = Cu + Zn^{+2}_{(aq)}$ માટે સંતુલન અચળાંકનું મુલ્ય ગણો.

(xii) નીચે આપેલ વિદ્યુત ધ્રુવોના પ્રકાર જણાવો.

(અ) ક્વીન હાયડ્રોન વિદ્યુત ધ્રુવ (બ) Zn- Zn આયન વિદ્યુત ધ્રુવ

(ક) Fe^{+2}, Fe^{+3} આયન વિદ્યુત ધ્રુવ (ડ) પ્રમાણિત H_2 વિદ્યુત ધ્રુવ

પ્રશ્ન-3(a) કાર્નોટ ચક્રનુ વિસ્તૃત વર્ણન કરો,અને પુરવાર કરો કે કોઈ પણ ચક્રિય પ્રક્રિયા માટે થતુ કુલ કાર્ય શોષાવેલી કુલ ઉષ્મા જેટલું થાય છે. (૦૫)

(b) એક મોલ આદર્શ વાયુનું તાપમાન ૧૦૦ K થી 300 K વધારવામાં આવે છે. જો (a) કદ અચળ રાખવામાં આવે તો અને (b) દબાણ અચળ રાખવામાં આવે તો એન્ટ્રોપીમાં થતો ફેરફાર ગણો.(C_v=1.5 R and R=8.314 $JK^{-}mol^{-}$). (૦૫)

OR

પ્રશ્ન-3(a) પ્રતિવર્તી અને અપ્રતિવર્તી પ્રક્રિયાઓ માટે એન્ટ્રોપીમાં થતો ફેરફાર સમજાવો. (૦૫)

(b) આદર્શ વાયુઓના મિશ્રણ ની એન્ટ્રોપી (entropy of a mixture) માટેનું સમીકરણ તારવો, અને એક મોલ ઓક્સિજન વાયુ અને બે મોલ હાઈડ્રોજન વાયુ ને મિશ્ર કરતા એન્ટ્રોપીમાં થતો ફેરફાર(entropy of mixing) ગણો.બન્ને વાયુઓ વચ્ચે કોઈ પણ પ્રકારની રાસાયણીક પ્રક્રિયા થતી નથી અને આ વાયુઓ આદર્શ વાયુ તરીકે વર્તે છે તેવું માની લેવામાં આવે છે. (૦૫)

પ્રશ્ન-૪(a) જ્યારે અબાષ્પશીલ દ્રાવ્યને શુદ્ધ દ્રાવકમાં ઉમેરવામાં આવે ત્યારે મોલલ ઉન્નયન અચળાંક અને ઉત્કલનબિંદુ માં થતા ઉન્નયન વચ્ચે નો સંબંધ દર્શાવતુ સમીકરણ તારવો. (૦૬)

(b) ૨૫°C તાપમાને ૧.૬ gm per dm^3 સાંદ્રતા ધરાવતા દ્રાવણનુ અભિસરણ દબાણ ૮૩ ટોર(torr) છે. આ દ્રાવણ માં અબાષ્પશીલ દ્રાવ્ય પદાર્થનો અણુભાર ગણો. (R=0.08214 dm^3 atm $K^{-}mol^{-}$). (૦૪)

OR

પ્રશ્ન-૪(a) અભિસરણ દબાણ માપવાની Morse-Frazer અને Berkeley-Hartley પધ્ધતિઓનુ વર્ણન કરો. (૦૬)

(b) બેન્ઝોઇક એસીડનું બેંઝિનમાં બનાવેલ દ્રાવણ ૮૨.૬°C તાપમાને ઉકળે છે અને ૩.૧°C તાપમાને ઠરે છે.ઉપરની વિગતો પરથી બન્ને તાપમાને બેન્ઝોઇક એસીડના કણોની સંખ્યા અને તેના બંધારણ વિષે શું માહિતી મળશે? શુદ્ધ બેંઝિનનુ ઉત્કલનબિંદુ ૮૦.૧ °C અને ઠારબિંદુ ૫.૫ °C છે. (K_f=5.12 K Kg mol^{-}, K_b=2.67 K Kg mol^{-}). (૦૪)

(પાનું ફેરવો)

પ્રશ્ન-૫ (a) વિધુતવિભાજન એટલે શું? HCl ના દ્રાવણ નુ વિધુતવિભાજન, ત્રણભાગ માની લઇને સમજાવો. (૦૬)

(b) ૨૫°C તાપમાને 0.૦૧ મોલર દ્રાવણનો અવરોધ ૨૧૦ ઓમ્ છે. ૨૫°C તાપમાને આ દ્રાવણ માટે મોલર વાહકતા ગણો. (કોષ અચળાંક 0.0૮૮ cm^{-}). (૦૪)

OR

પ્રશ્ન-૫ (a) વોલ્ટેજ V એ વાહકતામાપનને આધારે જલીય દ્રાવણમાં આયનોની આયનીક ચલનશીલતા શોધવા માટેનું સમીકરણ તારવો. (૦૬)

(b) ૨૫ °C તાપમાને સોડીયમ એસીટેટ, હાઇડ્રોકલોરિકએસીડ અને સોડીયમ કલોરાઈડ માટે અનંત મંદતાએ મોલર વાહકતા અનુક્રમે ૯૧.૦ x $10^{-૪}$,૪૨૬.૧૬ x $10^{-૪}$ અને ૧૨૬.૪૫ x $10^{-૪}$ S m^{2} mol^{-} છે. એસીટીક એસીડ માટે અનંત મંદતાએ મોલર વાહકતા ગણો. (૦૪)

પ્રશ્ન-૬ EMF માપન ની ઉપયોગીતાની યાદી આપો. કોઈ પણ બે વિસ્તારથી સમજાવો. (૧૦)

OR

પ્રશ્ન-૬ જુદા જુદા પ્રકારના સાંદ્રતા કોષોની વ્યાખ્યા આપો. પ્રવાહી જોડાણ વિહીન પોટેન્શીયલ વિદ્યુતવિભાજ્ય સાંદ્રતા કોષના EMF માટે યોગ્ય ઉદાહરણ લઈને સમીકરણ તારવો. (૧૦)

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SEAT No._____ No. of Printed Pages : 02

[69 & A-40]

SARDAR PATEL UNIVERSITY

S.Y. B.Sc. EXAMINATION, SEM – III

US03CCSC01: Fundamentals of Computer Programming Using 'C'

Date : 17/11/2017 **Time:02:00pm To 05:00pm** **Max. Marks : 70**

Q – 1 Multiple Choice Question [10]

i) Which of the following is machine independence program?
(a) High Level Language (b) Machine Language
(c) Assembly Language (d) Low level Language

ii) What symbol is used to represent output in a flowchart?
(a) square (b) circle (c) parallelogram (d) triangle

iii) Which is the limitation of high level language?
(a) Machine level coding (b) Machine dependence
(c) Lower efficiency (d) None of above

iv) What is the output of 9/2- (5%3)
(a) -2 (b) 0 (c) 2 (d) 3

v) The combination of ? and : is known as _____ operator.
a) Ternary b) Arithmetic c) dot d) Relational

vi) The value can be changed during program execution is known as _____.
a) Variable b) constant c) Operator d) None of these

vii) In two dimensional array the second subscript is define _____size.
(a) Row (b) column (c) vector (d) All of above

viii) '\0' is _____.
(a) Character value (b) Null Character
(c) Escape sequence (d) Symbolic

ix) The return type must be _____if no value return from the function.
a) void b) int c) float d) none of these.

x) The parameter is also known as _____
(a) argument (b) variable (c) data type (d) array

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

i) Differentiate: Machine Level Language and Low Level Language
ii) What is Translator? List all translators.
iii) Write advantages of Machine Level Language.
iv) Distinguish between Logical operator and Relational Operator.
v) Write difference between pre-increment and post- increment operator.
vi) Give the rules for writing the variable name in C.
vii) What is an array? Write syntax to declare 1D array in c. also give one example.
viii) What is string? Write the syntax of declaring string in c.
ix) Explain break statement with example.
x) Differentiate: formal parameter and actual parameter.
xi) What is user define function? Give one example of user define function.
xii) Write the advantages of function.

(P.T.O.)

Q – 3	a)	Write an algorithm to find out minimum of N numbers	[5]
	b)	What is flow chart? Write advantages and disadvantages of flowchart.	[5]
		OR	
Q – 3	a)	Draw flow chart To check whether inputted number is prime number or not.	[6]
	b)	Write advantages and disadvantages of algorithm.	[4]
Q – 4	a)	Explain if...else & nested if statement with syntax and example.	[5]
	b)	Explain in detail the structure of C program.	[5]
		OR	
Q – 4	a)	Explain switch statement with syntax and example.	[5]
	b)	Explain basic data types used in C language.	[5]
Q – 5.	a)	Explain puts() and gets() functions with syntax and example.	[5]
	b)	Explain pow() and islower() functions with syntax and example:	[5]
		OR	
Q – 5	a)	Explain loop statements with syntax and example.	[10]
Q – 6	a)	Explain strlen() and strcpy() functions with syntax and example.	[5]
	b)	Explain command line argument with example.	[5]
		OR	
Q – 6	a)	Explain with no argument & with return value function with example	[5]
	b)	Explain strrev() and strcat() functions with syntax and example.	[5]

—— X ——

SC

SEAT No._____ No. of Printed Pages: 02

[614 A-43] SARDAR PATEL UNIVERSITY

External Examination (CBCS)

B. Sc. - III[rd] Semester (Computer Science)

US03CCSC02: Computer Organization

20[th] November, Monday - 2017

Time : 2:00 pm to 5:00 pm Total Marks :70

Q-1 Select an appropriate option. 10

1. Computer hardware refers to the _____parts of a computer.
   (a) Logical (b) Physical (c) Data (d) None of these

2. Radix in the Binary Number System is _____.
   (a) 0 & 1 (b) 1 & 2 (c) 5 & 6 (d) None of these

3. In Hexadecimal Number system, A is stands for _____.
   (a) 10 (b) 15 (c) 14 (d) None of these

4. ALU stands for _____.
   (a) Arithmetic Logic Unit (b) Arithmetical Logic Unit
   (c) Arithmetical Logical Unit (d) Arithmetic Logic gate Unit

5. _____ points to the next instruction to be executed after finishing the current instruction.
   (a) Program counter (b) Program counting
   (c) Instruction register (d) None of these

6. In _____, multiple control unit share a common memory.
   (a) Array processor (b) Multiprocessor (c) Pipeline (d) None

7. Data can be re-written in _____.
   (a) CD or DVD ROM (b) Rewritable CD or DVD
   (c) Both (a) & (b) (d) None of these

8. The full form of PROM is _____.
   (a) Programmable ROM (b) Perfect ROM
   (c) Process read write memory (d) Project read only memory

9. _____ is an input device.
   (a) Monitor (b) Keyboard (c) Printer (d) All of above

10. Full form of LCD is _____
    (a) Liquid Crystal Display (b) Liquid Clear Display
    (c) Light Clear Display (d) None of above

Q-2 Answer the following questions. (Attempt any **TEN**) 20

1. Define the terms 'Hardware' and 'Software'.
2. What are the five basic operations performed by any Computer System?

3. List out the limitations of Primary Storage.
4. Explain 1's complement method with example.
5. Write the full form of ASCII and ANSI.
6. Explain Excess Notation with example.
7. What do you mean by Latency?
8. What is cache memory?
9. What is 'Pen Drive'?
10. What is Numeric Keypad?
11. What is Scanner?
12. What do you mean by inkjet printer?

Q-3		
(a)	Draw a block diagram of Basic Organization of a Computer System and explain the functions of the various units.	5
(b)	What are registers? Explain some of the commonly used.	5

OR

Q-3		
(a)	Write a short note on applications of the Computer Systems.	5
(b)	Explain the conversion of Binary number to Decimal number with suitable example.	5
Q-4		
(a)	Explain Hamming code method with example.	5
(b)	What is Parallelism? Explain Pipelining.	5

OR

Q-4		
(a)	List and explain the steps of Instruction Execution Cycle.	5
(b)	Write short note on Array Processor.	5
Q-5		
(a)	List the advantages and disadvantages of CD.	5
(b)	List the advantages and disadvantages of 'Memory Stick'.	5

OR

Q-5		
(a)	Write short note on 'Hard Disk'.	5
(b)	Write short note on 'DVD'.	5
Q-6	Write short note: (i) Direct Addressing (ii) Indirect Addressing	10

OR

Q-6	Write short note: (i) CRT Monitor (ii) Laser Printer	10

—X—

Seat No.

[42 & A-42]

SARDAR PATEL UNIVERSITY

B. Sc. (III Semester)

Tuesday, Date: 21/11/2017

Electronics and Communication

Session: Evening ; Time: 2:00 to 5:00 pm

Course Code:

U	S	0	3	C	E	L	C	0	1

Subject Title: Electronics and Communication

Total Marks: 70

Q-1 Multiple choice questions 10

1. Divergence is del operated on
   (i) Scaler quantity
   (ii) Vector quantity
   (iii) Tensor quantity
   (iv) None of the above

2. Gradient is
   (i) A vector normal to the surface
   (ii) A vector parallel to surface
   (iii) Both (i) and (ii)
   (iv) None of the above

3. A vector is specified by
   (i) Magnitude only
   (ii) Direction only
   (iii) Magnitude and direction both
   (iv) None of the above

4. A function f(x) is even if f(-x)
   (i) = -f(x)
   (ii) = f(x)
   (iii) = 0
   (iv) = 1

5. Cos n π =
   (i) –n
   (ii) $(-1)^n$
   (iii) 0
   (iv) 1

(P.T.O.)

6. Laplace transform of cosat
   (i) s/s^2+a^2
   (ii) s/s^2-a^2
   (iii) a/s^2+a^2
   (iv) a/s^2-a^2

7. The Laplace transform of $e^{at}t^n$ is given by

   (i) $\frac{n!}{S^{n+1}}$

   (ii) $\frac{n!}{(S-a)^{n+1}}$

   (iii) $\frac{\Gamma(n+1)}{S^{n+1}}$

   (iv) $\frac{n!}{(S-a)^{n-1}}$

8. 2Sin A CosB =
   (i) Sin (A+B) +(Sin (A-B)
   (ii) Sin (A+B) -(Sin (A-B)
   (iii) Cos(A-B)- Cos(A+B)
   (iv) Cos(A+B) +Cos(A-B)

9. $e^{i\Theta} - e^{-i\Theta} =$
   (i) $2i\sin\Theta$
   (ii) $2i\cos\Theta$
   (iii) $2i\tan\Theta$
   (iv) $2i\sec\Theta$

10. $F(s) = \int_{-\infty}^{+\infty} f(t)e^{ist}dt$ is called
   (i) Fourier transform
   (ii) Laplace's transform
   (iii) Inverse transform
   (iv) Direct transform

Q-2 Answer any **ten** questions in brief. **20**

1. Give geometrical interpretation of CROSS product.
2. Give physical interpretation of gradient.

3. What is irrotational motion and rotational motion.
4. Find a_0 for the Fourier series to represent x^2 in the interval $(-\pi$ to $\pi)$
5. Give expressions for a_o, a_n and b_n for a Fourier series.
6. Define Odd function and give example.
7. Find Laplace transform of t –Sinh2t
8. Find Laplace transform of tcosat
9. Find Laplace transform of tsinhat
10. Define Inverse Fourier Transform
11. Give expression for Fourier Cosine transform of the function f(x).
12. Define Fourier Transform

Q-3 A. If R = xi+yj+zk Show that $\nabla \bullet \vec{R} = 3 \quad \nabla X \vec{R} = 0$ **4**

B. A particle moves along the curve, $x = t^3 + 1, y = t^2, z = 2t + 3$ where t denotes time. Find the component of velocity and acceleration at t=1 in the direction i-3j+2k. **6**

OR

Q-3 Evaluate div $\vec{F}$ and curl $\vec{F}$ at a point (1, 2, 3) for **10**

(i) $\vec{F} = grad[x^3y + y^3z + z^3x - x^2y^2z^2]$.

(ii) $\vec{F} = x^2y\ zi + xy^2zj + xyz^2k$

Q-4 Find the Fourier series expansion of $f(x) = e^{-ax}$ in the interval $-\pi<x<\pi$. **10**

OR

Q-4 Find the Fourier series expansion of $f(x) = e^{-x}$ in the interval $0<x<2\pi$. **10**

Q-5 Find Laplace Transform of **10**

(i) $t^2 e^{-3t} \sin 2t$
(ii) $t^2 \sinat$

OR

Q-5 Find Laplace Transform of **10**

(i) $\sin^3 2t$
(ii) $e^{-3t} \sin 5t \sin 3t$

Q-6 Find the fourier transform of $f(x) = \begin{cases} 1-x^2 & for \quad |x| \le 1 \\ 0 & for \quad |x| > 1 \end{cases}$ **10**

C.P.T.O.)

Hence evaluate $\int_0^{\infty} \frac{xCosx - Sinx}{x^3} Cos\frac{x}{2} dx$

OR

Q-6 Find the fourier transfor of $f(x) = \begin{cases} 1 & for \quad |x| < 1 \\ 0 & for \quad |x| > 1 \end{cases}$ **10**

Hence evaluate $\int_0^{\infty} \frac{Sinx}{x} dx$

———— X ————

[374 A-27] SEAT No._____ No. of Printed Pages - 02

SARDAR PATEL UNIVERSITY V.V.NAGAR

B.Sc. (III[rd] SEM.) ELECTRONICS

25/11/2017 **NOVEMBER-2017 EXAMINATION**

ANALOG COMMUNICATION

US03CELC02

TIME: 2:00 pm to 5:00 pm **MARKS-70**

Q-1 Choose correct answer **[10]**

1. The frequency of the carrier signal is normally kept _____.
   (A) low (C) zero
   (B) average (D) high
2. Which modulation process is used for high quality audio communication?
   (A) AM (C) PM
   (B) FM (D) none of above
3. Varactor diode operates in _____ bias condition.
   (A) reverse (C) zero
   (B) forward (D) none of above
4. The highest modulation frequency typically used in AM broadcast is _____.
   (A) 15 KHz (C) 5 KHz
   (B) 25 KHz (D) none of above
5. The following is not the type of radio wave .
   (A) ground wave (C) acoustic wave
   (B) surface wave (D) none of above
6. The arrangement consisting two electric poles are known as _____.
   (A) array (C) dipole
   (B) monopole (D) none of above
7. Which range of frequency is known as UHF ?
   (A) 30-300 MHz (C) 3-30 MHz
   (B) 300-3000 MHz (D) none of above
8. Which portion of the characteristics curve is used in square law diode demodulation circuit?
   (A) non-linear (C) inverse
   (B) linear (D) none of above
9. To control frequency of the modulated signal _____ is used.
   (A) AFC (C) Limiter
   (B) AGC (D) none of above
10. Height of the transmitting antenna depends on _____.
    (A) transmitted power (C) modulating signal frequency
    (B) carrier signal frequency (D) none of above

Q-2 Short answer type question. (Any ten) **[20]**

1. Define AM and FM process.
2. Draw block diagram of communication system.
3. Differentiate between Amplitude and frequency modulation process.
4. Define modulation index.
5. What do you mean by linear diode detector?
6. Which factors affect to the magnitude of the space wave and the surface wave?
7. State different methods of frequency modulation.
8. What do you mean by square law diode detector?
9. Give classification of linear modulation method.
10. State classification of detector method.
11. State different types of radio wave propagation.
12. What is ionospheric propagation?

(P.T.O.)

Q.3 Discuss frequency modulation process with necessary waveforms. [10]

OR

Q.3 Discuss amplitude modulation process with necessary waveforms. [10]

Q.4 Discuss in detail square wave diode modulation method with necessary circuit diagram and waveform. [10]

OR

Q.4 Define demodulation process and discuss in detail linear diode detector with necessary circuit diagram and waveform. [10]

Q.5(A) Describe reactance tube modulation method with necessary diagram. [06]

Q.5(B) Draw the circuit diagram of the frequency modulation using a varactor diode and explain it. [04]

OR

Q.5 Discuss function and process of antenna action with necessary diagram. [10]

Q.6(A) Discuss ionospheric wave propagation in detail. [07]
Q.6(B) Discuss the concept of virtual height of layers. [03]

OR

Q.6(A) Explain surface wave propagation. [05]
Q.6(B) Explain space wave propagation. [05]

—— X ——

SEAT No._____ No. of Printed Pages : 02

[52]

SARDAR PATEL UNIVERSITY

B.Sc. (3rd Semester) Examination

2017

Saturday, 18th November

2:00 p.m. to 5:00 p.m.

US03CELE01 - Electronics Devices

Total Marks : 70

Q.1 Choose the correct answer [10]

1. The reactance of a Inductor is given as _____.
   (a) 1/2∏fL (b) 2∏fL (c) 2∏fC
2. The relative size of all fixed resistors change with the _____ rating.
   (a) Wattage (b) Voltage (c) Current
3. The width of depletion region is dependent on the _____ density.
   (a) Current (b) Doping (c) Charge
4. Pure semiconductor material is known as _____.
   (a) Extrinsic (b) Intrinsic (c) Capacitive
5. The barrier potential assists the flow of _____ carriers across the junction.
   (a) Positively charged (b) Minority (c) Majority
6. The process of recovering the _____ wave from the carrier is called detection.
   (a) Sinusoidal (b) High frequency (c) Modulating
7. Diagonal clipping occurs when the time constant RC is excessively _____.
   (a) Large (b) Small (c) Wide
8. The _____ circuit converts alternating quantity to unidirectional quantity.
   (a) Rectifier (b) Inverter (c) Clamper
9. In charge couple device all the metal electrodes are maintained at the same fixed _____ voltage.
   (a) Negative (b) Positive (c) Zero
10. The other name of tunnel diode is _____.
    (a) Varactor Diode (b) Esaki Diode (c) Zener Diode

Q.2 Answer any TEN questions in brief [20]

1. Explain briefly the variable inductor.
2. Write a note on system of colour coding in resistors.
3. What is capacitor? State the uses of capacitor.
4. Explain briefly doping density.
5. Draw the figure of an unbiased PN junction.
6. Write a note on P-type semiconductor.

[P.T.O]

7. Draw the circuit of voltage clamper and briefly explain its working.
8. Draw the frequency spectrum of an amplitude modulated voltage and briefly explain it.
9. What is amplitude demodulation ? What is the principle of operation of detector circuit ?
10. What is thermistor ? State the uses of thermistor.
11. What is a tunnel diode?
12. What is charge coupled device ?

Q.3 List the different types of fixed resistors and explain any two in detail. [10]

OR

Q.3 List the different types of fixed capacitors and explain any two in detail. [10]

Q.4 Discuss in detail the forward biased PN junction with the help of necessary diagram. [10]

OR

Q.4 Discuss in detail the reverse biased PN junction giving necessary figures. [10]

Q.5 (a) Draw the circuit of voltage doubler and explain its working giving necessary waveform. [05]

(b) Draw the circuit of peak rectifier and explain its working. [05]

OR

Q.5 What is modulation? Derive the expression for amplitude modulated wave. [10]

Q.6 Discuss in detail voltage variable capacitor diode. [10]

OR

Q.6 (a) Give an account of forward biased tunnel diode. [05]

(b) Give an account of reverse biased tunnel diode. [05]

——— X ———

[148A-11] **SARDAR PATEL UNIVERSITY**

B.Sc. (3rd Semester) Examination

Wednesday, 29th November 2017

2:00 p.m. to 5:00 p.m.

US03CELE02 - Instrumentation & Digital Electronics

Total Marks : 70

Q.1 Choose the correct answer **[10]**

1. Error is defined as deviation from _____.
   (a) Absolute value of measured variable (b) Average value of measured variable
   (c) True value of measured variable
2. Which type of error is said to be human error ?
   (a) Gross error (b) Random Error (c) Systematic error
3. The equivalent hexadecimal number for 14_{10} is_____.
   (a) A (b) E (c) F
4. 1's complement of 1010 is_____.
   (a) 0101 (b) 0111 (c) 1000
5. Decoding means the conversion from_____.
   (a) Decimal to Hexadecimal (b) Binary to Decimal (c) Decimal to binary
6. Non weighted binary codes are _____.
   (a) XS3 & Gray code (b) 5211 & 8421 (c) 8421 & 2421
7. Demorgan's theorem is break the line _____.
   (a) Change the number (b) Complement the output (c) Change the sign
8. In negative logic system _____.
   (a) 0 V is low state & 5 V is high state (b) 5 V is low state & 0 V is high state
   (c) None of above
9. The Gray code for Binary code 11001101_2 is_____.
   (a) 10101011 (b) 00110010 (c) 01010100
10. $AB_{16} + 98_{16}$ = _____.
    (a) ABC_{16} (b) 143_{16} (c) 134_{16}

Q.2 Answer any TEN questions in brief **[20]**

1. Give the equation for probable error.
2. Define Accuracy and Resolution.
3. What is positive zero and negative zero ?
4. List the radix for each number system.
5. Prove $A + \bar{A} = 1$.
6. Define reflective code.
7. State and prove commutative and associative laws of Boolean algebra.
8. Convert the following Decimal numbers to Gray code
   (i) 95 (ii) 106 (iii) 226
9. Draw the K-map for four variables.
10. Demorganize $\overline{A\bar{B} + \bar{A}C}$.

[P.T.O]

11. Reduce $\overline{\overline{AB} + \overline{A}} + AB$ expression.

12. Convert 25[illegible] binary.

Q.3 Draw the block diagram of CRO and explain its working. [10]

OR

Q.3 Discuss different types of errors in detail. [10]

Q.4 (a) Multiply 1011 by 0101 using computer method. [04]

(b) Add -17 and -16 in 2's complement form. [03]

(c) Add 173_8 and 265_8. [03]

OR

Q.4 (a) Multiply 1111 by 0111 using computer method. [04]

(b) Multiply $93BC_{16}$ by $C4_{16}$. [03]

(c) Subtract 0011_2 from 1110_2 [03]

Q.5 Explain the weighted and non weighted binary codes in detail. [10]

OR

Q.5 (a) Add 53 and 45 in XS3 form. [04]

(b) Add 547 and 257 in BCD form. [03]

(c) Convert Gray code 101010 to Binary. [03]

Q.6 Discuss in detail Universal building blocks. [10]

OR

Q.6 Draw the circuit of two input AND and OR gates using transistors and discuss it in detail. [10]

———X———

SEAT No._____ No. of Pages : 02

[62 & A-49]

SARDAR PATEL UNIVERSITY

S. Y. B.Sc, (THIRD SEMESTER) EXAMINATION

2017

Thursday, 16th November

2.00 pm to 5.00 pm

US03CENV01 Concepts of Ecology

Total Marks :70

Q.1. Select the correct answer and write in answer sheet (10)

1._____ is not a natural ecosystem

(a) Forest (b) Desert (c) Ocean (d) Rice field

2.Detritus food chain starts from _____ organic matter

(a) dead (b) living (c) consumers (d) none of above

3._____pyaramid indicates a high percentage of young individuals

(a) Bell-shaped (b) Urn-shaped (c) Broad base (d) Round shape

4. _____is the theoretical maximum production of new individuals under ideal conditions

(a) Maximum natality (b) Ecological natality (c) Specific density (d) Realised natality

5._____ is result of migration and subsequent ecesis

(a) Stratification (b) Zonation (c) Competition (d) Colonization

6._____ is not a qualitative character

(a) Physiognomy (b)Sociability (c) Presence & constance (d)Vitality

7. There are mainly ____ zones of a freshwater body, as lake

(a) two (b) three (c) four (d) five

8. ____is a semi-enclosed coastal body of water connected with the open sea

(a) Pond (b) Lake (c) Estuary (d) none of these

9. Transparency is measured by _____

(a) Secchi disk (b) Nephlometer (c) Hygrometer (d) Lux photometer

10. The zone between high and low tides is known as _____

(a) Neritic zone (b) Pelagic zone (c) Intertidal zone (d) Pelagic zone

(P. T. O.)

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

1. Explain the terms - Ecology & Ecosystem
2. Write a note on biotic and abiotic components of an ecosystem
3. Give a brief account on primary productivity
4. Enlist population characteristics
5. Define: Mortality
6. Write down the difference between r-selected species and k-selected species
7. Discuss vitality as a community character
8. Write in brief about origin and development of a community
9. Write a note on primary type of succession
10. Write a short note on major zones of freshwater body -Lake
11. Explain in brief lotic communities
12. Define : Limnology and Oceanography

Q.3 (a) Give a detailed note on Y-shaped energy flow model **(05)**
(b) Discuss pyramid of biomass with suitable diagram **(05)**

OR

Q.3 (a) How does the grazing food chain work? **(05)**
(b) Write in detail about functions of ecosystem **(05)**

Q.4. (a) Explain Age structure and draw the hypothetical diagram showing different types of age **(05)**
(b) Write a detailed note on dispersion pattern in populations **(05)**

OR

Q.4. (a) Describe different types of Survivorship curves on the basis of survivors and age **(05)**
(b) Discuss regulation of population density **(05)**

Q.5 (a) Discuss abundance as a qualitative and quantitative character **(05)**
(b) Write a note on Hydrosere **(05)**

OR

Q.5 (a) Give a detailed account on stratification with diagram **(05)**
(b) Write a note on quantitative characters of a community **(05)**

Q.6. (a) Discuss the zonation in the sea **(05)**
(b) Explain in detail the Ocean ecosystem **(05)**

OR

Q.6. (a) Discuss biotic components of Pond ecosystem **(05)**
(b) Describe in detail Terrestrial ecology **(05)**

—— X ——

SEAT No._____ No. of Printed Pages : 02

[70]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc.3rd SEMESTER EXAMINATION
17th November 2017,Friday
02.00 PM to 05.00 PM
Fundamentals of Environmental Science (US03CENV02)
Total Marks-70

Q.1. Select the correct answer and write it in the answer sheet **(10)**

1. Relative humidity is measured by the instrument _____

(a) Thermometer (b) Anemometer (c) Hygrometer (d) Rain Gauge

2. Daily responses of animals to light conditions are known as _____

(a) Phototactic (b) Phototropism (c) Circadian rhythms (d) circannual rhythms

3. _____ plays a key role in the stratosphere for the protection of Earth

(a) CH_4 (b) N_2 (c) O_2 (d) O_3

4. Temperature in mesosphere ranges from _____ °C

(a) -2 to -92 (b) -56 to -2 (c) -92 to 1200 (d) 15 to -56

5. _____ is not a major component in atmosphere

(a) Nitrogen (b) Oxygen (c) Argon (d) Water vapour

6. _____ is a result of a transformation of a pre-existing rock.

(a) Metamorphic rock (b) Igneous rock (c) Sedimentary rock (d) Grains

7. A convex-upward fold is an _____

(a) Antiform (b) Synform (c) Neutral folds (d) Core

8. _____rocks are formed due to volcanic eruption

(a) Minerals (b) Igneous rock (c) Metamorphic rock (d) Sedimentary rock

9. _____ is not a process of ozone depletion

(a) Accumulation (b) Transport (c) Mutable (d) Emission

10. Ozone depletion effects on _____ parts of any plant

(a) Reproduction (b) Flowering (c)Germination (d) All of above

(P.T.O.)

Q.2. Answer the following in brief (Any Ten) (20)

1. Write a short note on lithosphere
2. Write about thermal stratification
3. Explain in brief precipitation
4. Discuss soot particles in brief
5. Write a short note on Asian brown cloud
6. Give a note on Earth's radiation balance
7. Write a note on morphology of a folded surface
8. Explain in brief rock cycle
9. Write short note on plate tectonic movement
10. Discuss tropospheric ozone in brief
11. Write in brief about conversion, reaction and removal stages of ozone depletion process
12. Give a short note on worldwide ozone trends

Q.3 (a) Explain in detail effect of temperature on reproduction and growth and development in plants and animals (05)

(b) Describe the chief topographic factors (05)

OR

Q.3 (a) Write a detail note on various methods of soil conservation (05)

(b) Explain in detail principal horizons of soil profile (05)

Q.4 (a) Discuss in detail about structure of atmosphere (05)

(b) Write a detail note on El Nino phenomenon (05)

OR

Q.4 (a) Discuss formation of inorganic particulate matter in atmosphere (05)

(b) Write a note on effects of greenhouse gases on atmosphere (05)

Q.5 (a) Write a detail note on igneous rocks (05)

(b) Explain in detail formation of metamorphic rock (05)

OR

Q.5 (a) Describe in detail fold and process of folding (05)

(b) Discuss sedimentary rock and classification of rocks (05)

Q.6 (a) What is ozone hole? Discuss with an example (05)

(b) Write a short note on balance of chemical process for ozone (05)

OR

Q.6 (a) Discuss about consequences of ozone depletion on climate (05)

(b) Give a detail note on Montreal protocol (05)

—— X ——

SEAT No._____

No. of Printed Pages: 2

(63)

SARDAR PATEL UNIVERSITY

B.Sc. (Genetics) – Third Semester Examination (CBCS)

Thursday, 16th November2017

02:00 p.m. to 5:00 p.m.

US03CGEN01: Cell Molecular Biology and Genetics

Total Marks: 70

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

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

i. **During meiosis reduction of chromosome number in to half take pace in which of the following stages?**

(a) Prophase I (b) Anaphase I (c) Metaphase I (d) None of them

ii. **The phase of cell cycle which lasts for longer duration.**

(a) G_1 (b) G_2 (c) S (d) M

iii. **During cell division chromosomes behavior can be studied by.....**

(a) Phase constrast microscope (b) SEM (c) TEM (d) None of these

iv. **Fluid mosaic model of cell membrane was put forward by.....**

(a) Daniellie and Davson (b) Singer and Nicloson

(c) Garner and Allard (d) Watson and crick

v. **The two main components of plasma membrane are.....**

(a) Lipids and protein (b) Lipids, protein and carbohydrate

(c) Lipids and sugars (d) None of them

vi. **Fluid mosaic model was given by.....**

(a) Singer and Nicholson (b) Watson and Crick (c) Robert Brown (d) Beadle and Tatum

vii. **Nucleus is enclosed by..... concentric membranes.**

(a) One (b) Two (c) Three (d) None of them

viii. **The mitochondria are bounded by.....**

(a) Double unit membrane (b) Single unit membrane

(c) Triple unit membrane (d) None of the above

ix. **The experiment by..... showed that DNA is the genetic material.**

(a) Griffith (b) Watson and Crick (c) Hershey and Chase (d) Mendel

x. **Synthesis of DNA takes by .....**

(a) Transduction (b) Transcription (c) Transformation (d) Replication

P.T.O.

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

i. Write the significance of gametogenesis.
ii. What is meiosis? Write the importance of meiosis.
iii. What makes organism prokaryotic?
iv. Give the important features of Danielle and Davidson model.
v. Write the function of plasma membrane in plants.
vi. Enlist the importance of carbohydrate in the cell membrane.
vii. Write the functions of nuclear envelope in eukaryote cells.
viii. Write a short note on origin of mitochondria.
ix. What do you mean by specialized chromosomes.
x. Define nucleotide and polynucleotides.
xi. What is RNA? Write its functions.
xii. Write a short note on different forms of DNA.

Q.3 (a) Explain in detail about structure and organization of eukaryotic cell. **[05]**

(b) Give an account on mitosis. **[05]**

OR

Q.3 (a) Write stages and significane of meiosis. **[06]**

(b) Give a detail account on the M and S phases of cell cycle. **[04]**

Q.4 (a) Discuss in detail about Danielle Davidson model for membrane structure. **[06]**

(b) Write a note on cell junction in eukaryote. **[04]**

OR

Q.4 (a) Write a detail note on vesicular transport and membrane proteins **[06]**

(b) Give an account on neurotransmission and ion channels in animals. **[04]**

Q.5 (a) Describe the ultrastructure and function of nucleus **[06]**

(b) Write the salient features of salivary gland chromosome. **[04]**

OR

Q.5 (a) Explain in detail about ultra structure and function of chloroplast and mitochondria. **[06]**

(b) Write a short note on chromosomes. **[04]**

Q.6 Describe the experiment, which demonstrated that RNA is the genetic material in TMV. Differentiate between DNA and RNA. **[10]**

OR

Q.6 What do you mean by chemical basis of heredity and briefly describe its properties. Describe one experiment, which clearly showed that DNA is the genetic material.. **[10]**

SEAT No._____ No. of Printed Pages : 02

[71]

Sardar Patel University Examination

S.Y. B.Sc. (Genetics) III Semester Examination-2017

Course-US03CGEN02 - Principles of Genetics - I

Date: Friday, 17th November 2017 Total Marks-70

Time :2.00pm to5.00pm

Q.1 **Multiple Choice Questions (one mark each)** 10M

I The difference between two class limits is called
(a)class interval (b)mid point (c) range (d) none of these

II Standard deviation of variance is
(a) square (b) square root (c) Cube root (d) none of these

III Median of 15,65,56,87,90,55,89,37,42,77 is
(a) 7 (b) 40.1 (c) 6 (d) 60.5

IV Mode of 4,3,2,5,3,4,5,1,4,3,2,4 is
(a) 1 (b) 4 (c) 3 (d) 2

V The geometric mean of numbers 8,36,48 is
(a) 2.4 (b) 24 (c) 12 (d) none of these

VI Barr bodies were discovered by
a)Mendel (b) Lyon (c)Watson and Crick (d)None of above

VII Baldness in humans if _____traits
(a)Sex linked (b)sex limited (c)sex influenced (d) All of above

VIII Mendel's work was rediscovered in
(a)2001 (b) 1822 (c) 1884 (d) 1900

IX When one gene affects the expression of other gene which is not its allele, this phenomenon is called?
(a)Epistasis (b) Pleiotropy (c) Lethal Gene (d) Dominance

X Test cross ratio in Mendelian inheritance is
(a) 1:1 (b) 3:1 (c) 2:1 (d) none of above

Q.2 **Short questions : attempt any ten** 20M

1. Define standard deviation.
2. Define biostatistics
3. Define qualitative data.
4. find out median of 130,135,140,145,157,150,149,148,132,123,111
5. Find the arithmetic mean from the frequency table

marks	2	3	4	5	6
No of students	13	40	17	12	8

6. Find out relation between Arithmetic mean, Geometric mean and Harmonic mean.
7. With example give complementary gene action
8. What are lethal genes ?
9. What are multiple alleles ?
10. Write about environmental sex determination
11. What is genetic imprinting ?
12. What are gynandromorphs?

(P.T.O.)

Q.3 a. Write an elaborative note on Mendel's Law of Segregation 6M

b. Write a note on inheritance of comb pattern in poultry 4M

OR

Q.3 a. Write a note on Mendels experimental design 5M

b. Write a note on epistasis 5M

Q.4 a. Give an account of dosage compensation 5M

b. Write a note on sex determination in drosophila 5M

OR

Q.4 a. Write a note on sex linked ,sex limited and sex influenced traits 6M

b. Write a note on hormonal sex determination 4M

Q.5 a Plot multiple bar & sub-divided bar for the following data: 5M

year	Number of copy cases			
	NV	VP	NB	
2008	05	10	12	27
2009	10	10	06	26
2010	04	18	12	34

b Construct a histogram for the following data 5M

Class of interval	100-150	150-200	200-250	250-300	300-350
Frequency	4	6	13	5	2

OR

Q.5 a There are 400 student in F.Y BSc of a collage from which 250 are boys, 280 student of F.YBsc belongs to biology Group and rest of them to maths Group 85 girls have taken biology then Tabulate the above data 5M

b Plot pie diagram for the following data: 5M

year	Number of copy cases			
	NV	VP	NB	Total
2008	400	1000	1200	2600
2009	460	1100	1140	2700
2010	550	1250	1400	3200

Q.6 a. Find the Mode of the following data. 5M

Marks	10-15	15-20	20-25	25-30
No of students	2	8	7	3

b Find range ,Mean Deviation and Standard Deviation for following observation 5M
45,42,53,57,48

OR

Q.6 a. Calculate the Median for the following data. 5M

Class of interval	10-20	20-30	30-40	40-50	50-60
Frequency	2	7	10	5	1

b. If Mean is 150, Mode is 140 and σ =45 then find C.V skewness and Median 5M

——X——

SC

SEAT No._____ No. of Printed Pages : 02

[A-54]

SARDAR PATEL UNIVERSITY

S. Y. B.Sc. Industrial Chemistry

(Semester – 3rd) EXAMINATION (2010 Batch)

16th November 2017

Course No. : US03CICH01

(Heavy and Fine Chemicals)

Marks: 70 **Time: 2.00 pm to 5:00pm**

Q.1 **Answer the given multiple choice questions.** **[10]**

1. *H_2SO_4 can be used as _____ agent.*
   a. dehydrating b. oxidizing c. pickling d. All of these
2. *The gases used for welding and cutting of iron and steel are _____.*
   a.SO_2 b. N_2 c. Cl_2 d. Oxy-acetylene
3. *The catalyst used in production of H_2SO_4 by contact process is_____.*
   a. Ag b. V_2O_5 c. Pt. d. None of these
4. *Diaphragm cell is used for manufacture of _____.*
   a.Na_2CO_3 b. $NaHCO_3$ c. NaCl d. NaOH
5. *The soda ash is manufactured by _____ process.*
   a.Castner-Kelner b. Solvay's c. Diaphragm cell d.Cathode cell
6. *Sand is the raw material for manufacture of _____.*
   a. SiC b. Synthetic graphite c. CaC_2 d. Boron carbide
7. *Electric furnace are mainly preferred as it can give as high temperature as _____ ^oC*
   a) 2000 b) 5000 c) 4100 d) 8000
8. *KMnO4 is used as*
   a) Reducing Agent b) solvent c) Bleaching agent d) Oxidising agent
9. *_____ catalyst is used for manufacture of Dioxane from diethylene glycol.*
   a) Base b) Acid c) Neutral c) Salts
10. *The boiling point of THF is ___ ^oC*
    a) 66 b) 96 c) 78 d) none of these

Q.2 **Attempt any Six.** **[12]**

i. *Write uses of phosphoric acid.*
ii. *List uses of hydrogen.*
iii. *Which are the different electrolyte cells used in manufacturing of NaOH?*
iv. *List the sources of magnesium metal.*
v. *List two important factors which should be considered while selection of furnace.*
vi. *List different sources of CO_2.*
vii. *Write uses of DMF.*
viii. *Discuss uses of Diethyl ether.*

(P.T.O.)

Q.3 a)	*Write properties,uses and manufacturing of H_2SO_4.*	**[08]**
	OR	
Q.3 a)	*Write properties,uses and manufacturing of HNO_3.*	**[08]**
Q.4 a)	*Discuss manufacturing of Hydrogen.*	**[04]**
b)	*Write uses of Nitrogen.*	**[04]**
	OR	
Q.4 a)	*Discuss manufacturing of Oxygen*	**[04]**
b)	*Write uses of CO_2.*	**[04]**
Q.5 a)	*Write notes on: i) Nelson cell ii) Sources of NaCl.*	**[08]**
	OR	
Q.5 a)	*Discuss Manufacturing of NaOH.*	**[04]**
b)	*Write uses of Na_2CO_3*	**[04]**
Q.6 a)	*Write manufacturing of SiC.*	**[04]**
b)	*List uses of Resistance Furnace .*	**[04]**
	OR	
Q.6 a)	*Write manufacturing of CaC_2.*	**[04]**
b)	*List uses of Graphite.*	**[04]**
Q.7 a)	*Explain manufacturing of KMnO4.*	**[08]**
	OR	
Q.7 a)	*With the help of diagram explain manufacturing of Magnesium.*	**[08]**
Q.8 a)	*Write uses properties and manufacturing of Tetrahydrofuran(THF).*	**[08]**
	OR	
Q.8 a)	*Write uses properties and manufacturing of Dimethyl-formamide (DMF) .*	**[08]**

—X—

No. of Printed Pages : 02

[64&A-50]

SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry (Third Semester) Examination

HEAVY AND FINE CHEMICALS

Date: 16/11/2017 **Subject code: US03CICH01**

Time: 02:00 p.m. to 05:00 p.m. **Total Marks: 70**

Q.I **Select the correct option** 10

I. Oxidation of ammonia using catalyst gives _____.
a. H_2SO_4 b. HNO_3 c. H_3PO_4 d. HCl

II. H_2SO_4 can be used as _____ agent.
a. dehydrating b. oxidizing c. pickling d. All of these

III. Molecular weight of H_2SO_4 in_____ gm./mole.
a.96.0 b. 92.8 c. 98.08 d. 100

IV. The caustic soda has the chemical formula_____.
a. Na_2CO_3 b. $NaHCO_3$ c. NaCl d. NaOH

V. NaOCl is strong ____ agent.
a. Oxidizing b. bleaching c. reducing d. none of these

VI. In Solvay Process of Soda Ash manufacture NH_3 is a---------- .
a. Catalyst b. Reagent c. Promoter d. Inhibitor

VII Abrasives are the material having_____.
a. Very high resistance b. Very high conduction
c. very high hardness d. None of these.

VIII. Sand is the raw matrerial for manufacture of _____.
a. Silicon carbide b. Synthetic graphite
c. Calcium carbide d. Boron carbide

IX. The chemical formula of N,N-Dimethylformamide is_____
a.$(CH_3)_2NCHO$ b. $(CH_3)_2$-NCH_2 c. $(CH_3)_2CONH_2$ d. $(CH_3)_2NHCO_2$

X. _____ catalyst used in manufacture of Dioxane from diethylene glycol.
a. Acid b.Base c.Neutral Compound d. Salts

(P. T. O.)

Q.2	**Answer the following in short (ANY TEN)**	20
I.	List different sources of CO_2.	
II.	List different methods used for the manufacturing of Hydrogen.	
III.	Discuss uses of Nitrogen gas.	
IV.	Write the industrial uses of sodium bicarbonate.	
V.	Which are the different electrolyte cells used in manufacturing of NaOH?	
VI.	What are the uses of Na_2CO_3.	
VII	List the uses of Synthetic graphite.	
VIII.	List the uses of Hydroxyl amine.	
IX.	Explain the advantages of electric furnace.	
X.	Write the use of Diethylether.	
XI.	Write the use of DMSO.	
XII.	Write the properties of DMF.	
Q.3a	Write the manufacture process of Nitrogen gas by air liquification.	05
b.	Write the manufacture process of Sulphuric acid by contact process.	05
	OR	
Q.3a	With help of flow diagram explain the manufacture process of Sulphur dioxide gas.	05
b.	Write the industrial manufacture process of Phosphoric acid.	05
Q.4a	Write the manufacture processes of Na_2Co_3 by Solvay Ammonia process.	05
b.	Write the manufacture processes ofNaOCl.	05
	OR	
Q.4a	Write note on manufacture processes of NaOH using Diaphragm cell.	05
b.	Write the manufacture processes of Baking powder.	05
Q.5a	Explain the classification of electric furnace and the criteria of their selection.	05
b.	Explain the manufacturing of H_2O_2.	05
	OR	
Q.5a	With the suitable diagram explain calcium carbide manufacture.	05
b.	Give the production detail of $KMNO_4$.	05
Q.6	Write the manufacturing details of Dioxane.	10
	OR	
Q.6	Explain the manufacturing of DMF.	10

—— X ——

SC

SEAT No._____ No. 4JES:02

[534 A-40] **SARDAR PATEL UNIVERSITY**

B.Sc. Industrial Chemistry (3rd Semester) Examination

Chemical process principles

DATE: 18/11/2017 **SUBJECT CODE: US03CICH02**

TIME: 2:00 PM TO 5:00 PM **TOTAL MARKS: 70**

Atomic Weight: C-12, O-16, H-1, S-32,N-14, Na-23, Cl-35.5,Ca-40 ,P-31 ,Si-28

Q. 1 Choose the correct answer. **[10]**

(1) The average molecular weight is the weight of_____.
- (A) 0.1 mole (C) 1 mole
- (B) 0.001 mole (D) 10 mole

(2) The amount of heat require to raise temperature of 1 kg of substance by 1^{O} K is known as _____.
- (A) Mass transfer (C) Thermal conductivity
- (B) Heat capacity (D) Heat transfer

(3) The properties which are dependent on mass are _____.
- (A) Adiabatic process (C) Extensive properties
- (B) Intensive properties (D) None of above

(4) ^{O} Brix specific gravity scale is developed for _____.
- (A) Polymer industry (C) Pharmaceutical industry
- (B) Sugar industry (D) Petroleum industry

(5) Material balance calculation is based on _____.
- (A) Law of conservation of energy (C) Both (A) & (B)
- (B) Law of conservation of mass (D) None of above

(6) A mathematical relationship between the amount of substance adsorbed and its concentration at the constant temperature and different pressure is known as_____.
- (A) Heat of adsorption (C) Adsorption isobar
- (B) Adsorption isotherm (D) None of above

(7) Specific gravity of liquid is ratio of_____.
- (A) Volume (C) Density of liquid/Density of water
- (B) Vapor pressure/Atmospheric pressure (D) Temperature/Pressure

(8) Which of the following is the type of energy?
- (A) Work (C) Heat
- (B) Kinetic (D) All of above

(9) The process in which amount of moisture is increased in atmosphere is called _____.
- (A) Humidification (C) Dehumidification
- (B) Evaporation (D) Drying

(10) Input= Output equation valid for material balance calculation for the process.
- (A) Without chemical reaction (C) With chemical reaction
- (B) Both (A) & (C) (D) None of above

(P.T.O.)

Q.2 Answer the following.(attempt ten) [20]

(1) Explain molal units.
(2) Explain limiting reactant and excess reactant.
(3) Write in brief about vaporization and condensation.
(4) Define: (a) Relative saturation (b) Molal humidity
(5) Differentiate between point function and path function.
(6) Define: Partial pressure & Pure component volume
(7) Draw different types of adsorption isotherm.
(9) Discuss about yield and selectivity.
(10) What is critical temperature & critical volume?
(11) Define: Absolute Humidity and Humid heat
(12) Write about batch process and continuous process.

Q.3 (A) List and explain different method used to express the composition of mixtures and solutions. [05]

(B) Prove that for gaseous mixtures Pressure % = Mole% = Volume% [05]

OR

Q.3 (A) List and explain different methods used to express the composition of mixtures & solutions. [05]

(B) An aqueous solution of sodium chloride is prepared by dissolving 25kg of NaCl in 100kg of water. Find (a) weight % (b) mole % of the solution. [05]

Q.4 (A) List different steps which must be followed to solve material balance problems. [05]

(B) Phosphorus is prepared by heating a mass of calcium phosphate $Ca_3(PO_4)_2$, sand SiO_2 and charcoal. The reaction takes place as: [05]

$$Ca_3(PO_4)_2 + 3SiO_2 + 5C \rightarrow 3CaSiO_3 + 5CO + 2P$$

The amount of sand used is 15-weight percent excess and charcoal used is 35-weight percent excess of that theoretically required. Calculate (a) the percentage composition of the originally charge and (b) the amount of phosphorus produced if the reaction is 75% complete per 100 kg of calcium phosphate charged.

OR

Q.4 (A) Write a note on (a) Bypass operation (b) Purge operation [10]

Q.5 (A) Write a note on thermodynamic temperature scale. [05]

(B) Find the minimum amount of air for complete combustion of 1 kg of fluid which contains C kg carbon, H kg hydrogen, S kg sulphur and O kg oxygen. [05]

OR

Q. 5 (A) Derive an equation for efficiency of heat engine. [05]

(B) The orsat analysis of fuel gases from a boiler house chimney by mole is as given below: CO_2 -11.4%, O_2 – 4.2% and N_2 – 84.4%. (mole basis). Calculate the % excess air by assuming that complete combustion takes place. [05]

Q. 6 (A) 10000 kg/h of solution containing 20% methanol is continuously fed to a distillation column. Distillate is found to contain 98% methanol and waste solution from column carries 1% methanol. All percentages are by weight. Calculate the mass flow rates of distillate and bottom product and the percent loss of methyl alcohol. [05]

(B) In production of sulphur trioxide 100 kmol of SO_2 and 100 kmol of O_2 are fed to reactor. If the percent conversion of SO_2 is 80, calculate the composition of product stream on mole basis. [05]

OR

Q. 6 (A) Define adsorption isotherm. Also discuss Langmuir adsorption isotherm. [05]

(B) Differentiate between Physical adsorption and Chemical adsorption. [05]

—X—

SEAT No._____ No. of Printed Pages : 02

[65 & A-51]

Sardar Patel University

B. Sc. Semester – III Examination

Date: 16-11-2017, Thursday Time: 02:00pm to 05:00pm

Industrial Chemistry Vocational

COURSE NO: US03CICV01 (UNIT PROCESSES)

Notes: Figures to the right indicate full marks. Total marks: 70

Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. Processes use for Picric acid preparation is....
   a. Reduction
   b. Oxidation
   c. Oxi-Nitration
   d. Nitration
2. Aromatic nitration is
   a. Precipitation reaction
   b. Electrophilic substitution reaction
   c. Electrolysis reaction
   d. Nucleophilic substitution reaction
3. Which of the following is reducing agent?
   a. Metal+Acid
   b. Metal+Water
   c. Metal+Alkali
   d. All of them
4. Introduction of $RNHSO_2ONa$ are termed as
   a. Sulfoxidation
   b. Sulfochorination
   c. N-Sulfonate
   d. None of these
5. Which of the following are oxidizing agent?
   a. Dichromate
   b. Permanganates
   c. Peroxide
   d. All of these
6. The usual form of oxidation with dichromate is in the presence of...
   a. Sulfuric acid
   b. Hydrochoric acid
   c. Acetic acid
   d. All of these
7. Halogenation reaction involved ....
   a. Addition type
   b. Addition & Substitution type
   c. All of them
   d. None of them
8. In halogenation reactions, the reactivity orders are as.....
   a. Cl>Br>I>F
   b. Cl>F>Br>I
   c. F>Cl>Br>I
   d. F<Cl<Br<I
9. The rate of esterification in case of alcohol is...
   a. $1^0 > 3^0 > 2^0$
   b. $1^0 > 2^0 > 3^0$
   c. $3^0 > 2^0 > 1^0$
   d. $2^0 > 3^0 > 1^0$
10. Ingold has proposed_____ possible mechanism for ester hydrolysis.
    a. 08
    b. 06
    c. 01
    d. 04

(P.T.O.)

Q.2. Answer the following short questions. (Any TEN) (20)

1. Enlist various nitrating reagents.
2. Write any one reaction for preparation of primary amine.
3. Define term unit operation.
4. Define the terms Sulfochlorinations.
5. Write about chromic acid for oxidation reaction.
6. Give an example of different peroxides.
7. Give an outline of Hydrogenation of acids and esters to alcohols.
8. Define term "Catalytic reforming"
9. List out different chlorination agents.
10. Define term "Alcoholysis".
11. Write a reaction for acid catalysed hydrolysis of ester.
12. Write various Alkylating agents.

Q.3. Write a notes on following: (10)

a. Manufacture nitrobenzene by continuous process.
b. Oxynitration

OR

Q.3.a.Discuss the manufacturing of p-nitroacetanilide (05)

b. Write note on Bechamp metal and acid reduction. (05)

Q.4. Giving suitable examples, write about different methods of oxidation reaction. (10)

OR

Q.4. Write manufacturing of benzene sulfonic acid. (10)

Q.5. Write manufacturing of chlorobenzene from benzene. (10)

OR

Q.5. Write note on Hydrogenation of vegetable oil. (10)

Q.6. Write a notes on manufacturing of alkyl benzene. (10)

OR

Q.6. Discuss the following: (10)

1. Types of different hydrolysis reaction mechanism.
2. Manufacturing of Ethyl acetate.

—X—

SEAT No._____ [54]

SARDAR PATEL UNIVERSITY

Industrial chemistry (VOC.) SEMESTER – III, EXAMINATION
Fluid mechanics andheat Transfer (US03CICV02)

DATE: 18th Nov. 2017 TIME: 02:00 PM TO 05:00 PM
DAY: Saturday TOTAL MARKS: 70

Q. 1 Choose the correct answer. [10]

(1) Bernoulli's theorem is simply_____.
- (A) Weight density.
- (B) Mass density.
- (C) Material balance
- (D) energy balance.

(2) Example of Non-Newtonian fluid are _____
- (A) Tooth pastes
- (B) Paints
- (C) Jellies
- (D) All of these

(3) Examples of Pseudo plastic fluid are _____.
- (A) Blood
- (B) Polymers
- (C) Slurries
- (D) a & b Both

(4) Metal pipe is available in standard lengths of about_____ m
- (A) 8
- (B) 6
- (C) 10
- (D) 1

(5) which pump is including under classification of reciprocating pump_____
- (A) Piston pump
- (B) Plunger pump
- (C) Diaphragm pump
- (D) All of these.

(6) The vapour pressure of a liquid at the pumping temperature sets the lower limit for the suction pressure is _____
- (A) Priming
- (B) Cavitation
- (C) Pressure
- (D) None of above

(7) Conduction is restricted to flow of heat in .....
- (A) Solids
- (B) Liquids
- (C) Gases
- (D) Both solids and liquids

(8) The materials having high thermal conductivity are referred as .....
- (A) Good Conductors
- (B) Bad Conductors
- (C) Semi-conductors
- (D) Both A and C

(9) The shorter distance between two tube is called as the .....
- (A) Pitch
- (B) Clearance
- (C) Space
- (D) Distance

(10) The metal pipe employed to extended the heat transfer surface are known as .....
- (A) Heater
- (B) Fins
- (C) surface area
- (D) cooler

C.P.T.O.)

Q.2 Answer the following(ANY TEN) [20]

(1) Define the given terms (i) Non-Newtonian fluid (ii) Newtonian Fluid
(2) Draw the diagram of inclined manometer.
(3) Explain the given terms: Pseudo plastic fluid, Dilatant fluid
(4) What are pipe fittings, list them?
(5) Draw the diagram of Diaphragm valve.
(6) Draw the diagram of three types of casing.
(7) Write the statement of Fourier's Law of heat conduction
(8) What do you mean by black body?
(9) Enlist the various characteristics of a thermal insulator.
(10) What is clearance, Pitch and Fins?
(11) Draw the neat sketch of shell and tube heat exchanger and label its parts.
(12) State the advantage of flooding head heat exchanger

Q.3 (A) Write a note on inclined manometer [05]
(B) Write the complete details of Reynolds experiment. [05]

OR

Q.3 (A) Write the equation of continuity. [05]
(B) Give the note on Bernoulli's theorem. [05]

Q.4 Write a note on Centrifugal pump [10]

OR

Q.4 Explain about Reciprocating pump [10]

Q.5 (A) What do you mean by thermal insulation?Write its importance and characteristics of an ideal insulator with examples. [05]
(B) Write a detailed note on modes of heat transfer giving industrial examples. [05]

OR

Q. 5 (A) Write The equation of heat flow through a cylinder. [05]
(B) Derive the equation of heat flow through a composite wall. [05]

Q. 6 (A) Write a note on Extended surface heat exchanger . [05]
(B) Write a note on shell & tube type heat exchanger. [05]

OR

Q. 6 (A) Explain Double pipe heat exchanger. [05]
(B) write difference between single pass and multi pass shell. [05]

—X—

SEAT No._____ No. of Printed Pages : 02

[66]

SARDAR PATEL UNIVERSITY

S.Y.B.Sc III[rd] Semester Examination, (under CBCS)

USO3CINS01 (Measurement and indicators)

Tuesday , 16[th] November 2017

2:00 PM – 5:00 PM

Total Marks: 70

Q.1 Multiple choice questions. **[10]**

(1) The basic meter movement becomes a dc instrument measuring ___ by adding shunt resistance.

(a) Dc current (b) Dc voltage

(c)resistance (d) none of the above

(2) ___used to measure the radiation intensity from a transmitting at a given location.

(a) o/p power meter (b) field strength meter

(c) stroboscope (d) None of the above.

(3) Less power is consumed by the following device____

(a) LCD (b) LED

(c) neon lamps (d) nixie tube

(4) The liquid used in LCD are

(a) scattering (b) transmission

(c) illumination (d) absorption

(5) The basic meter movement becomes a dc instrument, measuring ___by adding a multiplier resistance.

(a) Dc Current (b)Resistance

(c) DC voltage (d) none of the above

(6) To select the range, a multirange ammeter uses____ switch.

(a) Double pole double throw (b) make before break type

(c) single pole double throw (d) simple

(7) The stroboscope is used to measure ____

(a)speed (b) frequency

(c) voltage (d) current

(8) The LED turns ON-OFF time is less than ___ second

(a) mV (b) nano

(c) KV (d) piko

(9) The stroboscope principle work on_____

(a) Flame (b) Flashlight

(c) LED (d) CRT

(10) Which type of gas used in gas discharge plasma display

(a) cold cathode (b) cathode anode

(c) cold anode (d) none of these

(P.T.O.)

Q.2 Short answer type questions (Attempt any Ten) **[20]**

(1) Discuss Transistor Voltmeter.
(2) Explain briefly phase meter.
(3) Draw the circuit diagram of PMMC.
(4) Draw the basic block diagram of the stroboscope.
(5) Write on peak responding voltmeter works.
(6) Explain briefly phase meter.
(7) Write a short note on D'Arsonal with suitable diagram.
(8) Enlist various type of signal measuring device.
(9) A moving coil 300 turns of 50mm width 60mm depth is placed in a flux density $0.3 wb/m^2$ showing deflecting torque $70 \times 10^{-6} Nm$
(10) Explain briefly telemetry.
(11) Draw a circuit diagram of transistor voltmeter.
(12) Write a short note on multi range voltmeter.

Q.3 **A** Discuss series type ohm meter. **[6]**
B Explain the working of AC voltmeter using full wave rectifier. **[4]**

OR

Q.3 **A** Write a note on gas discharge plasma with the important features. **[6]**
B Draw and discuss the practical PMMC with advantage and disadvantage. **[4]**

Q.4 **A** Give a detail note on solid state voltmeter with a diagram. **[6]**
B Write a note on segmented gas discharge display. **[4]**

OR

Q.4 **A** Write a note on liquid vapour display. **[6]**
B Explain briefly electrophoretic image display. **[4]**

Q.5 **A** Explain multirange voltmeter. **[5]**
B Give a detail note on chopper type DC amplifier voltmeter. **[5]**

OR

Q.5 **A** Write a detail note on stroboscope. **[5]**
B Discuss shunt type ohm meter. **[5]**

Q.6 **A** Give a detail and basic note on chopper type DC amplifier voltmeter **[10]**

OR

Q.6 **A** Write a block diagram of Q meter and explain about Q factors which many causes error. **[10]**

—X—

SEAT No._____ [72]

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar - 388120

B.Sc. (3RD Sem) Examination - 2017

17th November, 2017 (Friday)

02:00 PM - 05:00 PM

US03CINS02 (Instrumentation)

Basic Instrumentation and LASERs

Maximum Marks: 70

Que 1 Each question below gives a multiple choice of answers. Choose the most appropriate one. **[10]**

1 Rise Time is Given By _____ RC (R: Resistance; C: Capacitance).

a) 2.2 **b)** 2.4

c) 3.2 **d)** None of These

2 _____: Active Transducer.

a) Voltmeter **b)** Ammeter

c) Piezo Electric Sensor **d)** None of These

3 _____: Converts One Form of Energy Into Another Form of Energy.

a) Transducer **b)** Transistor

c) Diode **d)** None of These

4 The Resistance of Conductor is Directly Proportional To _____.

a) Length of Wire **b)** Diameter of Wire

c) Cross - Sectional Area of Wire **d)** None of These

5 The Typical Attenuation Factors Are _____.

a) 1X and 10X **b)** 10X and 20X

c) 1X and 100X **d)** None of These

6 _____MΩ: Value of High Resistance Passive Divider Probe.

a) 1 **b)** 100

c) 1000 **d)** None of These

7 Thermistor Has _____ Temperature Coefficient of Resistance.

a) Negative **b)** Positive

c) Negative As Well Positive **d)** None of These

8 _____ Measurement: Thermometer.

a) Temperature **b)** Pressure

c) Humidity **d)** None of These

9 Pumping Associated With _____.

a) Temperature **b)** Humidity

c) LASER **d)** None of These

10 Q - Switched LASER Produces Pulses in _____.

a) Seconds **b)** Milli - Seconds

c) Micro - Seconds **d)** None of These

(P.T.O.)

Que 2 Short Questions (Attempt any TEN). **[20]**

1 What is Transducer?
2 Explain What Strain Gauge is.
3 State Advantages of Potentiometers.
4 Draw Block Diagram of High Resistance Passive Divider Probe.
5 What is Ultrasonic Transducer?
6 Enlist Any Two Properties of LASER.
7 Define CMRR.
8 What is Decay Time Constant?
9 Explain Coherence in Terms of LASER.
10 Enlsit Laser Pumping Methods.
11 State Advantages of Gas Laser.
12 Draw a Diagram of Helium - Neon Laser.

Que 3 **[A]** Write on Bonded Strain Gauge. **[05]**

[B] Differentiate: Active and Passive Transducer. **[05]**

OR

[C] Explain Resistance Thermometer. **[05]**

[D] Enlist Advantages and Disadvantages of Electrical Transducers. **[05]**

Que 4 **[A]** Write a Note on Thermocouple. **[05]**

[B] Explain Piezo - Electric Transducer. **[05]**

OR

[C] Discuss Resistance Temperature Detector (RTD). **[05]**

[D] Give an Account of Linear Variable Differential Transforemer (Transducer) LVDT. **[05]**

Que 5 **[A]** Write on Rise Time. **[05]**

[B] Give Design of Passive and Active Probes. **[05]**

OR

[C] Discuss Probe in Detail. **[05]**

[D] Give an Account of Inductive Loading. **[05]**

Que 6 **[A]** Explain Dye Laser. **[05]**

[B] Discuss Ruby Laser. **[05]**

OR

[C] Write a Note on Laser Oscillator. **[05]**

[D] Discuss Spontaneous and Stimulated Emission. **[05]**

—X—

SEAT No._____

[73 & A-43]

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

S.Y. B.Sc EXAMINATION, III SEM

Date : 17th NOV 2017, Friday
Session : Evening
Course No : US03CINT01

Time :02:00pm To 05:00pm
Sub: Fundamentals of Information Technology
Total marks : 70

Q – 1 Multiple Choice Question [10]

i) _____ refers to unit of data consisting one or more characters.
(a) Field (b) Record (c) File (d) Database

ii) In Object Oriented Database objects consists of data and _____
(a) Instructions (b) Format (c) Key (d) None of these

iii) _____Processing is less expensive.
(a) Batch (b) Inline (c) Distributed (d) None of these

iv) _____ architecture is combination of mainframe and PC architecture.
(a) Hierarchical (b) LAN (c) Distributive (d) None

v) TPS stands for _____.
(a) Transaction Processing System (b) Transaction Processing Standard
(c) Transfer Process Standard (d) Transfer Process System

vi) MIS stands for _____.
(a) Management Instruction System (b)Management Information System
(c) Material Information System (d) Management Information Standard

vii) _____ is not the component of DSS.
(a) User Interface (b) Data Management
(c) Model Management (d) Communication

viii) _____ is the least abstract mode.
(a) Iconic (b) Mental (c) Analogue (d) Mathematical.

ix) From following _____ is not the type of people communication service on internet .
(a) E-mail (b) Message Board (c) Chat Room (d) Game

x) From the following _____ is not the top level domain.
(a) .gov (b) .org (c) .edu (d) .form

Q – 2 Short Answer **attempt any ten (Each carry 2 marks)** [20]

i) What is technology convergence
ii) How IT facilitates work in organizations?
iii) Differentiate: Batch processing and Online Processing.
iv) What is do you mean by distributed environment?
v) What is Information Infrastructure?
vi) What is the function of Knowledge workers?
vii) How data are collected from internal and personal sources?
viii) What is the function of DMS?
ix) Discuss knowledge management activities.
x) What is EDI and Extranet?
xi) What do you mean by Internet?
xii) How voice mail works?

Q – 3 a) Explain any two database organization in detail. [05]
b) Explain File processing in detail [05]

OR

(P.T.O.)

Q – 3	a)	Explain computer and communication system elements.	[05]
	b)	Discuss ethics of Information Technology	[05]
Q – 4	a)	List all information architecture and explain anyone information architecture in detail	[05]
	b)	Explain role of knowledge workers in organization	[05]
		OR	
Q – 4	a)	Explain all types of information system used at all levels of organization	[05]
	b)	Explain hierarchical and project and matrix organization structure.	[05]
Q – 5		Explain components and structure of DSS.	[10]
		OR	
Q – 5		Explain following in details i) EIS ii) Data mining	[10]
Q – 6	a)	List tools of communications and connectivity. Explain any one in detail	[06]
	b)	Explain features of the internet	[04]
		OR	
Q – 6	a)	Explain intranet and firewalls	[06]
	b)	Explain new internet technologies	[04]

SC

SEAT No._____

No. of Printed Pages : 2

[556 A-39] SARDAR PATEL UNIVERSITY

B.Sc. (Information Technology) SEM – III

US03CINT02 : Problem Solving Methodology & Programming in C

Date : 18/11/2017 Time : 2:00 PM to 5:00 PM Max Marks : 70

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

[01] The _____ is a step by step approach to solve any problem.
(A) Algorithm (B) Flowchart
(C) Process (D) Compiler

[02] Which of the following symbol is used for standard decision in flowchart?
(A) Circle (B) Diamond
(C) Square (D) Rectangle

[03] Which of the following section is compulsory in C program?
(A) Definition (B) Documentation
(C) Main (D) Link

[04] The _____ format specifier is used for float data type.
(A) % d (B) % f
(C) % c (D) % e

[05] The value can be changed during program execution is known as ____.
(A) Constant (B) Variable
(C) Operator (D) None of these

[06] In Array subscript can begin with number _____.
(A) Zero (B) One
(C) Two (D) Three

[07] The ____ loop executes at least one.
(A) While (B) Do ... While
(C) If (D) For

[08] An Array can be initialized either at compile time or at _____.
(A) Allocation time (B) Released time
(C) Run time (D) None of these

[09] The _____ is used to assign the value of one string to another.
(A) strcat( ) (B) strcpy( )
(C) strrev( ) (D) strcmp( )

[10] The _____ function count and return the number of character in a string.
(A) strlen( ) (B) strrev( )
(C) strupr( ) (D) strcpy( )

Q:2 Answer the following short questions : Attempt Any Ten [20]

[01] Write advantages of an algorithm.

[02] What is an assembler?

(P.T.O.)

[03] Write algorithm to find the given number is odd or even.
[04] Explain printf( ) statement with example.
[05] Write rules of variable name.
[06] Write difference between pre-increment and post-increment operator.
[07] Explain continue statement with example.
[08] What is an array? List out the type of array use in C programming.
[09] Write syntax of compile time initialization of 1D array in C.
[10] Define function? List out type of function use in C.
[11] Explain strlen ( ) function with syntax and example.
[12] Explain strcmp ( ) function with syntax and example.

Q:3 [A] What is Flow Chart? Explain Symbols used to Draw a Flow Chart. [06]

[B] Write an Algorithm and Flowchart to find Simple Interest. [04]

OR

Q:3 [C] Explain Generation of Computer Languages. [06]

[D] What is Editor? Explain Turbo C++ Editor in detail. [04]

Q:4 [A] Explain Nested If Statement with syntax and example. [06]

[B] Explain Arithmetic Operator in detail. [04]

OR

Q:4 [C] Explain Basic Data Types used in C Language. [06]

[D] Explain Basic Structure of C Program [04]

Q:5 [A] Explain Do...While loop with syntax and example. [05]

[B] Explain For loop with syntax and example. [05]

OR

Q:5 [C] Explain Declaration and Initialization of 2D array with syntax and example. [05]

[D] Write difference between While, Do...While and For loop. [05]

Q:6 [A] Explain the following functions with syntax and example. [06]
(1) strcpy( ) (2) gets( )

[B] Explain Function Definition with syntax and example. [04]

OR

Q:6 [C] Explain the following functions with syntax and example. [06]
(1) strcat( ) (2) puts( )

[D] Explain Return Statement with syntax and example. [04]

——— X ———

SEAT No._____ No. of Printed Pages : 02

[67]

SARDAR PATEL UNIVERSITY V.V.NAGAR

B.Sc. (III[rd] SEM.) INSTRUMENTATION (V)

16[th] NOVEMBER-2017 EXAMINATION

SUB. - ELECTRICAL INSTRUMENT AND POWER ELECTRONICS-1

SUB.CODE-US03CINV01

TIME: 2:00 pm to 5:00 pm MARKS-70

Q-1 Choose correct answer [10]

1. An induction motor works on_____.
   (A) DC only (C) both(A) and (B)
   (B) AC only (D) None of above
2. The resistance of armature winding depends on _____.
   (A) Length of conductor (C) Number of conductor.
   (B) Cross sectional area of conductor (D) All of above
3. _____ Connection is most economical for small, high voltage transformer.
   (A) star/ star (C) why/delta
   (B) delta/delta (D) All of above
4. _____ is to facilitate collection of current from the armature conductor.
   (A) Yoke (C) Armature
   (B) Commutator (D) None of above
5. If the flux of DC motor approaches zero, its speed will_____.
   (A) infinity (C) medium
   (B) zero (D) None of above
6. _____ is a machine which converts electrical energy in to mechanical energy.
   (A) Motor (C) Transformer
   (B) Generator (D) None of above
7. A series connected motor armature torque (T_a) is directly proportional to____.
   (A) I_a (C) I_a^3
   (B) I_a^2 (D) None of above
8. Motor efficiency is given by the ratio of _____ developed by the armature to its input.
   (A) Power (C) current
   (B) Voltage (D) None of above
9. Which type of winding employed for high current and low voltage to DC machine?
   (A) lap winding (C) simple winding
   (B) wave winding (D) None of above
10. Which type of core coil mainly used in transformer?
    (A) Air (C) Iron
    (B) Ferrite (D) None of above

Q-2 Short answer type question. (any ten) [20]

1. Write principle of operation transformer.
2. Derive an expression for voltage transformation ratio.
3. List magnetic hysteresis application.
4. Define speed regulation of a DC motor.
5. A 220 V D.C. machine has an armature resistance of 0.5 Ω. If the full load armature current is 20 A. Find the induced emf, when the machine acts as;
   (a) Generator (b) Motor.
6. List total losses in a D.C Generator.
7. The stator of 3-phase induction motor is wound for 4-poles and is supplied from 50Hz, 230 V. Determine synchronous speed (N_s).
8. Briefly explain significant of back emf.
9. Briefly derive voltage equation of a Motor.
10. List advantage of AC induction motor.

C.P.T.O.)

11. Briefly explain Slip used in induction motor.
12. Briefly explain: Why split ring is used in dc generator in place of slip ring?

Q.3(A)	State faraday's laws of electromagnetic induction and explain it in detail.	[05]
Q.3(B)	Discuss magnetic hysteresis with necessary figure.	[05]
	OR	
Q.3(A)	Discuss core type transformer with necessary figure.	[05]
Q.3(B)	Explain E.M.F equation of a transformer.	[05]
Q.4(A)	Discuss simple loop generator with necessary figure.	[07]
Q.4(B)	Differentiate lap winding and wave winding.	[03]
	OR	
Q.4(A)	List practical loop generator parts explain any three in detail.	[07]
Q.4(B)	A six-pole generator,having lap wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb	[03]
Q.5(A)	What is torque? Derive an equation for armature Torque $Ta=9.55\ E_b \times I_a / N$ Of a motor.	[06]
Q.5(B)	What is shaft torque? Derive an expression for shaft torque.	[04]
	OR	
Q.5(A)	Write a note on speed of D.C motor.	[06]
Q.5(B)	A 500-V, 37.3 kW, 1000 rpm dc shunt motor has on full load an efficiency of 90 %. The armature circuit resistance is 0.24 Ω and there is total voltage drop of 2 V at brushes .the field current is 1.8 A. Determine ;full load line current and full load shaft torque in N-m	[04]
Q.6(A)	Discuss speed control of induction motor by rotor rheostat control method.	[05]
Q.6(B)	Write a note on 2-phase supply production of rotating field in induction motor.	[05]
	OR	
Q.6(A)	Explain different methods for measurement of slip with necessary figure.	[10]

SEAT No._____ No. of Printed Pages : 02

[38] SARDAR PATEL UNIVERSITY - V.V.NAGAR

B.Sc. (SEMESTER - 3rd) EXAMINATION

INSTRUMENTATION (V)

24th November - 2017

US03CINV02 – OPERATIONAL AMPLIFIER AND INTERMEDIATE ELEMENT

TIME: 2:00 pm to 5:00 pm MARKS-70

Q-1 Choose correct answer. [10]

1. Operational amplifier has _____ input pins.
   (A) 2 (B) 6
   (C) 4 (D) 8
2. _____ stage must have very low output impedance.
   (A) Input (B) Intermediate
   (C) Output (D) Level shifting
3. _____ circuit is also known as trans-resistive op-amp.
   (A) D.C. voltage follower (B) Time mark generator
   (C) Current to voltage converter (D) Voltage to current converter
4. _____ gives spike wave as output when input is square wave.
   (A) Integrator (B) Differentiator
   (C) Comparator (D) Adding integrator
5. The output of zero crossing detector is _____ waves.
   (A) Sine (B) Spike
   (C) Triangular (D) Square
6. Which circuit is also known as squaring circuit?
   (A) Time mark generator (B) Schmitt trigger
   (C) Astable multivibrator (D) None of above
7. Instrumentation amplifier must have _____ inputs.
   (A) 1 (B) 2
   (C) 4 (D) 8
8. Gain in active filter is _____.
   (A) Unity (B) Zero
   (C) Variable (D) None of above
9. Maximum input offset voltage for IC-741 is _____.
   (A) 6 mV (B) 4 mV
   (C) 6.6 mV (D) 7 mV
10. The lowest gain that can be obtained from non-inverting op-amp with feedback is _____.
    (A) 0 (B) 1
    (C) -1 (D) None of above

C.P.T.O.)

Q-2 **Answer the following questions. (any ten)** [20]

1. List the ideal characteristics of op-amp.
2. Briefly explain pulse width modulation.
3. Draw the symbol and pin diagram of IC-741.
4. What do you mean voltage follower? Derive the output equation for D.C. voltage follower.
5. Draw the circuit diagram of all pass filter and explain its working.
6. In op-amp, V_{in} = 1.50 V, input resistance R_{in} = 10 KΩ, and feedback resistance R_f = 100 KΩ. Find the output voltage (V_{out}) for inverting and non-inverting op-amp.
7. Just draw the circuit and waveforms of time mark generator.
8. Explain current to voltage converter.
9. Enlist the requirements of good instrumentation amplifier.
10. Explain working of triangular wave generator with circuit diagram.
11. What is comparator? Briefly explain with circuit diagram.
12. Just draw the circuit diagram of notch filter.

Q.3(A) Explain non-inverting amplifier in detail and derive its equation for gain. [06]
Q.3(B) List different A.C. parameters of op-amp. Explain any three. [04]

OR

Q.3(A) Derive an equation of gain (A) for inverting amplifier with circuit diagram. [06]
Q.3(B) Explain summing op-amp with diagram and find V_{out}. [04]

Q.4(A) Derive an output equation of differential D.C. op-amp with neat diagram. [07]
Q.4(B) Explain voltage to current converter without load. [03]

OR

Q.4(A) Explain integrator op-amp. Derive its output equation. [07]
Q.4(B) Explain A.C. voltage follower. [03]

Q.5(A) Explain Monostable multivibrator in detail with necessary diagrams and find total time period (T). [07]
Q.5(B) Explain Schmitt trigger circuit with waveforms. [03]

OR

Q.5(A) Discuss Astable multivibrator and find the total time period (T). [07]
Q.5(B) Explain the working of phase detector with necessary diagrams. [03]

Q.6 What is instrumentation amplifier? Explain in detail with circuit diagram. [10]

OR

Q.6(A) Compare active and passive filter. [05]
Q.6(B) Discuss ideal characteristics of filter. [05]

S

02

SEAT No._____

[11 & A-11] SARDAR PATEL UNIVERSITY

S.Y.B.SC

3rd Semester Examination

Tuesday 28th November-2017

US03EMIC-01

(FUNDAMENTAL OF MICROBIOLOGY)

TIME: 02:00 to 04:00 PM TOTAL MARKS: 70

Q-1. MULTIPLE CHOICE QUESTIONS 10

1. Who found the free living nitrogen fixing Azotobacter and its uses in promoting soil fertility?
   a) Pasture
   b) Beijerinck
   c) John Needham
   d) Joseph Lister
2. Pasteurization processed is worked at ____°C temperature.
   a) 52.8
   b) 72.6
   c) 62.8
   d) 64.8
3. Methano bacterium have a cell wall composed of?
   a) Peptidoglycan
   b) lipopolysaccharide
   c) Pseudomurein
   d) No cell wall
4. Hollow non helical filamentous appendages serve as a port of entry for genetic material during mating is called?
   a) Flagella
   b) fimbriae
   c) pili
   d) Mesosome
5. The dye which ionizes to give the dye portion of the molecules a positive electrical charge is called?
   a) Acidic dye
   b) Basic dye
   c) Neutral dye
   d) Leuco dye
6. 40X objective and 10 X ocular lens produce a total magnification of?
   a) 50
   b) 400
   c) 30
   d) 40
7. Which of the following is a differential medium?
   a) Nutrient Agar
   b) Luria agar
   c) Blood agar
   d) None of the above
8. Viruses can be cultivated in?
   a) Selective media
   b) Enrichment media
   c) Enriched media
   d) Infecting mice
9. Microbes which grow best within a temperature range of 25 to 40℃ are called?
   a) Mesophiles
   b) Psychrophiles
   c) Thermophiles
   d) All of the above
10. Who is called as father of antiseptic surgery?
    a) Robert Koch
    b) Louis Pasture
    c) Paul Ehrlich
    d) Joseph Lister

Q-2. **Give short and specific answers (any 10)** 20

1. What you understand by Pure culture?

(P.T.O.)

2. Give contribution of Paul Ehrlich.
3. Discuss the role of Sergie Winogradsky in agriculture microbiology.
4. Define: Capsule and Prosthecae
5 What are metachromatic granules?
6. Give an account on different shapes in which bacteria exist with suitable examples.
7. What are the advantages of staining?
8. What is Numerical Aperture?
9. Give the procedure for Monochrome staining.
10. Define selective and differential Media
11. Give an account of autotrophs and heterotrophs.
12. Give an account on Peptone.

Q-3	A	Discuss Germ theory of disease.	06
	B	Give contribution of scientist with relation to molecular Biology.	04
		OR	
Q-3	A	Give contribution of Louis Pasture in Microbiology.	06
	B	Explain in brief Agriculture microbiology.	04
Q-4	A	Discuss structure of Flagella.	05
	B	Write note on Cell membrane.	05
		OR	
Q-4	A	Give an account on Gram Positive cell wall with suitable diagram	05
	B	Write note on Capsule.	05
Q-5	A	Discuss different parts of compound microscope with their functions.	10
		OR	
Q-5	B	Give principle and method of gram staining.	10
Q-6	A	Give various techniques for isolation of Pure culture.	06
	B	Discuss Growth curve of Bacteria.	04
		OR	
Q-6	A	Discuss different types of media.	06
	B	Give an account on Chemotrophs	04

SC

SEAT No._____ Page : 02

[74 & A-44]

SARDAR PATEL UNIVERSITY

B. Sc.- Microbiology

Semester- iii

US03CMIC01-Fundamentals of Microbiology - I

Date : 17/11/2017 , Friday.

Time : 2:00 P.M To 5:00 P.M **Marks : 70**

Note : Figures to the right indicate full marks.

Q.1 Multiple choice questions. (10)

1. How many microscopes were made by Antony van Leeuwenhoek during his life time?
   a) More than 100 c) More than 200
   b) More than 250 d) More than 500
2. Basic technique of plugging the bacterial culture tubes with cotton was initiated by:
   a) Schulze & Schwann c) H. Schroder & T. von Dusch
   b) Louis Pasteur d) Robert Koch
3. Antiseptic surgical practice was discovered by:
   a) Paul Ehrlich c) A. Fleming
   b) Selman Waksman d) Joseph Lister
4. A group that imparts color to the dye molecule:
   a) Chromophore c) Chromate
   b) Auxochrome d) Flurochrome
5. Agent which is used to increase the intensity of the Staining is known as:
   a) Intensifier c) Fixative
   b) Mordant d) None of the above
6. A structure commonly present in prokaryotic cell and absent in eukaryotes is:
   a) Lysosome c) mesosome
   b) Phagolysosome d) None of the above
7. Cluster of polar flagella at one end of bacterium is known as:
   a) Monotrichous arrangement c) Lophotrichous arrangement
   b) Peritrichous arrangement d) Amphitrichous arrangement
8. Endospores are resistant to:
   a) Staining c) Desiccation
   b) Radiation d) All of the above
9. Electron microscope provides useful magnification up to:
   a) X100 c) X2000
   b) X400,000 d) X1000
10. Magnification power of oil immersion lens is:
    a) X100 c) X45
    b) X10 d) X1000

(P. T. O.)

Q.2 Short answer questions. (Attempt any Ten) (20)

1. What is pure culture? Explain its importance.
2. Explain the term Attenuation.
3. What is Phagocytosis? Who discovered it?
4. What is acidic dye? Give its example.
5. What is mordant? Give two examples of mordant.
6. Draw a neatly labeled diagram of Typical Bacterial cell.
7. Write any two functions of the cell membrane of a bacterial cell.
8. Give two functions of pili of a bacterial cell.
9. Enlist the Cytoplasmic inclusions commonly present in bacterial cell.
10. What is Resolving power of a microscope?
11. Explain the principle of Phase contrast Microscopy.
12. Give two limitations of Electron microscopy.

Q.3 (a) Discuss the contributions of Robert Koch in the development of Bacteriology. (06)

(b) Write the contribution of following Scientist in the development of Microbiology. (04)

1) S. Winogradsky 2) Willem Beijerinck

3) Paul Ehrlich 4) Edward Jenner

OR

Q.3 Discuss the contributions of Louis Pasteur in the development of Microbiology. (10)

Q.4 What is differential staining? Discuss the Gram's staining in detail. (10)

OR

Q.4 Write notes on :

(i) Fixation of smear in staining process. (05)

(ii) Chemistry of dyes. (05)

Q.5 Explain the Structure & chemical composition of Bacterial Cell Wall. (10)

OR

Q.5 Discuss the structure and functions of :

(i) Bacterial Capsule (05)

(ii) Endospore (05)

Q.6 Describe the working and application of transmission electron microscopy. (10)

OR

Q.6 Write notes on :

(i) Fluorescence microscopy. (05)

(ii) Compound Microscope. (05)

----------XXXXX----------

SEAT No._____ No. of Printed Pages :

[A-46] SARDAR PATEL UNIVERSITY

B.Sc.(3rd Semester) EXAMINATION 2017 (2010 Batch)

Friday, November 17th, 2017

2:00 p.m. TO 5:00 p.m.

SUBJECT: MICROBIOLOGY US03CMIC02

(Fundamental Microbiology)

Maximum Marks: 70

Q.1. Each question below gives a multiple choice of answers. Choose the most appropriate one. [10]

1. As per the Whitaker's five kingdom concept, bacteria are included in which of the following kingdom?
   (a) Monera (b)Protista
   (c) Animallia (d)Plantae
2. As per the Second edition of Bergey's Manual of Systematic Bacteriology actinomycetes are classified in which of the following volume?
   (a) 1 (b) 2
   (c) 3 (d) 4
3. Which of the following is the lowest taxonomic rank?
   (a) Domain (b) Kingdom
   (c) Species (d) Genus
4. Base composition of DNA during classification of bacteria is determined in terms of which of the following?
   (a) mol% (A+G) (b) mol% (G+C)
   (c) mol% (A+T) (d) mol% (T+C)
5. Which of the following nutritional type of bacteria uses CO_2 as a sole carbon source?
   (a) Chromotrophs (b) Autotrophs
   (c) Heterotrophs (d) Chemotrophs
6. Which of the following in bacteriological media act as a source of nitrogen?
   (a) Glucose (b) Peptone
   (c) Nacl (d) Maltose
7. Which type of bacteria requires very low level of oxygen for their survival and high level of oxygen is toxic for them?
   (a) Aerobic (b) Microaerophilic
   (c) Facultative (d) Anearobic
8. Which of the following method is used for the isolation of anaerobic bacteria from the mixed population?
   (a) Pour plate (b) Spread Plate
   (c) Micromanipulator (d) Roll tube method
9. In which phase of the bacterial growth curve growth rate is equal to death rate?
   (a) Lag (b) Log
   (c)Stationary (d) Death

(P.T.O.)

10. Too many phages attached to single bacterium leads to_____.

(a) Lysogeny (b) Lytic

(c) Premature lysis (d) Productive infection

Q-2 Give Short Answers to Following Questions (Any six) **[12]**

1. Who introduced the third kingdom 'Protista'? Why?
2. Enlist different criteria for the nomenclature and identification of bacteria.
3. Write about the role of agar-agar in bacteriological media and mention about its source.
4. Define (i) Mesophiles (ii) Pure Culture
5. Define: (a) Generation Time (b) Growth rate
6. Draw neat and labeled diagram of T_4 bacteriophage.
7. What is 'Micromanipulator'? Write about its role in isolating Pure Culture.
8. Give at least one example each of plant and animal virus.

Q-3 [A] Write a note on- Whittaker's five kingdom concept. **[04]**

[B] Write a note on- Bergey's Manual of Systematic Bacteriology **[04]**

OR

Q-3 Give detail account on Major characteristics used for the classification of bacteria. **[08]**

Q-4 [A] Enlist General methods of classifying bacteria and write in detail about Numerical Taxonomy. **[05]**

[B] Write a note on-Taxonomic groups. **[03]**

OR

Q-4 Discuss various methods to establish genetic relatedness in bacteria for its classification. **[08]**

Q-5 Write a detail note on-Nutritional types of bacteria **[08]**

OR

Q-5 Write a detail note on- different types of bacteriological media. **[08]**

Q-6 [A] Discuss about various types of bacteria as per their gaseous requirements. **[04]**

[B] Discuss various methods for maintenance and preservation of pure culture. **[04]**

OR

Q-6 Discuss in detail various methods for isolating 'Pure Culture' with its merits and demerits. **[08]**

Q-7 [A] Enlist various methods of bacterial growth measurement and write about those methods which directly measure cell numbers. **[04]**

[B] Write a note on- Continuous culture. **[04]**

OR

Q-7 Draw neat and labeled diagram of a typical bacterial growth curve and discuss each phase in detail **[08]**

Q-8. [A] Discuss the process of absorption and penetration of T4 bacteriophage lytic cycle in *E.coli* **[04]**

[B] Write a note on- Lysogenic Cycle. **[04]**

OR

Q-8 Discuss various methods for the cultivation of animal viruses. **[08]**

SC

SEAT No._____ No of printed pages: 03

[624-45] SARDAR PATEL UNIVERSITY

BSc. (III-Semester) EXAMINATION

Monday, 20th November, 2017

2:00 pm – 5:00 pm

US03CMIC02: FUNDAMENTALS OF MICROBIOLOGY - II

Total Marks: 70

Note: (i) Attempt all questions.

(ii) Marks are indicated on the right hand side.

Q.1 Attempt the following multiple choice questions. (10)

1. According to Whittaker's five kingdom classification microorganisms are part of which three kingdoms

   (i) Monera, Protista, Fungi (ii) Monera, Protista, Plantae

   (iii) Protista, Plantae, Animallia (iv) Fungi, Protista, Plantae

2. As per Bergey's Manual of Systematic bacteriology 'Gracilicutes' includes _____

   (i) Prokaryotes that lack a cell wall.

   (ii) Prokaryotes with cell wall structure characteristic of Gram negative bacteria.

   (iii) Prokaryotes with cell wall structure characteristic of Gram positive bacteria.

   (iv) None of the above.

3. Which nutritional type of bacteria use radiant energy as an energy source and organic compound as carbon source

   (i) Chemotrophs (ii) Chemoorganotrophs (iii) Photolithotrophs (iv) Photoorganotrophs

4. Which amongst the following can be used as solidifying agent for media preparation?

   (i) Agar agar (ii) Silica gel (iii) Gelatin (iv) All of the above

5. During the growth curve of bacteria which phase shows the constant growth rate

   (i) Lag phase (ii) Log phase (iii) Stationary (iv) Decline phase

6. The organisms which are able to grow at 40^0C or above are called _____

   (i) Mesophiles (ii) Psychrophiles (iii) Thermophiles (iv) Facultative mesophiles

[P.T.O]

7. Optimum growth temperature for microorganisms which are pathogenic for humans and other warm blooded animals is _____.

(i) 20^0C (ii) 40^0C (iii) 37^0C (iv) 30^0C

8. Which among the following shows step like or zig zag growth pattern

(i) Synchronous culture (ii) Continuous culture (iii) Mixed culture (iv) None of the above

9. A virus that infects the bacterial host and cause fragmentation of host DNA is known as_____

(i) Lytic Phage (iii) Avirulent (iii) Bacteriophage (iv) None of the above

10. When the avirulent phage infects a bacterial host which process among the following occur?

(i) Infected cell releases a large number of progeny phage.

(ii) It causes lysis of host cell.

(iii) On penetration of phage DNA to host cell it follows lytic cycle.

(iv)The phage DNA integrates with the host chromosome

Q.2 Give short answers of the following (Any ten) **(20)**

1. Write about (a) Genetic relatedness (b) Numerical taxonomy
2. Explain Haeckel's classification system.
3. Define the following: (a) Taxa (b) Classification
4. Enlist and write about various physical requirements essential for bacterial growth.
5. Define the following: (a) Phototrophs (b) Heterotrophs
6. What are the different physiological groups of micro-organisms based on the response to temperature?
7. Define (a) Continuous culture (b) Synchronous growth.
8. Define the term (a) Axenic culture (b) Generation time
9. What is freeze drying and write about its advantages.
10. Draw neat and labelled diagram of a typical bacteriophage.
11. Define the term (a) Plaque (b) Virulent phage
12. Write about helical symmetry of virus

Q.3 (a) Enlist major characteristics of micro-organisms & explain antigenic and cultural characteristics of micro-organisms for classification in detail. **(06)**

(b) Explain classification based on DNA homology experiment. **(04)**

OR

Q.3 (a) Explain r-RNA cataloguing experiment. **(05)**

(b) Write a short note on Whittaker's five kingdom concept. **(05)**

Q.4 (a) Enlist types of media and describe selective and differential media in detail. **(05)**

(b) Explain cultivation of anaerobic bacteria. **(05)**

OR

Q.4 Explain different nutritional requirements of bacteria in detail. **(10)**

Q.5 Describe various techniques that can be used for the isolation of pure culture in detail. **(10)**

OR

Q.5 Describe a typical bacterial growth curve & label the various phases and brief about factors which determines the early and late phase of each stage. **(10)**

Q.6 (a) Enlist and discuss different steps involve in lytic cycle of T4 bacteriophage in *E. coli* host. **(06)**

(b) Write short note on cultivation of plant viruses. **(04)**

OR

Q.6 (a) Write short note on lysogenic cycle of bacteriophage in a bacterial host. **(06)**

(b) Brief about cultivation of animal viruses by chick embryo technique. **(04)**

SC

SEAT No._____

[43 & A-43]

No of printed pages : 3

SARDAR PATEL UNIVERSITY
B.Sc.(SEMESTER III) EXAMINATION
Tuesday , 21th November, 2017
MATHEMATICS : US03CMTH01
(ADVANCED CALCULUS)

Time : 02.00 p.m. to 05.00 p.m.

Maximum Marks:70

10

Que.1 Fill in the blanks.

(1) $\int_1^3 \int_0^y dxdy =$ .....

(a) 9 (b) 9/2 (c) 4 (d) 2

(2) If region R is represented by $a \le x \le b$; $f_1(x) \le y \le f_2(x)$ then $\iint_R f(x,y)\,dxdy =$ .....

(a) $\int_a^b \int_{f_1(x)}^{f_2(x)} f(x,y)\,dydx$ (b) $\int_a^b \int_c^d f(x,y)\,dxdy$ (c) $\int_{f_1(x)}^{f_2(x)} \int_a^b f(x,y)\,dxdy$ (d) $\int_a^b \int_{f_1(x)}^{f_2(x)} dydx$

(3) For $x+y=u$, $x-y=v$, jacobian J = ...

(a) -2 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{-1}{2}$

(4) $xdx+ydy+zdz =$ .....

(a) $d\left[\frac{x^2+y^2+z^2}{2}\right]$ (b) $d\left[\frac{x^2+y^2+z^2}{3}\right]$ (c) $d\left[x^2+y^2+z^2\right]$ (d) $d\left[\frac{(x+y+z)^2}{2}\right]$

(5) Area of limacon $r = a(1+\cos\theta)$ in the first and second quadrant is A = ...

(a) $\frac{3\pi a^2}{2}$ (b) $\frac{3\pi a}{4}$ (c) $\frac{3\pi a^2}{4}$ (d) $\frac{3\pi^2 a^2}{4}$

(6) If $f = -xy^2$, $g = x^2y$ then $\frac{\partial g}{\partial x} - \frac{\partial f}{\partial y} =$ .....

(a) $2xy$ (b) $-4xy$ (c) $4xy$ (d) $-2xy$

(7) Parametric form of $x^2+y^2=a^2$ is $\bar{r}$ =.....

(a)$a\cos v\bar{i} + a\sin v\bar{j} + v\bar{k}$ (b) $a\cos u\bar{i} + a\sin u\bar{j} + v\bar{k}$ (c) $u\cos v\bar{i} + v\sin u\bar{j} + a\bar{k}$

(d) $\cos v\bar{i} + \sin v\bar{j} + a\bar{k}$

(8) If $\bar{r} = u\cos v\,\bar{i} + u\sin v\,\bar{j} + u\,\bar{k}$ then $EG - F^2 =$ .....

(a) 2 (b) 0 (c) $2u^2$ (d) u^2

(9) $\int_0^1 \int_0^2 \int_1^3 dxdydz =$ .....

(a) 1 (b) 6 (c) 3 (d) 4

(10) If $\bar{n} = \bar{j}$ then $dA =$ .....

(a) 0 (b) $dxdz$ (c) $dxdy$ (d) $dydz$

Que.2 Answer the following (Any Ten) 20

(1) Evaluate $\int_C 3(x^2+y^2)ds$, where C : along the circle $x^2+y^2=1$ from (1,0) to (0,1). (clockwise direction)

(2) Evaluate $\int_C [y^2dx - x^2dy]$, where C : along the straight line from (2,0) to (0,1).

(3) Evaluate $\iint_R e^{x^2\ y^2}\, dxdy$ where $R : x^2+y^2 \le 1$.

(4) Evaluate the line integral $\int_{(2,0,0)}^{(-1,2,\pi)} [ye^{xy}\cos z dx + xe^{xy}\cos z dy - e^{xy}\sin z dz]$ on any path .

(5) Find area of region $r = a(1+\cos\theta)$ in second and third quadrant .

(6) In usual notation prove that $A = \frac{1}{2}\int_C [xdy - ydx]$.

(7) Identify the surface $\overline{r} = au\cos v\overline{i} + bu\sin v\overline{j} + u^2\overline{k}$.

(8) Find equation of tangent plane and normal line to the surface $x^2+y^2=z$ at $(2,1,5)$.

(9) Obtain first fundamental form of the surface $\overline{r} = u\cos v\overline{i} + u\sin v\overline{j} + u\overline{k}$.

(10) If f is harmonic function then prove that $\iint_S \frac{\partial f}{\partial n}\, dA = 0$.

(11) Find total mass of a mass distribution of density $\sigma = x^2y^2z^2$, R : $|x| \le 1$, $|y| \le 1$, $|z| \le 1$.

(12) Let R be a closed region in space and S be its boundary , let g be harmonic function in R then prove that $\iint_S g\frac{\partial g}{\partial n}\, dA = \iiint_R |\nabla g|^2\, dV$.

Que.3 (a) Transform $\iint_R (x+y)^3\, dxdy$ in uv-plane by taking $x+y=u, x-2y=v$.
Then evaluate it, where R : Parallelogram with vertices $(1,0),(0,1),(3,1),(2,2)$. 5

(b) Find volume of the region bounded by cylinder $x^2+y^2=4$ and by the plane $y+z=4$, $z=0$. 5

OR

Que.3 (a) Find the centroid of density 1 in the plane area bounded by $y = 2x - x^2$ and $y = 3x^2 - 6x$. 7

(b) Find area of the region bounded by bounded by $x^2=4y$, $8y = x^2+16$. 3

Que.4 (a) Verify Green's theorem for $f = 3x^2 - 8y^2$, $g = 4y - 6xy$,
C : the boundary of region bounded by $x=0$, $y=0$, $x+y=1$. 6

(b) Change the order of integration in $\int_0^{a\cos\alpha} \int_{x\tan\alpha}^{\sqrt{a^2-x^2}} f(x,y)\, dydx$. 4

OR

Que.4 (a) State and prove Green's theorem for plane . 5

(b) Verify the result $\iint_R \nabla\cdot\overline{V}\, dxdy = \int_C \overline{V}\cdot\overline{n}\, ds$ for $\overline{V} = 7x\overline{i} - 3y\overline{j}$ C : the circle $x^2+y^2=4$. 5

Que.5 (a) Find area of the surface $z^2 = x^2 + y^2$, where $0 \leq z \leq 1$. 5

(b) Find moment of inertia of surface $S : \bar{r} = (a + bcosv)(cosu\bar{i} + sinu\bar{j}) + bsinv\bar{k}$, $a > b > 0$, $0 \leq u, v \leq 2\pi$ of density 1 about z-axis . 5

OR

Que.5 (a) State and prove divergence theorem of Gauss . 5

(b) Evaluate $\iint_S f(x,y,z)\, dA$, where $f(x,y,z) = xy$, $S : x^2 + y^2 = 4$, $|z| \leq 1$. 5

Que.6 (a) State and prove Stoke's theorem . 5

(b) By using triple integral ,find moment of inertia of a mass distribution of density 1 in a region R about x-axis , where R : the sphere $x^2 + y^2 + z^2 = a^2$. 5

OR

Que.6 (a) Verify Stoke's theorem for $\bar{V} = 3y\bar{i} - xz\bar{j} - yz^2\bar{k}$ and surface S : $2z = x^2 + y^2$ bounded by $z = 2$. 6

(b) By using triple integral , find volume of the region in the first octant bounded by $y = 1 - x^2$, $z = 1 - x^2$. 4

SC

SEAT No._____ 03

[15 & A-19]

Sardar Patel University, Vallabh Vidyanagar

B.Sc. Examinations: 2017-18 (Sem. - III)

Subject : Mathematics US03CMTH02 Max. Marks : 70

Numerical Analysis

Date: 29/11/2017 Timing: 02.00 pm - 05.00 pm

Q: 1. Answer the following by choosing correct answers from given choices. **10**

[1] Which of the following intervals contains a root of $x^2 - 3x - 4 = 0$
[A] [1, 3] [B] [3, 5] [C] [5, 7] [D] [7, 9]

[2] Mid-points of intervals are used for approximation of root of an equation while using the method of
[A] False position [B] Bisection [C] Iteration [D] Aitkin's Δ^2-Process

[3] Initial approximation of a root of $x^3 - x - 2 = 0$ can be chosen from
[A] [0,1] [B] [-1,0] [C] [1,2] [D] [-2,-1]

[4] $y_n - E^{-1}y_n =$
[A] Δy_{n+1} [B] ∇y_{n+1} [C] Δy_n [D] ∇y_n

[5] If $\Delta y_5 = 5$ and $y_6 = 11$ then $y_5 =$
[A] 16 [B] -16 [C] -6 [D] 6

[6] $E^m y_n - E^n y_m =$
[A] m [B] n [C] 1 [D] 0

[7] In usual notations, for tabluated data with equally spaced arguments, $[x_0\ x_1\ x_2\ x_3\ x_4] =$
[A] $\frac{1}{4!h^4}\Delta^4 y_4$ [B] $\frac{1}{4!h^4}\Delta^4 y_0$ [C] $\frac{1}{4!h^4}\Delta y_0$ [D] $\frac{1}{4!h^4}\Delta y_4$

[8] Langrange's Interpolation formula can be used for a data with ____ arguments.
[A] Rational [B] Irrational [C] only equally spaced [D] Unequally spaced

[9] For using Simpson's $\frac{1}{3}$ rule it is required that the number of sub-intervals be
[A] even [B] odd [C] a multiple of 3 [D] a multiple of 8

[10] Which of the following method can be used to evaluate a numerical integral?
[A] Picard's Method [B] Euler's Method
[C] Runge-Kutta method [D] Romberg's Method

Q: 2. Answer ANY TEN of the following. **20**

[1] Find an interval containing an initial approximation of $\sin x = \cos x$

[2] Find first approximation of a root of $x^3 + 8x - 7 = 0$ using bisection method.

(P.T.O.)

[3] Find an interval containing an initial approximation of $x^2 - 10x + 7 = 0$

[4] Prove that $\mu = \frac{1}{2}\left(E^{\frac{1}{2}} + E^{-\frac{1}{2}}\right)$

[5] If $E^{10}y_1 = 20$ then find $E^5 y_6 + E^6 y_5$

[6] Prove that $E^{-1} \equiv 1 - \nabla$

[7] If $y_1 = 4$, $y_3 = 12$, $y_4 = 19$ and $y_x = 7$ find x. Write the formula you use and also give it's name.

[8] Construct divided difference table for the data

x	2	3	4	5
y	10	15	18	20

[9] Using Langrage's interpolation formula, find $y(x)$ for the data

x	4	5	7
y	10	-5	2

[10] Using Simpson's $\frac{1}{3}$ rule find $\int_1^7 x dx$, with subintervals of length 1 unit.

[11] Discuss Euler's method for solving a differential equation.

[12] Using Trapezoidal rule find $\int_0^3 e^3 dx$, with 3 subintervals of equal lengths.

Q: 3 [A] Using Bisection method find a real root of the equation $x^3 - 4x - 9 = 0$ correct upto three decimal palaces 5

[B] Find a real root of $\sin x = 10(x - 1)$ by iteration method correct upto three decimal places 5

OR

Q: 3 [A] Discuss the Aitken's Δ^2-Process for approximation of a real root of an equation. 5

[B] Find a real root of $x^3 - 2x - 5 = 0$, correct upto three decimal places, by Newton-Raphson method 5

Q: 4 [A] Derive Newton's Forward Difference interpolation formula for equally spaced values of arguments. 5

[B] Use Gauss's forward formula to find y for $x = 30$ given that 5

x	21	25	29	33	37
y	18.4708	17.8144	17.1070	16.3432	15.5154

OR

Q: 4 [A] Derive Gauss's Backward interpolation formula for equally spaced values of argument 5

[B] Let $y = g(x)$ be a function such that

$$g(20) = 2854,\ g(24) = 3162,\ g(28) = 3544,\ g(32) = 3992$$

Use Bessel's formula to obtain $g(25)$. 5

Q: 5 [A] Using mathematical induction, in usual notations prove that

$$[x_0, x_1, x_2, x_3, ..., x_n] = \frac{1}{h^n.n!}\Delta^n y_0$$

5

[B] Certain corresponding values of x and $\log_{10} x$ are

$$(300, 2.4771),\ (304, 2.4829),\ (305, 2.4843),\ \text{and}\ (307, 2.4871)$$

Find $\log_{10}(301)$. 5

OR

Q: 5 [A] Discuss the method of succesive apprximation for inverse interpolation. 5

[B] The following table of values of x and y is given :

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

Find first and second derivatives of y w.r.t. x when $x = 1.2$ 5

Q: 6 [A] Describe the Romberg's Integration method. 5

[B] From the Taylor's series for $y(x)$, find $y(0.1)$ correct upto four decimal places if $y(x)$ satisfies $\frac{dy}{dx} = x - y^2$ and $y(0) = 1$ 5

OR

Q: 6 [A] Describe Picard's method of successive approximation and use it to approximate y when $x = 0.2$, given that $y(0) = 1$ and $\frac{dy}{dx} = x - y$, correct upto three decimal places 10

———X———

[A-45] Seat: _____ No. of printed pages : 02

SARDAR PATEL UNIVERSITY

Third Semester B. Sc. Examination(Batch-2010)

Under CBCS

Tuesday, 17th November-2017

Time: 02:00 P.M. To 05:00 P.M.

Subject: PHYSICS [US03CPHY01]

Electronics and Optics

Total Marks 70

N.B: **(i) All the symbols have their usual meanings.**
(ii) Figures at the right side of questions indicate full marks.

Que.1 Choose the correct option to answer the following MCQs. **[10]**

1 The voltage divider biasing circuit is also known as _____.
(a) biasing circuit independent of β (b) biasing circuit independent of temperature (c) Emitter bias circuit (d) Simple bias circuit

2 A point which represents value of I_c (dc) and V_c (dc) in output characteristic of a transistor is known as _____.
(a) B-Point (b) Q point (c) Active point (d) Transient point

3 If the power gain of an amplifier be X and its voltage gain be Y, then its current gain will be _____.
(a)X-Y (b) X*Y (c) X/Y (d) X+Y

4 The feedback network is also known as _____ network.
(a) α (b) π (c) μ (d) β

5 The gain of an emitter follower is always _____.
(a) Greater than 1 (b) Equal to 1 (c) Negative (d) Less than 1

6 The full form of R.F.C. is_____.
(a) radio frequency choke (b) resistor frequency circuit
(c) resistor feedback circuit (d) radio frequency circuit

7 The Barkhausen condition for which an amplifier becomes an oscillator, is _____.
(a) A =1 (b) β =1 (c) A*β = 1 (d) A* β = -1

8 Spherical aberration arises due because marginal and paraxial rays form the images at _____.
(a) infinity (b) same place (c) different place (d) none of these

9 If spreading of the image takes place in a plane parallel to the lens axis, the aberration is called_____.
(a) astigmatism (b) coma (c) curvature of field (d)distortion

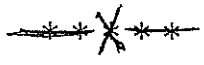
10 For principal points, magnification is _____.
(a) angular (b) transverse (c) zero (d) none of these

Que.2 Answer *briefly* any Six of the following questions. **[12]**

1 What is the need for bias stabilization?
2 Define voltage gain and power gain.
3 Define thermal runaway with proper diagram.
4 Write merits and demerits of negative feedback.
5 What is advantage of RC oscillators over LC oscillators?
6 Enlist various types of aberrations produced by a lens.
7 Explain briefly about achromatic doublet.
8 Why cross wire cannot be used in Huygens eyepiece?

(P.T.O.)

Que.3	(a)	Explain selection of a proper Q point of a transistor in CE mode using output characteristics.	[05]
	(b)	Draw diagram for a simple biasing circuit using npn transistor.	[03]
		OR	
Que.3	(a)	What is fixed bias circuit? Using fixed biasing circuit of npn transistor, obtain three coordinates of the Q point.	[05]
	(b)	Discuss the advantages of voltage divider biasing circuit.	[03]
Que.4	(a)	What are small signal amplifiers? Draw the circuit of such amplifier and discuss function of each component.	[05]
	(b)	Discuss phase relationship between input and output current of npn transistor.	[03]
		OR	
Que.4	(a)	What are h parameters? Obtain relations for four h parameters using its equivalent circuit for a transistor.	[05]
	(b)	Draw the amplifier circuit for (a) dc behavior (b) ac behavior.	[03]
Que.5	(a)	What is an emitter follower circuit? Explain it with proper diagram.	[05]
	(b)	Enlist the advantages of negative feedback.	[03]
		OR	
Que.5	(a)	What is feedback? Explain the effect of negative feedback on output impedance and bandwidth of an amplifier.	[05]
	(b)	Classify various types of feedback.	[03]
Que.6	(a)	Discuss Hartley oscillator with suitable diagram.	[05]
	(b)	Why positive feedback is required in an oscillator?	[03]
		OR	
Que.6	(a)	Draw the labeled diagram for Wien bridge oscillator.	[05]
	(b)	explain RC phase shift oscillator with labeled diagram.	[03]
Que.7	(a)	What is chromatic aberration? Discuss various types of chromatic aberration.	[05]
	(b)	Write a note on Curvature of field.	[03]
		OR	
Que.7	(a)	What is spherical aberration? Discuss various methods used to minimize it.	[05]
	(b)	Write a note on distortion.	[03]
Que.8	(a)	With suitable diagram, explain cardinal points and their planes of a co-axial lens system.	[05]
	(b)	A co-axial lens system placed in air has two lenses of focal lengths 20cm and 25cm separated by distance of 10 cm. Find the positions of the cardinal points.	[03]
		OR	
Que.8	(a)	Explain in detail about Huygens eyepiece.	[05]
	(b)	Give the comparison between Huygens and Ramsden's eyepiece.	[03]



SC

No. of Printed Pages : 02

SEAT No._____

[75 & A-41]
(Eng.)

SARDAR PATEL UNIVERSITY

S. Y. B.Sc. Examination, semester –III

Physics course code: USO3CPHY01

DATE: 17-11-2017 Course title: Optics TIME: 2-00 TO 5-00

[TOTAL MARKS 70]

Q.1 Write answer to the following multiple choice questions in your answer book by selecting the proper option [10]

(1) In Hyugen's eyepiece the focal length of the field lens is ___times the focal length of the eye lens.

(a) Five (b) Four (c) Three (d) Two

(2)The Hyugen's eyepiece is_____ type of eyepiece.

(a) Positive (b) Negative (c) Neutral (d) None of these

(3) In Newton's rings arrangement the thickness of the air gap at the contact point of the lens is ____

(a) $\lambda/2$ (b) Zero (c) 2 t (d) n λ

(4) The bending of wave at an edge of an obstacle is called ----

(a) refraction (b) reflection (c) interference (d) diffraction

(5) The Nicol prism is most widely used as____ device.

(a) refracting (b) polarising (c) reflecting (d) diffracting

(6) Refractive index for 'E' ray in less than that of 'O' ray ($\mu_e < \mu_o$) is known as _____

(a) neutral crystal (b) positive crystal (c) negative crystal (d) none of these

(7) The formula for Brewster's law is given by

(a) $\theta_p = \tan^{-1} \mu$ (b) $\mu = \tan^{-1} \theta_p$ (c) $\theta_p = \cot \mu$ (d) $\theta_p = \cot^{-1} \mu$

(8) The numerical aperture of optical fibre is defined as _____ acceptance angle

(a) cot (b) cos (c) tan (d) sine

(9) At the output end of optical fibre system there is

(a) photo diode (b)Sound source(c) Nicol prism (d) quartz crystal

(10) The refractive index of the core material is ___ refractive index of the cladding.

(a) less than (b) equal to (c) slightly greater than (d) slightly less than

Q. 2 Answer the following question in brief (Any ten) [20]

(1)Define spherical aberration.

(2) What is achromatism?

(3) What is astigmatism?

(4) Why Newton's rings are circular ?answer briefly

(5) Enlist the techniques for obtaining Interferance.

(6) What is the advantage of Fabry-Parot interferometer over Michelson interferometer.

(7) What is double refraction ?

(8) State Malus law.

(9) Explain polarizer and analyser

(10) Explain core and cladding

(11) What is numerical aperture?

(12) Give any four application of optical fibre

Q. 3 With proper diagram discuss the cardinal points and cardinal planes of a coaxial lens system. [10]

OR

Q.3 Discuss the construction of Ramsden eyepiece and calculate the position of cardinal points with diagram hence give its advantages and disadvantages. [10]

(P.T.O.)

Q.4 (a) Explain the experimental arrangement to observe Newton's rings and how it is used to determine the wavelength of light? [6]

(b) What is diffraction ? Explain Fresnal diffraction and fraunhoffer diffraction. [4]

OR

Q.4 (a)Describe the construction and working of Llyod's mirror also compare the interference fringes produced by Llyod's mirror and biprism. [6]

(b) How biprism can be used to determine the thickness of thin transparent sheet? [4]

Q. 5 (a) Prove that the intensity of the transmitted polarized light is exactly half that of incident intensity of unpolarised light (hint: $I = I_0/2$) [6]

(b))Give the Hyugen's explanation of double refraction in uni axial crystal [4]

OR

Q. 5 (a)Explain unpolarised light and polarised light hence explain different types of polarized light. [6]

(b)Discuss Brewster's law. [4]

Q. 6 (a) Obtain formula for critical angle of propagation ($\theta_c = cos^{-1}\frac{n_2}{n_1}$) for step index fibre. [6]

(b) Write advantages of optical fibre. [4]

OR

Q. 6 (a) Write notes on (i) step index fibre. (ii) Graded index fibre. [6]

(b)What is the optical fibre? Discuss its structure in brief. [4]

—X—

[75 & A-41]
(નવું)

No. of Printed Pages : 02

સરદાર પટેલ યુનિવર્સીટી

એસ.વાય.બી.એસસી. સેમેસ્ટર - ૩

ભૌતિકશાસ્ત્ર કોર્સ કોડ : USO3CPHY01 **સમય- ૨-૦૦ થી ૫-૦૦**

તા:૧૭ /૧૧/૨૦૧૭ **પ્રકાશશાસ્ત્ર** **કુલગુણ:૭૦**

પ્ર.૧ યોગ્ય વિકલ્પ પસંદ કરી ઉત્તરવહિમાં જવાબ લખો. [૧૦]

(૧) હ્યુજન આઇપીસમાં વસ્તુકાચની કેન્દ્રલંબાઇ નેત્રકાચ કરતા____ ગણી હોય છે.

(a) પાંચ (b) ચાર (c) ત્રણ (d) બે

(૨) હ્યુજનનો આઇપીસ _____ પ્રકારનો છે.

(a) ધન (b) ઋણ (c) તટસ્થ (d) આમાંથી કોઈ નહી

(૩) ન્યૂટનના વલયોની ગોઠવણીમાં સ્પર્શબિન્દુએ હવાના સ્તરની જાડાઈ_____ હોય છે.

(a) λ/૨ (b) શૂન્ય (c) ૨t (d) nλ

(૪) અંતરાયની ધાર પર તરંગના વકણ ને _____ કહે છે.

(a) વક્રીભવન (b) પરાવર્તન (c) વ્યતીકરણ (d) વિવર્તન

(૫) નિકોલ પ્રીઝમ બહુધા _____ ઉપકરણ તરીકે વપરાય છે.

(a) વિવર્તક (b) ધ્રુવક (c) પરાવર્તક (d) વક્રીભવક

(૬) અસામાન્ય કિરણનો વક્રીભવનાંક સામાન્યકિરણ કરતા ઓછો (μ_e μ_0) હોય તો તેને _____કહે છે .

(a) તટસ્થ સ્ફટીક (b) ધન સ્ફટીક (c) ઋણ સ્ફટીક (d) આમાંથી કોઈ નહી

(૭) બ્રુસ્ટરનો નિયમ નું સુત્ર _____ છે.

(a) $\theta_p = \tan^{-1}\mu$ (b) $\mu = \tan^{-1}\theta_p$ (c) $\theta_p = \cot\mu$ (d) $\theta_p = \cot^{-1}\mu$

(૮) ઓપ્ટીકલ ફાઇબરનો ન્યૂમેરીકલ એપરચર____ એકસેપ્ટન્સકોણ તરીકે વ્યાખ્યાયિત થાય છે.

(a) cot (b) cos (c) tan (d) sine

(૯) ઓપ્ટીકલ ફાઇબર તંત્રના આઉટપુટ છેડા પર ____ હોય છે.

(a) ફોટો ડાયોડ (b) ધ્વનીઉદગમ (c) નિકોલ પ્રીઝમ (d) ક્વાર્ટ્ઝ સ્ફટીક

(૧૦) કોરદ્રવ્ય નો વક્રીભવનાંક, ક્લેડીંગદ્રવ્યના વક્રીભવનાંક કરતાં _____ હોય છે.

(a) ઓછો (b) બરાબર (c) થોડો વધારે (d) થોડો ઓછો

પ્ર.૨ ટૂંકમાં જવાબ આપો.(ગમેતે દસ લખો) [૨૦]

(૧) ગોલિય વિપથન ની વ્યાખ્યા આપો

(૨) એક્રોમેસટીઝમ એટલે શું?

(૩) એસ્ટીગ્મેટીઝમ એટલે શું?

(૪) ન્યૂટનના વલયો કેમ વર્તુળાકાર હોય છે? ટૂંકમાં જણાવો.

(૫) વ્યતિકરણ મેળવવાની રીતો જણાવો.

(૬) ફેબ્રી- પેરોટ ઇન્ટરફેરોમીટર કઈરીતે માઇકલસન ઇન્ટરફેરોમીટર કરતાં વધુ લાભદાયી છે?

(૭) દ્વિવક્રીભવન એટલે શું ?

(૮) માલસ ના નિયમ નું કથન લખો.

(૯) ધ્રુવક અને વિશ્લેષક સમજાવો .

(૧૦) સમજાવો- કોર અને ક્લેડીંગ.

(૧૧) આંકીક મુખદર્પણ (ન્યુમેરીકલ એપર્ચર) એટલે શું ?

પાનું ઉલટાવો)

(૧૨) ઓપ્ટીકલ ફાઇબર ના ગમે તે ચાર ઉપયોગો લખો.

પ્ર.૩ સમઅક્ષીય દગકાચ (COAXIAL LENS) ના તંત્ર માટે યોગ્ય આકૃતિ સહિત કાર્ડીનલ બિંદુઓ અને કાર્ડીનલ સમતલો ચર્ચો. [૧૦]

અથવા

પ્ર.૩ રામ્સડેન આઈપીસ ની રચના ચર્ચો અને તેના કાર્ડીનલ બિંદુઓ યોગ્ય આકૃતિ સહિત મેળવો તેમજ તેના ફાયદા તેમજ ગેરફાયદા જણાવો. [૧૦]

પ્ર.૪(a) ન્યૂટનના વલયો મેળવવાની પ્રાયોગિક રીત સમજાવો અને તેનાથી કેવી રીતે પ્રકાશની તરંગલંબાઇ નક્કી કરી શકાય ? [૬]

(b) વિવર્તન એટલે શું? ફેસ્નલ વિવર્તન અને ફ્રોનહોફર વિવર્તન સમજાવો [૪]

અથવા

પ્ર.૪ (a) લોયડના અરીસાની રચના તેમજ કાર્ય વર્ણવો તેમજ લોયડના અરીસામાં અને બાયપ્રીઝમમાં મળતી વ્યતીકરણ શલાકાઓ સરખાવો. [૬]

(b) બાયપ્રીઝમ વડે પાતળી પારદર્શક તકતી ની જાડાઈ કેવી રીતે નક્કી કરી શકાય છે ? [૪]

પ્ર.૫ (a) સાબિત કરોકે પારગમિત ધ્રુવીભૂતપ્રકાશ ની તીવ્રતા આપાત અધ્રુવીભૂતપ્રકાશ ની તીવ્રતા કરતાં અડધી હોય છે. ($I = \frac{I_0}{2}$) [૬]

(b) એક અક્ષીય સ્ફટીકમાં થતાં દ્વીવકીભવન માટેની હ્યૂજન ની સમજુતી આપો. [૪]

અથવા

પ્ર.૫ (a) અધ્રુવીભૂતપ્રકાશ અનેધ્રુવીભૂતપ્રકાશ સમજાવી વિવિધ પ્રકારનાધ્રુવીભૂતપ્રકાશની સમજુતિ આપો. [૬]

(b) બ્રુસ્ટરના નિયમ ની ચર્ચા કરો. [૪]

પ્ર.૬ (a) સ્ટેપ ઇન્ડેક્સ ફાઇબરમાં ગતિ કરતા કિરણના ક્રાંતિકોણ નુ સૂત્ર ($\theta_C = \cos^{-1}\frac{n_2}{n_1}$) તારવો. [૬]

(b) ઓપ્ટીકલ ફાઇબરના ફાયદાઓ લખો. [૪]

અથવા

પ્ર.૬ (a) નોંધ લખો - (i) સ્ટેપ ઇન્ડેક્સ ફાઇબર (ii) ગ્રેડેડ ઇન્ડેક્ષ ફાઇબર [૬]

(b) ઓપ્ટીકલ ફાઇબર એટલે શું ?તેમજ તેના બંધારણ ની ચર્ચા કરો. [૪]

—X—

[75 & A-41]
(ચકાસેલું)

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સરદાર પટેલ યુનિવર્સીટી

એસ.વાય.બી.એસસી. સેમેસ્ટર - ૩

ભૌતિકશાસ્ત્ર કોર્સ કોડ : USO3CPHY01 સમય- ૨-૦૦ થી ૫-૦૦

તા:૧૭ /૧૧/૨૦૧૭ પ્રકાશશાસ્ત્ર કુલગુણ:૭૦

પ્ર.૧ યોગ્ય વિકલ્પ પસંદ કરી ઉત્તરવહિમાં જવાબ લખો. [૧૦]

(૧) હ્યુજન આઇપીસમાં વસ્તુકાચની કેન્દ્રલંબાઇ નેત્રકાચ કરતા____ ગણી હોય છે.

(a) પાંચ (b) ચાર (c) ત્રણ (d) બે

(૨) હ્યુજનનો આઇપીસ _____ પ્રકારનો છે.

(a) ધન (b) ઋણ (c) તટસ્થ (d) આમાંથી કોઈ નહી

(૩) ન્યૂટનના વલયોની ગોઠવણીમાં સ્પર્શબિન્દુએ હવાના સ્તરની જાડાઈ_____ હોય છે.

(a) λ/૨ (b) શૂન્ય (c) ૨t (d) nλ

(૪) અંતરાયની ધાર પર તરંગના વકણ ને _____ કહે છે.

(a) વક્રીભવન (b) પરાવર્તન (c) વ્યતીકરણ (d) વિવર્તન

(૫) નિકોલ પ્રીઝમ બહુધા _____ ઉપકરણ તરીકે વપરાય છે.

(a) વિવર્તક (b) ધ્રુવક (c) પરાવર્તક (d) વક્રીભવક

(૬) અસામાન્ય કિરણનો વક્રીભવનાંક સામાન્યકિરણ કરતા ઓછો (μ_e μ_o) હોય તો તેને _____કહે છે .

(a) તટસ્થ સ્ફટીક (b) ધન સ્ફટીક (c) ઋણ સ્ફટીક (d) આમાંથી કોઈ નહી

(૭) બ્રુસ્ટરનો નિયમ નું સુત્ર _____ છે.

(a) $\theta_p=\tan^{-1}\mu$ (b) $\mu=\tan^{-1}\theta_p$ (c) $\theta_p=\cot\mu$ (d) $\theta_p=\cot^{-1}\mu$

(૮) ઓપ્ટીકલ ફાઇબરનો ન્યૂમેરીકલ એપરચર____ એક્સેપ્ટન્સકોણ તરીકે વ્યાખ્યાયિત થાય છે.

(a) cot (b) cos (c) tan (d) sine

(૯) ઓપ્ટીકલ ફાઇબર તંત્રના આઉટપુટ છેડા પર ____ હોય છે.

(a) ફોટો ડાયોડ (b) ધ્વનીઉદગમ (c) નિકોલ પ્રીઝમ (d) ક્વાર્ટ્ઝ સ્ફટીક

(૧૦) કોરદ્રવ્ય નો વક્રીભવનાંક, ક્લેડીંગદ્રવ્યના વક્રીભવનાંક કરતાં _____ હોય છે.

(a) ઓછો (b) બરાબર (c) થોડો વધારે (d) થોડો ઓછો

પ્ર.૨ ટૂંકમાં જવાબ આપો.(ગમેતે દસ લખો) [૨૦]

(૧) ગોલિય વિપથન ની વ્યાખ્યા આપો

(૨) એક્રોમેસટીઝમ એટલે શું?

(૩) એસ્ટીગ્મેટીઝમ એટલે શું?

(૪) ન્યૂટનના વલયો કેમ વર્તુળાકાર હોય છે? ટૂંકમાં જણાવો.

(૫) વ્યતિકરણ મેળવવાની રીતો જણાવો.

(૬) ફેબ્રી- પેરોટ ઇન્ટરફેરોમીટર કઈરીતે માઇકલસન ઇન્ટરફેરોમીટર કરતા વધુ લાભદાયી છે?

(૭) દ્વિવક્રીભવન એટલે શું ?

(૮) માલસ ના નિયમ નુ કથન લખો.

(૯) ધ્રુવક અને વિશ્લેષક સમજાવો .

(૧૦) સમજાવો- કોર અને ક્લેડીંગ.

(૧૧) આંકીક મુખદર્પણ (ન્યુમેરીકલ એપર્ચર) એટલે શું ?

(પાનું ઉલટાવો)

(૧૨) ઓપ્ટીકલ ફાઇબર ના ગમે તે ચાર ઉપયોગો લખો.

પ્ર.૩ સમઅક્ષીય દગકાચ (COAXIAL LENS) ના તંત્ર માટે યોગ્ય આકૃતિ સહિત કાર્ડીનલ બિંદુઓ અને કાર્ડીનલ સમતલો ચર્ચો. [૧૦]

અથવા

પ્ર.૩ રામ્સડેન આઈપીસ ની રચના ચર્ચો અને તેના કાર્ડીનલ બિંદુઓ યોગ્ય આકૃતિ સહિત મેળવો તેમજ તેના ફાયદા તેમજ ગેરફાયદા જણાવો. [૧૦]

પ્ર.૪(a) ન્યૂટનના વલયો મેળવવાની પ્રાયોગિક રીત સમજાવો અને તેનાથી કેવી રીતે પ્રકાશની તરંગલંબાઇ નક્કી કરી શકાય ? [૬]

(b) વિવર્તન એટલે શું? ફ્રેસ્નલ વિવર્તન અને ફ્રોનહોફર વિવર્તન સમજાવો [૪]

અથવા

પ્ર.૪ (a) લોયડના અરીસાની રચના તેમજ કાર્ય વર્ણવો તેમજ લોયડના અરીસામાં અને બાયપ્રીઝમમાં મળતી વ્યતીકરણ શલાકાઓ સરખાવો. [૬]

(b) બાયપ્રીઝમ વડે પાતળી પારદર્શક તકતી ની જાડાઈ કેવી રીતે નક્કી કરી શકાય છે ? [૪]

પ્ર.૫ (a) સાબિત કરોકે પારગમિત ધ્રુવીભૂતપ્રકાશ ની તીવ્રતા આપાત અધ્રુવીભૂતપ્રકાશ ની તીવ્રતા કરતાં અડધી હોય છે. ($I = \frac{I_0}{2}$) [૬]

(b) એક અક્ષીય સ્ફટીકમાં થતાં દ્વીવક્રીભવન માટેની હ્યૂજન ની સમજુતી આપો. [૪]

અથવા

પ્ર.૫ (a) અધ્રુવીભૂતપ્રકાશ અનેધ્રુવીભૂતપ્રકાશ સમજાવી વિવિધ પ્રકારનાધ્રુવીભૂતપ્રકાશની સમજુતિ આપો. [૬]

(b) બ્રુસ્ટરના નિયમ ની ચર્ચા કરો. [૪]

પ્ર.૬ (a) સ્ટેપ ઇન્ડેક્સ ફાઇબરમાં ગતિ કરતા કિરણના ક્રાંતિકોણ નુ સૂત્ર ($\theta_C = \cos^{-1}\frac{n_2}{n_1}$) તારવો. [૬]

(b) ઓપ્ટીકલ ફાઇબરના ફાયદાઓ લખો. [૪]

અથવા

પ્ર.૬ (a) નોંધ લખો - (I) સ્ટેપ ઇન્ડેક્સ ફાઇબર (ii) ગ્રેડેડ ઇન્ડેક્ષ ફાઇબર [૬]

(b) ઓપ્ટીકલ ફાઇબર એટલે શું ?તેમજ તેના બંધારણ ની ચર્ચા કરો. [૪]

SEAT No._____ No. of Printed Pages : 02

[63&A-44] (Eng.)

SARDAR PATEL UNIVERSITY VALLABH VIDYANAGAR

B. Sc. 3rd SEMESTER EXAMINATION (CBCS) : NOVEMBER 2017

Subject: Physics | Title: Basic Solid State Electronics | Subject Code: US03CPHY02

Date: 20-11-2017 Monday | Time: 02:00 p.m. to 05:00 p.m. | Total Marks: 70

Q.1 Answer the following MCQs with correct option (Each of One Mark). (10)

1. For proper amplification, the position of the operating point on a load line should be ..... region.
   (a) near saturation (b) near cut-off (c) in middle of active (d) in cut-off.
2. With a fixed bias circuit if collector current is more than collector saturation current then the operating point will be in ..... region.
   (a) cut-off (b) saturation (c) active (d) near cut-off.
3. The..... bias circuit is also called as "voltage feedback bias circuit"?
   (a) collector to base (b) voltage-divider (c) fixed (d) emitter
4. Which of the following h-parameter defines input impedance of a CE transistor ?
   (a) h_{ie} (b) h_{re} (c) h_{fe} (d) h_{oe}
5. Which h-parameter of a CE transistor circuit is measured in Siemens?
   (a) h_{ie} (b) h_{oe} (c) h_{re} (d) h_{fe} .
6. Using series voltage negative feedback ..... can be increased.
   (a) harmonic distortion (b) noise (c) input impedance (d) gain
7. For positive feedback, the phase difference between the feedback signal and input signal must be of ..... degree.
   (a) zero (b) 180 (c) 90 (d) 270.
8. The emitter follower circuit offers ..... input impedance and ..... output impedance.
   (a) low, high (b) high, low (c) low, low (d) high, high,
9. Which oscillator uses capacitive-divider feedback circuit?
   (a) Hartley (b) Phase shift (c) Colpitts (d) Crystal
10. Hartley oscillator is a type of ..... Oscillator ?
    (a) phase shift (b) RC (c) Crystal (d) LC

Q-2 Answer any TEN questions in short (Each of two Mark) (20)

1. Why operating point shifts? Explain thermal run away of the transistor.
2. State requirements of a good biasing circuit.
3. Draw the circuit of collector to base bias circuit and state its feature.
4. For a CE transistor circuit at a certain fixed collector voltage, Δi_c is of 1 mA corresponding to Δi_b of 5 μA. Determine its current amplification factor.
5. State advantages of expressing gain of multistage amplifier in dB.
6. In a multistage amplifier with three identical stages, each stage is having a voltage gain of 100. Determine the overall gain of the amplifier in dB.
7. Why feedback is used in amplifiers?
8. Find the gain of a negative feedback amplifier with internal gain $A = 100$ and feedback factor $\beta = 0.1$.
9. Draw the labeled circuit of an Emitter follower.
10. State requirements of a feedback amplifier to become an oscillator.
11. Explain importance of RC oscillators.
12. Draw the labeled circuit of a Colpitts oscillator.

(P.T.O.)

Q-3 (a) What is Voltage divider biasing circuit? Explain determination of operating point of such circuit using approximate analysis method. (06)

(b) Draw the Voltage divider biasing circuit with $V_{CC} = 9V$, $R_1 = 40K\Omega$, $R_2 = 5K\Omega$, $R_E = 1K\Omega$ and $R_C = 5\ K\Omega$. Using necessary equations of approximate analysis method, determine V_B, I_E and V_{CE} of the circuit. (Given $V_{BE} = 0.3V$). (04)

OR

Q-3 (a) With suitable diagram explain determination of operating point of a Fixed bias circuit. Why this circuit is not much used? (06)

(b) What is an operating point? Using necessary diagram explain effect of operating point on the output signal when it is (i) near to cut-off region and (ii) near to saturation region. (04)

Q-4 (a) What are small signal amplifiers? Draw the circuit of a single stage CE amplifier and discuss function of each component. (06)

(b) Using equivalent circuit method develop ac equivalent circuit of a CE transistor. (04)

OR

Q-4 (a) Define h-(hybrid) parameters of a transistor and explain development of h-parameter equivalent circuit of a CE transistor. (06)

(b) Why multistage amplifier is required? Explain its voltage gain and decibel gain. (04)

Q-5 What is a feedback? Using block diagram explain various types of feedback with their features. Derive expression for voltage gain (A_f) of a series voltage negative feedback amplifier in terms of its internal gain (A). (10)

OR

Q-5 State advantages of negative feedback and discuss the effect of negative feedback on (i) gain and its stablility (ii) distortion & noise and (ii) bandwidth of an amplifier. (10)

Q-6 (a) What is an oscillator circuit? Explain construction and working of Hartley oscillator. State its features. (06)

(b) Write a note on Phase shift oscillator. (04)

OR

Q-6 (a) Explain principle of Wein bridge oscillator and explain its working. (06)

(b) What is a Crystal oscillator? State its features. What is piezoelectric effect? State features of various types of crystals employed in oscillator circuits. (04)

SEAT No._____ No. of Pages : 02

[634A-UU] (Guj.) **SARDAR PATEL UNIVERSITY VALLABH VIDYANAGAR**

B. Sc. 3rd SEMESTER EXAMINATION (CBCS) : NOVEMBER 2017

Subject: Physics **Title: Basic Solid State Electronics** **Subject Code: US03CPHY02**

Date: 20-11-2017 Monday **Time: 02:00 p.m. to 05:00 p.m.** **Total Marks: 70**

Q.1 નીચેના બહુવિકલ્પી પ્રશ્નો ના સાચા વિકલ્પ થી જવાબ આપો. (દરેક નો 1 ગુણ). (10)

1. યોગ્ય એમ્પ્લીફિકેશન માટે ઓપરેટીંગ પોઇંટનું સ્થાન લોડલાઇન પર ..... હોવુ જોઇએ.
   (a) સેચ્યુરેશન વિસ્તાર નજીક (b) કટ-ઓફ્ વિસ્તાર નજીક
   (c) એક્ટિવ વિસ્તારની મધ્યમાં (d) કટ-ઓફ્ વિસ્તારમાં
2. ફિક્સ્ બાયસ પરિપથ(circuit) માં, જો કલેક્ટર પ્રવાહ કલેક્ટર સેચ્યુરેશન પ્રવાહ કરતાં વધારે હોય, તો ઓપરેટીંગ પોઇંટ ..... માં હશે.
   (a) કટ-ઓફ્ વિસ્તાર (b) સેચ્યુરેશન વિસ્તાર (c) એક્ટિવ વિસ્તાર (d) કટ-ઓફ્ વિસ્તાર નજીક
3. ..... બાયસ પરિપથ "વોલ્ટેજ ફિડબેક બાયસ પરિપથ" તરીકે પણ ઓળખાય છે.
   (a) કલેક્ટરટુ બેઝ (b) વોલ્ટેજ ડિવાઇડર (c) ફિક્સ્ (d) એમિટર
4. નીચેના માંથી ક્યો h-પેરામીટર CE ટ્રાંઝિસ્ટર માટે ઇનપુટ ઇમ્પેડેંસ ને વ્યાખ્યાયીત કરે છે?
   (a) h_{ie} (b) h_{re} (c) h_{fe} (d) h_{oc}
5. CE ટ્રાંઝિસ્ટર માટે ક્યો h-પેરામીટર સિમેંસ મા મપાય છે?
   (a) h_{ic} (b) h_{oc} (c) h_{re} (d) h_{fe} .
6. શ્રેણી વોલ્ટેજ નેગેટીવ ફિડબેકનો ઉપયોગ કરીને ..... વધારી શકાય.
   (a) હાર્મોનિક ડિસ્ટોર્શન (b) નોઇસ (c) ઇનપુટ ઇમ્પેડેંસ (d) ગેઇન
7. પોઝીટીવ ફિડબેક માટે ફિડબેક સિગ્નલ અને ઇનપુટ સિગ્નલ વચ્ચે કળા તફાવત .... ડીગ્રી નો હોવો જોઇએ.
   (a) શુન્ય (b) 180 (c) 90 (d) 270.
8. એમિટર ફોલોઅર પરિપથ ..... ઇનપુટ ઇમ્પેડેંસ અને ..... આઉટપુટ ઇમ્પેડેંસ આપે છે.
   (a) નીચો(low), ઉંચો(high) (b) ઉંચો(high), નીચો(low)
   (c) નીચો(low), નીચો(low) (d) ઉંચો(high), ઉંચો(high)
9. કયા ઓસ્સિલેટર (oscillator) માં કેપેસિટીવ-ડિવાઇડર ફિડબેક પરિપથ વપરાય છે?
   (a) હાર્ટલે(Hartley) (b) ફેઝ શિફ્ટ(Phase shift) (c) કોલ્પિટ્સ(Colpitts) (d) ક્રિસ્ટલ(Crystal)
10. હાર્ટલે(Hartley) ઓસ્સિલેટર એ ..... પ્રકારનું ઓસ્સિલેટર છે?
    (a) ફેઝ શિફ્ટ(Phase shift) (b) RC (c)) ક્રિસ્ટલ(Crystal) (d) LC

Q-2 કોઇ પણ 10 પ્રશ્નો ના ટુંકમાં જવાબ આપો. (દરેક ના 2 ગુણ). (20)

1. ઓપરેટીંગ પોઇંટ કેમ ખસે(shifts) છે? ટ્રાંસિસ્ટર માટે થર્મલ રન અવે (thermal run away) સમજાવો.
2. સારા બાયસિંગ પરિપથની જરુરીયાતો (requirements) જણાવો.
3. કલેક્ટરટુ બેઝ બાયસ પરિપથ દોરો અને તેની લાક્ષણિકતા જણાવો.
4. કોઇ CE ટ્રાંઝિસ્ટર પરિપથમાં, કોઇ ચોક્કસ કલેક્ટર વોલ્ટેજ માટે 5 µA ના Δi_b માટે 1 mA નો Δi_c છે. તેનો પ્રવાહ એમ્પ્લીફિકેશન ફેક્ટર (current amplification factor) નક્કી કરો.
5. મલ્ટીસ્ટેજ એમ્પ્લીફાયર ના ગેઇન ને dB માં દર્શાવવાના ફાયદા જણાવો.
6. ત્રણ એક સરખા સ્ટેજ ના બનેલા મલ્ટીસ્ટેજ એમ્પ્લીફાયર ના પ્રત્યેક સ્ટેજ નો ગેઇન 100 છે. આ એમ્પ્લીફાયરનો કુલ ગેઇન dB માં નક્કી કરો.
7. એમ્પ્લીફાયરમાં ફિડબેક નો ઉપયોગ કેમ થાય છે?
8. આંતરિક(internal) ગેઇન $A = 100$ અને ફિડબેક ફેક્ટર $\beta = 0.1$ ધરાવતા નેગેટીવ ફિડબેક એમ્પ્લીફાયરનો ગેઇન શોધો.

(P.T.O.)

9. એમિટર ફોલોઅર (emitter follower) પરિપથ નામ નિર્દેશસહિત દોરો.

10. ફિડબેક એમ્પ્લીફાયરને ઓસ્સિલેટર બનવા માટેની જરુરીયાતો (requirements) જણાવો.

11. RC ઓસ્સિલેટર્સની અગત્યતા સમજાવો.

12. નામ નિર્દેશસહિત કોલ્પિટ્સ(Colpitts) ઓસ્સિલેટર નો પરિપથ દોરો.

Q-3 (a) વોલ્ટેજ ડિવાઇડર બાયસિંગ પરિપથ શું છે? આવા પરિપથનું ઓપરેટીંગ પોઇંટ એપ્રોક્ષિમેટ પૃથ્થકરણ પધ્ધતિ (approximate analysis method) થી કેવી રીતે નક્કિ થાય તે સમજાવો. (06)

(b) જેમાં $V_{CC} = 9V$, $R_1 = 40K\Omega$, $R_2 = 5K\Omega$, $R_E = 1K\Omega$ and $R_C = 5\ K\Omega$ હોય તેવો વોલ્ટેજ ડિવાઇડર બાયસિંગ પરિપથ દોરો. એપ્રોક્ષિમેટ પૃથ્થકરણ પધ્ધતિનાં જરુરી સમિકરણોનો ઉપયોગ કરી પરિપથના V_B, I_E અને V_{CE} નક્કી કરો. (આપેલ $V_{BE} = 0.3V$). (04)

અથવા

Q-3 (a) યોગ્ય ડાયાગ્રામ વડે ફિક્સ બાયસ પરિપથ(fixed bias circuit) નું ઓપરેટીંગ પોઇંટ નક્કી કરવાનું સમજાવો. આ પરિપથ, કેમ વધારે ઉપયોગમાં લેવાતો નથી? (06)

(b) ઓપરેટીંગ પોઇંટ શું છે? યોગ્ય ડાયાગ્રામ વડે ઓપરેટીંગ પોઇંટ જ્યારે (i)કટ-ઓફ્ વિસ્તારની નજીક હોય અને (ii) સેચ્યુરેશન વિસ્તારની નજીક હોય, ત્યારે તેની આઉટ્પુટ સિગ્નલ પર થતી અસરો સમજાવો, . (04)

Q-4 (a) સ્મોલ સિગ્નલ એમ્પ્લીફાયર્સ શું છે? સિંગલ સ્ટેજ CE એમ્પ્લીફાયર પરિપથ દોરી તેના દરેક ઘટકો ના કાર્યો ચર્ચો. (06)

(b) સમતુલ્ય પરિપથ પધ્ધતી(equivalent circuit method)નો ઉપયોગ કરી CE ટ્રાંઝિસ્ટર નો ac સમતુલ્ય પરિપથ (ac equivalent circuit) મેળવો. (04)

અથવા

Q-4 (a) ટ્રાંઝિસ્ટરના h-પેરામીટર્સ વ્યખ્યાયિત કરો અને CE ટ્રાંઝિસ્ટર માટે h-પેરામીટર્સ સમતુલ્ય પરિપથ (equivalent circuit) મેળવો. (06)

(b) મલ્ટીસ્ટેજ એમ્પ્લીફાયરની કેમ જરુર પડે છે? તેનો વોલ્ટેજ ગેઇન અને ડેસિબેલ ગેઇન સમજાવો. (04)

Q-5 ફિડબેક શું છે? બ્લોક ડાયગ્રામ થી વિવિધ પ્રકારના ફિડબેક તેમની લાક્ષણિકતઓ સાથે સમજાવો. (10)
શ્રેણી વોલ્ટેજ નેગેટીવ ફિડબેક એમ્પ્લીફાયર ના વોલ્ટેજ ગેઇન (A_f) માટે નુ સુત્ર તેના આંતરિક(internal) ગેઇન (A) ના સ્વરુપ માં મેળવો.

અથવા

Q-5 નેગેટીવ ફિડબેક ના ફાયદાઓ જણાવો અને નેગેટીવ ફિડબેકની એમ્પ્લીફાયરના (i) ગેઇન અને તેની સ્થીરતા (stablility) (ii) ડિસ્ટોર્શન & નોઇસ અને (iii) બેંડવિડ્થ પર થતી અસર ચર્ચો. (10)

Q-6 (a) ઓસ્સિલેટર પરિપથ શું છે? હાર્ટલે(Hartley) ઓસ્સિલેટર ની રચના અને કાર્ય સમજાવો. તેની લાક્ષણિકતાઓ જણાવો. (06)

(b) ફેઝ શિફ્ટ(Phase shift) ઓસ્સિલેટર પર ટુંક નોંધ લખો. (04)

અથવા

Q-6 (a) વેન બ્રિજ(Wien bridge) ઓસ્સિલેટર નો સિધ્ધાંત સમજાવો અને તેનું કાર્ય સમજાવો. (06)

(b) ક્રિસ્ટલ(Crystal) ઓસ્સિલેટર શું છે? તેની લાક્ષણિકતાઓ જણાવો. પિઝોઇલેક્ટ્રિક (piezoelectric) અસર શું છે? ઓસ્સિલેટર પરિપથમાં વપરાતા વિવિધ પ્રકારના ક્રિસ્ટલ્સના લક્ષણો જણાવો. (04)

Seat : ____ No. of printed pages : 02

[A-46] **SARDAR PATEL UNIVERSITY**

Third Semester B. Sc. Examination (NC)(Batch- 2010)

Monday,20th November, 2017

Time: From 02:00 to 05:00 PM

Subject: PHYSICS [**US03CPHY02**]

Title: Solid State Physics, Thermodynamics and Wave oscillation

Total Marks 70

N.B:**(i)All the symbols have their usual meanings.**
(ii) Figures at the right side of questions indicate full marks.

Que.1 **Choose the correct option for the following questions.** **[10]**

1 The lattice parameters for a orthorhombic crystal system is
(a) $a \neq b \neq c$, $\alpha = \beta = \gamma = 90^\circ$ (b) $a=b=c$, $\alpha \neq \beta = \gamma = 90^\circ$
(c) $a=b=c$, $\alpha \neq \beta \neq \gamma \neq 90^\circ$ (d) $a=b=c$, $\alpha = \beta = \gamma \neq 90^\circ$

2 The number of atoms present in the unit cell of fcc structure is
(a) 4 (b) 2 (c) 6 (d) 8

3 The atomic packing factor of simple cubic crystal structure is _____ %.
(a) 52 (b) 56 (c) 60 (d) 64

4 The full form for bcc is _____ .
(a) body centered cubic (b) base centered cubic
(c) body circle cubic (d) body centered circle

5 Radiation is one of the method through which _____ is transmitted.
(a) protons (b) electrons (c) heat (d) neutron

6 Amount of transmitted heat is directly proportional to _____difference.
(a) temperature (b) pressure (c) volume (d) density

7 According to Stefan's law the rate of emission of radiant energy is proportional to _____.
(a) T^4 (b) T^2 (c) T (d) P^4

8 A resistive force proportional to the amplitude and independent of the frequency in solid is referred to as _____
(a) coulomb friction (b) viscous
(c)structural damping (d)none of this

9 For _____ case, the reactance in the series LCR circuit is predominantly inductive.
(a) $\omega < \omega o$ (b) $\omega > \omega o$ (c) $\omega \leq \omega o$ (d) $\omega = \omega o$

10 The dark lines in the solar spectrum are called _____lines
(a) Fraunhofer (b) Raman (c) Emission (d) All above these

Que.2 **Answer *briefly* any Six of the following questions.** **[12]**

1 Define the terms: Unit cell and Primitive cell.
2 Explain the terms: (i) Coordination number and (ii) Atomic packing factor.
3 Show the [110] and [010] directions in the cubic crystals.
4 Draw the structure of NaCl.
5 Define conduction and convection of heat.
6 State Kirchhoff's law of radiation.
7 Obtain relation between the logarithmic decrement, relaxation time and duality factor.
8 Discuss in brief Nuclear Magnetic Resonance.

(P.T.O.)

Que.3	a	Explain the different crystal systems with necessary figures.	[05]
	b	Define the terms: 1. Lattice 2. Crystal structure 3. Basis.	[03]
		OR	
Que.3	a	Show that the APF for hcp structure is 0.74.	[05]
	b	Calculate the APF for simple cubic structure.	[03]
Que.4	a	With suitable figure, explain procedure to determine Miller indices of a plane.	[05]
	b	Draw the following crystal planes and in the unit cell. 1. (100) 2. (002).	[03]
		OR	
Que.4	a	Discuss the powder method to record the diffracted rays.	[05]
	b	State and explain Braggs' law of diffraction.	[03]
Que.5	a	Discuss the method of determination of thermal conductivity of rubber tube.	[05]
	b	Draw a schematic diagram of Lee-Charlton's Method to determine thermal conductivity of a card board.	[03]
		OR	
Que.5	a	Discuss the Searle's method to determine thermal conductivity of a metal rod.	[05]
	b	Obtain the expression for heat transfer Q and define coefficient of thermal conductivity K.	[03]
Que.6	a	State Stefan-Boltzmann's law and give mathematical proof of it.	[05]
	b	Draw the neat diagram of disappearing filament optical pyrometer.	[03]
		OR	
Que.6	a	Explain in detail the laboratory method for the determination of Stefan's constant.	[05]
	b	Draw the labeled diagram of total radiation pyrometer.	[03]
Que.7		Derive the differential equation of the damping oscillator of a system having one degree of freedom with suitable diagram.	[08]
		OR	
Que.7		Derive the equation for total energy of a weakly damped oscillator and also discuss the average power dissipation during one time period.	[08]
Que.8		Using the example of moving coil Galvanometer and LCR circuit, explain mechanical damping and electromagnetic damping.	[08]
		OR	
Que.8		What are forced oscillations? Discuss the forced oscillations of a one-dimensional damped oscillator and obtain its general solution.	[08]

SEAT No._____ No. of Printed Pages : 03

[A-44]

Sardar Patel University

B.Sc. Semester-III (NC – 2010 Batch) Examination

Saturday, 18th November, 2017

Course Code: USC03CSTA01

(Descriptive Statistics)

Time: 2 to 5 p.m M.Marks: 70

Note: (i) Simple/Scientific calculator is allowed. (ii) Graph paper will be provided on request.
(iii) Figures to the right indicate marks. (iv) Q.3 to 8 each sub question have 4 marks

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Q.1 Multiple Choice Questions (10×1)

(1) Extreme value have no effect on
(a) Median (b) Harmonic Mean (c) Geometric Mean (d) Arithmetic Mean

(2) If Laspeyre's price index is 324 and Paasche's price index is 144, then Fisher's index is
(a) 180 (b) 234 (c) 216 (d) Not possible

(3) The mean of 50 observations is 36. If two observations 30 and 42 are removed then the mean of remaining observations is
(a) 58 (b) 48 (c) 38 (d) 36

(4) Index number reveal the state of
(a) Inflation (b) Deflation (c) Inflation/deflation both (d) None of these

(5) Mean deviation which is calculated is minimum at
(a) Mean (b) Median (c) Mode (d) All of these

(6) The base period should be _____
(a) Abnormal (b) Normal (c) Current year (d) None of these

(7) The standard deviation of observations 31, 32, ...,47 is _____
(a) $2\sqrt{6}$ (b) $4\sqrt{3}$ (c) $\sqrt{\frac{17}{12}}$ (d) $\sqrt{\frac{47^2-1}{12}}$

(8) In a five number summary, which of the following is used for data summarization?
(a) the largest value (b) P_{25} (c) the median (d) All of these

(9) What is the denominator in GFR (General Fertility Rate)
(a) Married women (b) Married women in reproductive age
(c) Women in child bearing age (d) All women

(10) The mode of frequency distribution can be determined graphically with the help of
(a) Frequency curve (b) Frequency polygon (c) Ogives (d) Histogram

Q.2 Short Type Questions (Attempt Any Six) (6×2)

(1) Explain the concept of (i) positive skewness (ii) negative skewness by sketching suitable diagrams locating measures of central tendency.

(2) State the various measures of mortality. According to you, which measure is most suitable for studying mortality among the people of various religions?

(3) With respect to index number, write down the characteristics of base year.

(4) Draw Box-plot for the data given below:

18, 27, 34, 52, 54, 59, 61, 68, 78, 82, 85, 87, 91, 93, 100

(5) For two numbers prove that

$G.M = \sqrt{A.M \times H.M}$

Is the result hold true for any n numbers?

(6) From the following series of data, calculate Inter Quartile Range (IQR)

(P.T.O.)

4, 8, 12, 16... 996

(7) List out the various measures of mortality. For comparing mortality of two populations which measure of mortality do you recommend? Name and define it.

(8) For two numbers 3 and 5 show that $SD = \frac{1}{2}(Range)$

Q.3 (a) If each observations is increased by 4 then mean will

(a) remains the same (b) be increased by 4

(c) be decreased by 4 (d) be 4 times of the original

State and prove the result you have used to answer the above.

(b) The weights of coffee in 70 jars is shown in the following table:

Weight (in gms)	200 - 201	201 - 202	202 - 203	203 - 204	204 - 205	205 - 206
No. of jars	13	27	18	10	1	1

Is the given distribution symmetrical? Justify your answer by calculating most suitable statistical measure.

OR

Q.3 (a) State the various properties of mean. Prove any one of them.

(b) Prove that the weighted mean of first n natural numbers whose weights are equal to the corresponding number is equal to $\frac{(2n+1)}{3}$

Q.4 (a) The sum of squares of deviations is least (minimum) when measured from

(a) Mean (b) Median (c) Mode (d) All of the above

Choose most suitable one and prove the same.

(b) Two groups with n_1 and n_2 observations having mean $\overline{X_1}$ and $\overline{X_2}$, standard deviations S_1 and S_2 respectively. Derive the formula for combined standard deviation in each of the following cases:

$(i)\ \overline{X_1} = \overline{X_2}$ $(ii)\ n_1 = n_2$

$(iii)\ n_1 = n_2\ and\ \overline{X_1} = \overline{X_2}$ $(iv) n_1 = n_2\ and\ \overline{X_1} = \overline{X_2}\ and\ S_1 = S_2$

OR

Q.4 (a) In usual notation, Prove that

$$S^2 = \frac{n_1 s_1^{\,2} + n_2 d_1^{\,2} + n_2 s_2^{\,2} + n_2 d_2^{\,2}}{n_1 + n_2} \text{ where } d_1 = \overline{X_1} - \overline{X},\ d_2 = \overline{X_2} - \overline{X},\ \overline{X} = \frac{n_1\overline{X_1} + n_2\overline{X_2}}{n_1 + n_2}$$

(b) The following table gives the frequency distribution of the marks of 800 candidates in an examination.

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of students	50	220	300	170	60

Find (i) Quartile deviation (Q.D) (ii) if the passing standard is 45%, find the result.

Q.5 (a) Define moments. Establish the relationship between the moments about mean in terms of moments about any arbitrary point. The first three moments of a distribution about the value 2 are 1, 22 and 10. Find its mean, standard deviation and moment measure of skewness.

(b) The mean and variance of 5 observations are 4.4 and 8.24 respectively. If 3 of the observations are 1, 2 and 6. Find the remaining two observations.

OR

Q.5 (a) In what respect is the weighted mean superior to the simple mean?

(b) The daily expenditure of 100 families are given below:

Daily Expenditure(Rs.)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of families	13	?	27	?	16

If the mode of the distribution is 44, calculate Karl-Pearson's coefficient of skewness.

Q.6 (a) Describe in brief about the problems and precautions in the construction of index numbers.

(b) If $L(p)$ and $P(q)$ represent respectively Laspeyre's index number for prices and Paasche's index number for quantities, show that $\frac{L(p)}{L(q)} = \frac{P(p)}{P(q)}$

OR

Q.6 (a) Verify whether the following formulae satisfy Factor reversal test:
(i) Laspeyre (ii) Paashe (iii) Fisher

(b) What is an index number? State its importance.

Q.7 (a) Write a note on infant Mortality Rate (IMR).

(b) From the following data:
Calculate (i) the Crude death rates (ii) Age- specific death rates (iii) the standardized death rates. Comment on your findings.

Age-group	Town A		Town B		Standard Population	
	Population	No. of deaths	Population	No. of deaths	Population	No. of deaths
< 10	4215	36	3240	30	2200	60
10-25	12050	46	20010	100	8040	8
25-60	6372	60	4175	48	6100	4
≥ 60	8020	152	2980	60	4080	50

OR

Q.7 (a) Write a note on Age Specific Death Rate (ASDR)

(b) Following are the data regarding population and deaths by age in 1970 for white females in Miami, Alaska and US:

Age group	Miami		Alaska		US	
	Population	No. of deaths	Population	No. of deaths	Population	No. of deaths
< 15	1,14,350	136	37,164	59	23,961	32
15 – 24	80,259	57	20,036	18	15,420	9
25 – 44	1,33,440	208	32,693	37	21,353	30
45 - 64	1,42,670	1,016	14,947	90	19,609	14
65 +	92,168	3,605	2,077	81	10,685	52

Calculate STDR of Miami and Alaska considering the population of US as standard population.

Q.8 (a) State the various measures of Fertility. Explain any one of them.

(b) The following are the fertility rates in Rajasthan in various age groups of women of child bearing age for the census year 1981.

Age group	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
Fertility rate	73	270	290	237	166	93	40

Calculate TFR and comment on it.

OR

Q.8 (a) What is General Fertility Rate (GFR) and how can it be determined?

(b) The following data pertaining to the female population and number of live births in different age groups of reproductive age. Calculate the general and specific fertility rates. Comment on your findings.

Age group	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44
Female population	29,240	24,565	21,138	18,319	15,661	13,035
No. of live births	2,046	6,313	5,792	4,048	2,380	1,094

X

SEAT No._____ No. of Pages : 04

[564 A-41] SARDAR PATEL UNIVERSITY

B.Sc. Semester – III Examinations

18th November 2017

Saturday

Course Code: - US03CSTA01

(Descriptive Statistics)

Time:- 2:00 P.M. to 5:00 P.M. Marks: - 70

Note: - Simple/ Scientific calculator is allowed.

Q.1. Select an appropriate answer for the given choice. [10]

1. The second Quartile = 5th Deciles = 50th Percentiles=_____.
   a) Median b) Mode c) A.M. d) G.M.
2. Shreya has received the following grades on her first 4 Math tests: 77, 83, 81 and 78. The grade must she receive on her 5th test to have an average of 80 in the class_____.
   a) 80 b) 84 c) 81 d) 79
3. Median between X1, X2, X3,.....,X11(all arrange in ascending order) is _____.
   a) X6 b) X5 c) X7 d) X11
4. The standard deviation of symmetrical distribution is 3. __ must be the value of the 4th moment about the mean in order that the distribution be mesokurtic.
   a) 1875 b) 243 c)244 d)245
5. In case of open end classes, an appropriate measure of dispersion to be used is___
   a) Median b) Mode c) Quartile deviations d) Standard deviation.
6. If an index of kurtosis is -2.89, then_____.
   a) the curve is relatively flat. b) there is a mistake in the calculation. c) the curve is relatively steep. d) none of these
7. Base period for an index number should be_____.
   a)A year only b) A normal period c)A period at distant past d) None of these
8. Laspeyre's index formula uses the weights as _____.
   a) Base period b) Current year c) Average of the weights of a number of years. d) None of these
9. The death rate obtained for a segment of a population is known as_____.
   a)age-specific death rate b) crude death rate c)standardized rate d) Vital index.
10. Crude death rate, expressed simply as a ratio, provides_____.
    a) the probability of babies born and died during the year b) the probability of a fetal during the year. c)the probability of a person dying during the year. d) all of above

(P.T.O.)

Q.2. Attempt any **Ten** questions from the following questions:- [20]

1. What is the weighted mean of first 10 natural numbers whose weights are equal to the corresponding number?
2. A man having to drive 90 kms wishes to achieve an average speed of 30 kmph. For the first half of the journey his average speed is only 20 kmph. What must be his average for the second half of the second half of the journey if his overall average speed is 30 kmph?
3. What do you mean by measures of central tendency? Write down the characteristics of ideal measures of central tendency.
4. Explain the meaning of skewness.
5. Explain the concept of (i) positive skewness (ii) negative skewness by sketching suitable diagrams locating measures of central tendency.
6. Express raw moments in terms of central moments.
7. What are Factor reversal Test and Time reversal test?
8. Does Laspeyre's index numbers satisfies Time Reversal test?
9. What is Index numbers? State its uses.
10. What is Vital statistics?
11. What events are covered under vital Statistics? What are the various uses of vital statistics for a country?
12. Define crude death rate and point out its limitations.

Q.3.(a) Weights of the students (in kgs.) are recorded by a machine as under. [03]

49	57	50	55	61	54	59	64	58	56

If the weighing machine shows weight more by 3 kg, find the correct values of standard deviation without calculating the correct weights. State clearly, the results which you have applied.

(b) The following table gives the frequency distribution of the marks of 800 candidates in an examination. [07]

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	50	220	300	170	60

Determine (i) Median

(ii) the no. of students having marks:

(a)less than 40 (b) between 45 to 80 (c) more than 75.

(iii) if it is desired to have 75% result, what grace marks a student be given?

OR

Q.3.(a) Income of employees in an industry given below. The total income of the 10 employees in the class over Rs. 2500 is Rs. 30000. Compute the mean income. Every employee belonging to the top 25% of the earners is required to pay 5% of his income to workers relief fund. What should be the total contribution to this fund? [07]

Monthly Income	0-500	500-1000	1000-1500	1500-2000	2000-2500	2500>
No. of workers	90	150	100	80	70	10

(b) Calculate the missing frequency from the following data. If the Median for the given data is 135. [03]

Weights(lbs)	Under 119	119-129	129-139	139-149	149 & above
No. of persons	15	-	266	96	17

Q.4.(a) In usual notation, Prove that [05]

$$S^2 = \frac{\sum_{i=1}^{k} ni(Si^2 + di^2)}{\sum_{i=1}^{k} ni}, \text{ where } di = Xi - \bar{X},\ i = 1,2,\ldots,k \quad \bar{X} = \frac{\sum_{i=1}^{k} ni\bar{X}i}{\sum_{i=1}^{k} ni}$$

(b) Following is the frequency distribution of systolic B.P. of 100 low-birth weight infants .Is the distribution symmetrical? Justify your answer by calculating a suitable statistical measure. [05]

Systolic b.p.(mmHg)	10-20	20-30	30-40	40-50	50-60
No. of infants	1	2	5	3	1

OR

Q.4.(a) State the various methods to determine skewness and its coefficient. Explain any one of them. [05]

(b) A study was conducted comparing female adolescents who suffer from bulimia to healthy females with similar body compositions and levels of physical activity. Listed below are measures of daily caloric intake, recorded in kilocalories per kilogram of samples of adolescents from each group. Draw Box- and – Whisker plot for both the groups and comment on it. [05]

Daily caloric intake Kcal/kg)					
Bulimic			Healthy		
15.9	18.9	25.1	20.7	30.6	23.1
16.0	19.6	25.2	22.4	33.2	23.8
16.5	21.5	25.6	25.3	25.7	24.5
17.0			30.6		

Q.5.(a) DOC Company produces and sells four types of electric appliances. The prices and quantities in 2009 and 2010 are shown below: Calculate Laspeyre's , Passche's and Fisher's price index number for DOC Company, using 2009 as the base period: [05]

	2009		2017	
Type	Price (Rs)	Quantity	Price (Rs)	Quantity
Radio	100	20	120	15
Toaster	200	40	250	25
Clock	130	30	130	50
Hair dryer	225	10	250	10

(b) What is the difference between Laspeyre's and Passche's system of weights in compiling a price index? Calculate Fisher's Index number for the data given below. [05]

	Quantity (units)		Value (Rs.)	
Type	2005	2017	2005	2017
A	100	150	500	900
B	80	100	320	500
C	60	72	120	360
D	30	33	360	297

(P.T.O.)

OR

Q.5.(a) Examine whether Fisher's satisfy Time reversal test for the given data? [05]

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	6.5	500	10.8	560
B	2.8	124	2.9	148
C	4.7	69	8.2	78
D	10.9	38	13.4	24
E	8.6	49	10.8	27

(b) Calculate Laspeyre's, Passche's and Fisher's quantity index number for the data given in Q.5.(a). [05]

Q.6.(a) What are the measures of mortality to express death rates? State the measures of mortality. Explain any one of them. [05]

(b) Explain methods of collection of vital statistics. [05]

OR

Q.6. Calculate (i) Crude Death Rate (ii) Age-specific Death Rate (iii) Standardized Death Rate taking the population of Town-A as standard population and compare their health conditions. [10]

Age groups	Town- A		Town- B	
	Population	No. of Death	Population	No. of Death
< 5	6040	215	9300	390
5-15	12640	240	15410	250
15-35	13300	300	18620	330
35-50	4620	360	8140	790
>50	6710	460	6490	590

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SEAT No._____ No. of Printed Pages : 03

[A-32]

Sardar Patel University

B.Sc. Semester - III Examination (NC – 2010 Batch)

Friday, 24th November, 2017

Time: 2 *to* 5 p.m Course Code: US03CSTA02 M.Marks: 70

(Elements of Probability Theory)

Note: (*i*) Simple/Scientific calculator is allowed. (*ii*) Graph paper will be provided on request.

(*iii*) Figures to the right indicate marks. (*iv*) Q.3 to 8 each sub question have 4 marks

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Q.1 Multiple Choice Questions (10×1)

(1) If $P(A)=\frac{1}{4}, P(B)=\frac{2}{5}$ and $P(A\cup B)=\frac{1}{2}$ then $P(A^c\cup B^c)=$ _____

(a) 0.50 (b) 0.58 (c) 0.80 (d) 0.85

(2) If K is a constant then $E(K)$ will be

(a) 0 (b) K (c) ∞ (d) cannot be determined

(3) If a r.v. X has mean 3 and standard deviation 4. The variance of the r.v. $Y=2X+5$ is

(a) 16 (b) 64 (c) 32 (d) 6

(4) If $f(x)=3x^2, 0<x<1$

$=0$, otherwise, is the p.d.f. of a random variable X then $P\left(X\le\frac{1}{4}\right)=$ _____

(a) 1 (b) $\left(\frac{1}{4}\right)^3$ (c) 0 (d) $\left(\frac{3}{4}\right)^3$

(5) The joint p.d.f. of X and Y is

$f(x,y)=\frac{xy}{4}, 0<x<2, 0<y<2$ *and zero otherwise*

Then the value of $P(0<X<1\cap 1<Y<2)=$ _____

(a) $\frac{1}{16}$ (b) $\frac{2}{16}$ (c) $\frac{3}{16}$ (d) $\frac{5}{16}$

(6) A box contains 6 red and 4 black balls. Two balls are drawn from this box. The probability that both are of the same colours = _____

(a) 20/45 (b) 21/45 (c) 6/10 (d) 4/10

(7) If $f(x)=\frac{1}{4}, -2<x<2$

$=0$, otherwise, is the p.d.f. of a random variable X, then $P(X=1)=$ _____

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) 0 (d) 1

(8) The joint p.d.f of X and Y is

$f(x,y)=k(x+3y), 0<x<1, 0<y<1$ *and zero otherwise*

Then the value of $k=$ _____

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{8}$

(9) If $M_x(t)=e^{2(e^t-1)}$ is the m.g.f of a random variable X then mean = _____

(a) 1 (b) 2 (c) 3 (d) 4

(10) For two independent events A and B, $P(A^c/B)$ is

(a) 0 (b) $\frac{1-P(A)}{P(B)}$ (c) $\frac{P(B)-P(A)}{P(B)}$ (d) $1-P(A)$

Q.2 Short Type Questions **(Attempt Any Six)** (6×2)

(1) Check whether the following function is p.m.f. or not?

$f(x)=\frac{1}{2x}, x=1,2,\ldots$ *and zero otherwise*

(2) Determine the constant 'C' so that $f(x)$ being p.m.f. of a r.v. X

$f(x)=C(1+x)^2, x=0,1,2,3.$ *and zero otherwise*

(3) Consider the joint probability distribution of X and Y is

(P.T.O.)

Y	X	
	0	1
0	0.2	0.4
1	0.3	0.1

Compute $V(X-Y)$

(4) If $f(x)=\frac{x}{21}, x=1,2,\ldots 6$
$=0$, otherwise is the p.m.f. of a r.v. X then find $V(3X+1)$

(5) The joint p.d.f of X and Y is
$f(x,y)=k(x+3y), 0<x<1, 0<y<1$ *and zero otherwise*
(i) Determine the value of k (ii) the marginal distribution of X

(6) If A and B are two independent events then prove that A' and B' are also independent.

(7) Find the m.g.f of X if $f(x)=\frac{1}{8}(x+1), 2<x<4$

(8) Write an appropriate sample space for the following random experiment
(i) Throwing (rolling) of two dice (ii) Throwing of three coins

Q.3(a) State and prove additive law of probability for two events. Using this prove that $P(A^c)=1-P(A)$

(b) Probability of solving specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If try to solve the problem independently, find the probability that (i) the problem is solved (ii) exactly one of them solves the problem.

OR

Q.3 (a) In a lottery of 25 tickets numbered from 1 to 25, two tickets are drawn simultaneously.
Find the probability that (i) One ticket (ii) at least one (iii) both, the tickets drawn has/have prime numbers

(b) The following are the composition of flowers in two baskets:
Basket – I : 5 Pink, 2 White and 3 Yellow flowers Basket – II : 7 Pink and 3 White flowers
A basket is selected at random then a flower is chosen from selected basket.
(i) What is the probability that a white flower will be chosen?
(ii) Given that flower chosen is white, find the probability that it is come from Basket – II.

Q.4 (a) Consider the experiment of tossing of three unbiased coins. Let the random variable X denote the number of tails. Find the p.m.f and c.d.f. of X.

(b) Given that $f(x)=K\left(\frac{1}{2}\right)^x, x=0,1,2,\ldots 6$ *and zero otherwise*, is the probability distribution of X. Find K and c.d.f of X.

OR

Q.4 (a) If $P(A_i)=p, i=1,2,3$ and they are independent. Find the probability that (i) At least one (ii) exactly two (iii) all the three, events, occurs.

(b) A continuous r.v. X has pdf

$$f(x)=\begin{cases}\frac{x}{3}, 0\le x<1\\ \frac{5}{27}(4-x), 1\le x<4\\ 0\ ,\ otherwise\end{cases}$$

(i) Find the distribution function of X (ii) $P(X>2)$

Q.5 (a) The pdf of a r.v. X is $f(x)=k(1-x), 0<x<1$ *and zero otherwise*
Determine (i) the value of K (ii) Inter Quartile Range (IQR)

(b) A r.v. X has the following probability mass function:

x	1	2	3	4	5	6	7	8
$P(X=x)$	k	k	$3k$	$2k$	k^2+k	$2k^2$	$4k^2+k$	$3k^2$

(i) *Find* k (ii) the c.d.f. of X (iii) for which value of k, $P(X\le k)=\frac{1}{2}$?

OR

Q.5 (a) If $f(x)=5e^{-5x}, x>0$ *and zero otherwise*, is the p.d.f. of X. Find the m.g.f, c.g.f and β_1 and β_2.

(b) If $P(t) = (4-3t)^{-1}$ is the p.g.f. of a r.v. X then find $P(X=0), P(X>2)$ and $E(X)$.

Q.6 (a) If $P(X=x) = \left(\frac{1}{4}\right)^x \left(\frac{3}{4}\right), x = 0,1,2 \ldots$

$= 0$, otherwise, is the p.m.f. of r.v. X, find the mean and variance of X.

(b) If $f(x) = kexp(-x/3), x > 0$ *and zero otherwise*, is the p.d.f. of a r.v. X then find (i) k (ii) μ_r'

OR

Q.6 (a) From a group of 5 men and 3 women, a committee of 3 members is selected. If X represents the no. of women in the committee, find $E(X)$ *and* $V(X)$.

(b) Let X be the sum of the numbers on upper face of rolling two dice. Find $E(2+3X)$*and* $V(X)$

Q.7 (a) Find the m.g.f. of X if $\mu_r' = (r+1)!\, 2^r, r = 0,1,2, \ldots$

(b) If $f(x) = \frac{1}{4}, -2 < x < 2$

$= 0$, otherwise, is the p.d.f. of X then show that $M_X(t) = \frac{1}{(2t)} Sinh(2t)$

OR

Q.7 (a) Show that the m.g.f. of a r.v. X having the pdf

$f(x) = \frac{1}{3}$, $-1 < x < 2$

$= 0, otherwise,$ is $M(t) = \frac{e^{2t} - e^{-t}}{3t}$

(b) If $M_X(t) = (1-3t)^{-1}$ then show that $V(X) = \left(E(X)\right)^2$

Q.8 (a) If $f(x,y) = k(x+2y), x = 0,1,2, and\ y = 0,1,2$

$= 0, otherwise$, is the joint p.m.f. of X and Y , then find (i) k (ii) the marginal distribution of X and Y (iii) $P(X = 2/Y = 1)$ (iv) $P(Y = 2/X = 1)$

(b) The joint pdf of X and Y is

$f(x,y) = 6x^2y, 0 < x < 1$ *and* $0 < y < 1$ *and zero otherwise*

(i) Verify that $\int_0^1 \int_0^1 6x^2y\, dxdy = 1$

(ii) find (a) $P\left(0 < X < \frac{3}{4}, \frac{1}{3} < Y < 2\right)$ (b) $P(X < 1/Y < 2)$

OR

Q.8 (a) The joint pdf of two r.v's X and Y is

$f(x,y) = k(2x+y), 2 < x < 6, 0 < y < 5$ *and zero otherwise*

Find (i) the constant k (ii) the marginal distribution of X and Y

(iii) Calculate (a) $P(X > 3, Y > 2)$ (b) $P(Y < 2)$

(b) Given $f(x,y) = \frac{x+2y}{18}$, $x, y = 1,2$ *and zero otherwise*

Examine whether X and Y are independent or not.

—X—

SEAT No._____

[38& A-26] SARDAR PATEL UNIVERSITY

B.Sc. Semester – III (November 2017)

Subject:- Probability theory

Paper:- US03CSTA02

25, November,2017

Saturday

Time : 02.00 p.m. to 05.00 p.m. **Marks : 70**

1 Multiple Choice Questions [10]

(1) If A and B are independent events then P(A∩B) = ------.
(a) P(A) - P(B) (b) P(A) *P(B) (c) 0 (d) ∅

(2) For the events A and B if A ⊂ B then the relation between P(A) and P(B) is ---------.
(a) $P(A) \leq P(B)$ (b) $P(A) \geq P(B)$ (c) $P(A) \neq P(B)$ (d) none

(3) If two fair dice are tossed then the probability that sum is 8 = ----.
(a) 8 /36 (b) 7 /36 (c) 6 /36 (d) 5 /36

(4) If F(x) = 0 , x < 0
= x^3 , $0 \leq x < 1$
= 1 , $x \geq 1$, is the c.d.f. of the random variable X then f(x) = -------.
(a) $3x^2$ (b) 3x (c) 2x (d) none

(5) If F(x) is the c.d.f. of a discrete random variable x then $P(a \leq X \leq b)$ = ---------.
(a) F(b) + F(a) (b) F(b) - F(a) (c) F(b) * F(a) (d) none

(6) If f(x) = $\frac{x}{21}$, x = 1, 2, 3 4, 5, 6.
= 0 , otherwise. then P(X < 4) = ----------.
(a) $\frac{2}{21}$ (b) $\frac{3}{21}$ (c) $\frac{6}{21}$ (d) none.

(7) If $E(X) = \int_{-\infty}^{\infty} x.f(x)dx$. then the random variable X is ---------- random variable.
(a) continuous (b) Discrete (c) both (a) & (b) (d) none.

(8) If $M_X(t)$ is the m.g.f. of a random variable X and Y = aX + b then $M_y(t)$ = ------- .
(a) $e^{bt}M_X(at)$ (b) $e^{at}M_X(bt)$ (c) $M_X(at+b)$ (d) none.

(9) f(x , y) = k(2x + y) , x = 1,2,3; y = 1, 2, 3.
= 0 , elsewhere, is the joint p.m.f. of X and Y
(a) 120 (b) 220 (c) 320 (d) none.

(10) If two random variables X and Y are independent then E(X.Y) = --------.
(a) E(X) * E(Y) (b) E(X) + E(Y) (c)) E(X)/E(Y) (d) none.

2 Short Questions. (Attempt any **TEN**) [20]

(1) A box contains 6 red and 5 white balls. One ball is drawn at random from a box. What is the probability that it is a white ball.

(2) State the law of addition for two events. Hence prove it for three events.

(3) What is the probability that a leap year selected at random will contain 53 Mondays?

(4) Following table shows the p.m.f. of a discrete random variable X.

x :	1	2	3	4	5	6
P(X = x)	k	2k	3k	4k	5K	6K

Find (i) k (ii) $P(X \geq 4)$.

(5) If f(x) = 2x, 0 < x < 1
= 0, otherwise, is the p.d.f. of the random variable X then find c.d.f. of X and hence find $P(0.2 \leq X \leq 0.8)$ and $P(0.5 \leq X \leq 1)$.

(P.T.O.)

(6) If $F(x) = 0, \quad x < 3$
$= \frac{x-3}{7}, \quad 3 \leq x < 10,$
$= 1, \quad x > 10$, is the c.d.f. of a random variable X then find the p.d.f. of X . Also find Q_1, median and P_{75}.

(7) If $f(x) = 3x^2, 0 < x < 1$
$= 0$, otherwise is the p.d.f. of a continuous random variable X then find E(X) and V(X).

(8) If $M_X(t) = (1 - 3t)^{-1} \; t < \frac{1}{3}$ is the m.g.f. of a random variable X then find mean and variance.

(9) If $P(t) = (\frac{1}{3})(1 - \frac{2}{3}t)^{-1}$ is the p.g.f. of a random variable X then find P(X = 0), and mean.

(10) $f(x,y) = k(x + 2y)$, $x = 0,1,2$; $y = 0,1,2.$,
$= 0$, elsewhere is the joint p.m.f. of X and Y then
find (i) k (ii) the marginal p.m.fs of X and Y

(11) $f(x,y) = k$, $0 < x < 1$; $0 < y < 2$,
$= 0$, elsewhere is the joint p.d.f. of X and Y then find (i) k (ii) $P(0.5 < X < 0.8)$
(iii) $P(1 < Y < 2)$.

(12) $f(x,y) = kxy$, $0 < x < 2$; $0 < y < 2$,
$= 0$, elsewhere is the joint p.d.f. of X and Y then find (i) k (ii) $P(1 < X < 2)$.

3 (a) The chances of X, Y and Z becoming managers of a company are 4 : 2 : 3. The probabilities that Bonus scheme will be introduced if X, Y, Z become managers are 0.30, 0.50 and 0.80 respectively. If bonus scheme has been introduced, what is the probability that X is appointed as the manager. [5]

(b) If A and B are two events of a sample space S such that $P(A) = \frac{3}{4}$, $P(B) = \frac{5}{8}$, show that (i) $P(A \cup B) \geq \frac{3}{4}$ (ii) $\frac{3}{8} \leq P(A \cap B) \leq \frac{5}{8}$. State the clearly you use. [5]

OR

3 (a) If $A_1, A_2, \ldots\ldots, A_n$ are n independent events for which $P(A_i) = p_i$, i = 1,2,.....,n. Find the probability that (i) all the events occur simultaneously. (ii) none of the events occurs. (iii) at least one of the events occurs. What is the probability of all the above events if $P(A_i) = p$, i =1,2,...n. [5]

(b) Write an appropriate sample space for tossing of two fair dice. Find the probability for the following events. (i) the sum is greater than 10. (ii) the first die shows an odd number. (iii) the sum is either 5 or 8. [5]

4 (a) The p.d.f. of a random variable X is given by $f(x) = k \sin(\frac{\pi x}{a})$, $0 < x < a$ [5]
$= 0$, otherwise.
Determine k and find c.d.f. of X and hence obtain median, Q_1 and P_{50}.

(b) If $f(x) = kx$, $0 < x < 3$ [5]
$= k(6 - x) \quad 3 \leq x < 6,$
$= 0$, otherwise, is the p.d.f. of X then find (i) k (ii) the c.d.f. of X and hence find (iii) $P(2 \leq X \leq 4)$ (iv) $P(1 < X)$ and (v) $P(X > 4)$.

OR

4 (a) If a discrete random variable X takes values $0, \pm 1, \pm 2, \pm 3$ with [5]
$P(X < 0) = P(X = 0) = P(X > 0)$.Then find the p.m.f. of X and the c.d.f. of X. Also find $P(-2 < X < 3)$ and $P(X = 3)$.

(b) If F(x) is the c.d.f. of a discrete random variable X and a < b, be two real numbers, then prove that $P(a < X \leq b) = F(b) - F(a)$. State the results for $P(a < X < b)$ and $P(a \leq X \leq b)$ [5]

5 (a) If $f(x) = \frac{2x}{n(n+1)}$, x = 1,2,.....,n [5]
$= 0$, otherwise is the p.m.f. of a discrete random variable X then find mean and variance of X.

(b) If $f(x) = 3e^{-3x}$, $0 < x < \infty$; [5]
= o, elsewhere is the p.d.f. of X then find μ_r' and hence or otherwise find its mean and Variance. Also find β_1 and β_2.

OR

5 (a) If $M_X(t) = e^{5(e^t - 1)}$ is the m.g.f. of a random variable X. Show that all the cumulants are same. [5]
What is mean and variance.

(b) Define (i) r^{th} central moment (ii) r^{th} row moment. State the relation between them and prove it. [5]

6 If $f(x,y) = k(2x + 3y)$, $x = 1,2,3,4$; $y = 1,2,3$. [10]
= 0, elsewhere, the joint p.m.f. of X and Y.
Find (i) constant k(ii) the marginal .p.m.f of X and Y. (ii) P(X=2/ Y= 1) (iii) P(Y = 2/ X = 3).
Also find E(X), E(Y) and V(X) and V(Y) and correlation coefficient r.

OR

6 The joint p.d.f. of random variable X and Y is given by [10]
$f(x, y) = \frac{9(1+x+y)}{2(1+x)^4(1+y)^4}$, $0 < x < \infty$, $0 < y < \infty$;
= 0, elsewhere, the joint p.d.f. of X and Y. Find both marginal p.d.fs and conditional p.d.fs.

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SEAT No._____ No. of Printed Pages : 02

[44 & A-41]

Sardar Patel University

B. Sc. Semester III Examination 2017

ZOOLOGY

US03CZOO01 (Invertebrata and vertebrata)

21st November 2017, Tuesday

2:00 pm to 5:00 pm

Total Marks: 70

Q I. Multiple Choice Questions. [10]

1. The hydroid colony of Obelia is_____.
   A. Polymorphic B. Dimorphic
   C. Trimorphic D. Tetramorphic
2. Which of the following cells are totipotent in sponges?
   A. Thesocytes B. Archaeocytes
   C. Myocytes D. Scleroblasts
3. Sexual reproduction takes place by_____in protozoa.
   A. Binnary fission B. Multiple fission
   C. Conjugation D. None
4. The name of the free swimming and tailed larvae in Fasciola hepatica is _____.
   A. Metacercaria B. Miracidium
   C. Cercaria D. Redia
5. Nereis is commonly known as:
   A. Earthworm B. Clamworm
   C. Roundworm D. None
6. The teeth in shark are modified:
   A. Placoid scales B. Cycloid scales
   C. Bony plates D. Ctenoid scales
7. Liver in dog fish is_____.
   A. Single lobed B. Bilobed
   C. Trilobed D. Four lobed
8. The third eye lid in frog is called_____.
   A. Pineal eye B. Upper eyelid
   C. Lower eyelid D. Nictitating membrane
9. The semi-digested acidic food in stomach is known as:
   A. Bolus B. Bile
   C. Chyme D. Chyle
10. The feeding habit of the tadepole larva of frog is_____.
    A. Omnivorous B. Herbivorous
    C. Carnivorous D. Piscivorous

[P.T.O]

Q II. Answer the following in short.(Attempt any Ten) [20]

1. List the types of pseudopodia found in protozoa.
2. Draw a neat and labeled diagram of Sycon.
3. Define polymorphism.
4. Write about the suckers present in liver fluke.
5. Mention functions of parapodia in Nereis.
6. What is epitoky?
7. State the location and functions of ampulla of lorenzini.
8. Give habits and habitat of Scoliodon.
9. Write the economic importance of fishes as fish oil.
10. What is sexual dimorphism in frog?
11. What is buccal respiration in frog?
12. Give a brief account on tongue in frog.

Q III. (a) Write a note on flagellar movement in protozoa. [05]
(b) Describe the morphology of medusa in Obelia. [05]

OR

Q III. (a) Explain the life cycle of Obelia. [06]
(b) Give an account on external morphology of Sycon. [04]

Q IV. (a) Describe the external morphology of Liver fluke. [05]
(b) Write a note on trochophore larva in Nereis. [05]

OR

Q IV. (a) Give a detailed account on nervous system in Nereis. [06]
(b) Describe excretory system in Liver fluke. [04]

Q V. (a) Describe alimentary canal of Scoliodon. [07]
(b) Explain the structure of placoid scales with suitable diagram. [03]

OR

Q V. (a) Describe the external features of Shark with diagram. [07]
(b) Write a short note on olfactory organs in Scoliodon . [03]

Q VI. Describe the structure and functions of brain in frog with labeled diagrams. [10]

OR

Q VI. Mention the respiratory organs in frog and explain pulmonary respiration in frog. [10]

———X———

SEAT No._____ 02

[484 A-33] **SARDAR PATEL UNIVERSITY**

S.Y.B.Sc (THIRD SEMESTER) EXAMINATION.

WEDNESDAY, 22/11/2017

TIME:2: 00 P.M.—5:00 P.M.

US03CZOO 02 (ZOOLOGY)

(PHYSIOLOGY & ADAPTATION)

TOTAL MARKS :70

Q-1 **CHOOSE CORRECT ANSWER :** **10**

1. Role of pace maker is to :
   a. Initiate wave of contraction in heart **b.** Increases heart beat.
   c. Regulate blood supply to heart **d.** Decreses heart beat.

2 Which of the following has the thickest wall in heart ?
   a. Left ventricle **b.** Right atrium **c.** Right ventricle. **d.** Left atrium.

3 _____ muscles contract during inspiration.
   a. Internal intercostal **b.** External intercostal.
   c. Redial. **d.** All of these.

4 Which of these contain vocal cords?
   a. Ribs **b.** Diaphragm **c.** Intercostal muscles. **d.** Larynx.

5 The infective sage of Entamoeba histolytica is _____.
   a. Binucleate form. **b.** Sporozoite form. **c.** Minuta form. **d.** Tetranucleate form.

6 Hypertension may damage :
   a. Kidney. **b.** Brain. **c.** Heart. **d.** All of these.

7 Exocoetus is an example of _____adaptation.
   a. Arboreal. **b.** Fossoreal. **c** . Primary aquatic **d** . Secondary aquatic.

8 Bat is adapted for ----------
   a. Active flight. **b** . Passive flight. **c** . Both a and b. **d** . None.

9 Blood vessels supplying oxygenated blood to heart muscles are ----------
   a. Carotid artery. **b.** Coronary artery **c.** Pulmonary artery **d.** Phrenic artery

10 Scansorial adaptation means animal adapted for _____.
   a. Burrowing. **b.** Tree living.
   c. Fast running **d** . none of these.

(P.T.O.)

Q-2		**ANSWER IN SHORT : (ANY TEN)**	**20**
	1	Which factors regulates the process of genesis of red blood cells ?	
	2	Give the name of events occur during one complete cardiac cycle.	
	3	What are the blood pumps?	
	4	Draw neat and labelled diagram of respiratory system of human.	
	5	What is Respiration ?	
	6	Write about symptoms of influenza.	
	7	Explain –systolic and diastolic blood pressure.	
	8	Write about sickle cell anemia.	
	9	Draw neat and labelled diagram of trophic form of Entamoeba histolytica.	
	10	What is syndactyli ?	
	11	What is nictitating membrane?Write it's significance.	
	12	Write about significance of feathers in Volant adaptation.	
Q-3		Describe the various types of heart found in animals.	**10**
		OR	
Q-3		Describe about ABO system of blood group and add a note on Rhesus blood factor.	**10**
Q-4	A	Explain briefly human respiratory system.	**06**
	B	Discuss – Pneumonia.	**04**
		OR	
Q-4	A	Write a note on respiratory organs of animals.	**05**
	B	Write a note on chemical regulation of respiration.	**05**
Q-5	A	Write a note on Hook worm.	**05**
	B	Write a note on Gonorrhoea.	**05**
		OR	
Q-5	A	Describe briefly – Genital Herpes.	**05**
	B	Write a brief note on Bypass surgery.	**05**
Q-6		Describe:	
	A	Mimicry.	**05**
	B	Aquatic adaptations.	**05**
		OR	
Q-6	A	Discuss- echolocation.	**05**
	B	Explain –Camouflage.	**05**

*** ***** ******* ******** ***** ***

[30 (Guj.)] Seat No.: _____ No. of Printed Pages : 4

SARDAR PATEL UNIVERSITY
B. Sc. (III Semester) Examination
Saturday, 25th November 2017
US03EBCH01 – Fundamentals of Biochemistry – I
02.00 p.m. – 04.00 p.m.

કુલ ગુણ : ૭૦

પ્ર. ૧ નીચેનામાંથી યોગ્ય વિકલ્પ પસંદ કરી લખો. (૧૦)

૧. નીચેનામાંથી કયુ પ્રવાહી માનવ શરીરમાં વધારેમાં વધારે હોય છે?
અ) ICF બ) ECF ક) ITF ડ) કોઈપણ નહીં

૨. મૂત્રપિંડને ઉત્તેજીત કરી પાણીને સંગ્રહ કરવાનું કાર્ય નીચેનામાંથી કયા અંતઃસ્ત્રાવનું છે?
અ) ADH બ) આલ્ડોસ્ટેરોન ક) કાઈનીન ડ) આપેલ તમામ

૩. _____ રીસેપ્ટર એ પ્લાસમા અથવા ECFના પ્રમાણમાં ફેરફાર માટે જવાબદાર છે.
અ) ઓસ્મો રીસેપ્ટર બ) ઝ-રસાયણ રીસેપ્ટર ક) તાપમાન રીસેપ્ટર ડ) દબાણ રીસેપ્ટર

૪. નીચેનામાંથી કયો કાર્બોદિત પદાર્થ RNAમાં હોય છે?
અ) રીબ્યુલોઝ બ) રીબોઝ ક) એરીથ્રોસ ડ) ગ્લુકોઝ

૫. શેરડીના રસમાં આવેલી શર્કરા _____ અને _____ એકમ ધરાવે છે.
અ) ગ્લુકોઝ, ગ્લુકોઝ બ) ગ્લુકોઝ, ગેલેક્ટોઝ
ક) ગ્લુકોઝ, ફ્રુક્ટોઝ ડ) ફ્રુક્ટોઝ, ફ્રુક્ટોઝ

૬. સેલોબાયોઝમાં કયો ગ્લાયકોસીડીક બંધ હોય છે?
અ) α-1-4 બ) α-1-6 ક) β-1-4 ડ) β-1-6

૭. ગ્લાયસીન એમીનો એસીડની PI _____ છે.
અ) 2.34 બ) 2.97 ક) 4.9 ડ) 9.6

૮. નીચેનામાંથી કયો એમીનો એસિડ ગ્લુકોઝેનીક નથી?
અ) એસ્પારટેટ બ) ગ્લાયસીન ક) લ્યુસીન ડ) એલેનીન

૯. કોણીય પ્રવેગ માટેનો એકમ _____ છે.
અ) રેડીઅન્ટ/સેકન્ડ બ) રેડીએન્ટ/મીનીટ
ક) ચક્રીયગતિ/મીનીટ ડ) ચક્રીયગતિ/સેકન્ડ

૧૦. કયુ રસાયણ ક્રોમેટોગ્રાફીમાં જુદું પડ્યું છે કે નહીં તે જોવા માટે વપરાય છે?
અ) ક્રોમો પ્રોટીન બ) HCL ક) નીનહાઈડ્રીન ડ) આપેલ તમામ

પ્ર. ૨ નીચેના પ્રશ્નોનાં ટૂંકમાં જવાબ આપો. **(કોઈપણ દસ)** (૨૦)

૧. કારણ આપોઃ પાણીનું બંધારણ V-આકારનું છે.
૨. વધારે પડતું પાણી પીવું નુકશાનકારક છે. તેનાં કારણો લખો.
૩. વ્યાખ્યા આપો : ન્યૂનતમ ઉત્સર્જન વોલ્યુમ અને હોમીયોસ્ટેસીસ
૪. ચક્રીય અને અચક્રીય રાયબોસનું સૂત્ર દોરો.
૫. વિસંમીત કાર્બન એટલે શું?
૬. કારણ આપો : દૂધની શર્કરા એ રીડ્યુસીંગ સ્વરૂપની છે.
૭. વેલીન અને લ્યુસીન એમીનો એસિડના સૂત્રો દોરો.

૮. એમીનો એસિડનું કીટોજેનીક અને ગ્લુકોજેનીક વર્ગીકરણ કયા આધારે કરવામાં આવે છે?

૯. એરોમેટીક એમીનો એસિડના નામ લખો.

૧૦. પાર્ટીશન સહસંબંધાંક અને અસરકારક ડીસ્ટ્રીબ્યુટીવ સહસંબંધાંકના સૂત્રો લખો.

૧૧. સેડીમેન્ટેશન રેટ પર અસર કરતાં પરીબળો કયા છે?

૧૨. ક્રોમેટોગ્રાફીનો સામાન્ય સિદ્ધાંત લખો.

પ્ર. ૩ ટૂંકનોંધ લખોઃ

(અ) પાણીનું બંધારણીય સૂત્ર (૦૫)

(બ) શરીરમાં પાણીની વહેંચણી (૦૫)

અથવા

પ્ર. ૩ ટૂંકમાં વર્ણવોઃ

(અ) શરીરમાં ઈલેકટ્રોલાઈટ્સની વહેંચણી (૦૫)

(બ) પાણીનું સામાન્ય પ્રમાણ (૦૫)

પ્ર. ૪ ટૂંકનોંધ લખોઃ

(અ) લેકટોઝ (૦૫)

(બ) માલ્ટોઝ (૦૫)

અથવા

પ્ર. ૪ ટૂંકમાં જણાવોઃ

(અ) કાર્બોહાઈડ્રેટ્સના સ્ત્રોત અને ઉપલબ્ધિ લખો. (૦૫)

(બ) કાર્બોહાઈડ્રેટ્સના કાર્યો લખો. (૦૫)

પ્ર. ૫ વર્ણવોઃ

(અ) એમીનો એસિડનો એમ્ફોટેરીક સ્વભાવ (૦૫)

(બ) મેટાબોલીક ફેટ આધારિત એમીનો એસિડનું વર્ગીકરણ (૦૫)

અથવા

પ્ર. ૫ ટૂંકનોં લખોઃ

(અ) પ્રોટીનનું ડીનેચરેશન (૦૫)

(બ) નોન-પ્રોટીન એમીનો એસિડ (૦૫)

પ્ર. ૬ સેડીમેન્ટેશન માટેનું સમીકરણ તારવો અને સેન્ટ્રીફ્યુઝની ઉપયોગીતા લખો. (૧૦)

અથવા

પ્ર. ૬ TLC માટેની પદ્ધતિ, સિદ્ધાંત અને ઉપયોગીતા લખો. (૧૦)

SE

SEAT No._____ No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

[30] S.Y.BSc III[rd] SEMESTER EXAMINATION NOVEMBER 2017

BIOCHEMISTRY: USO3EBCH01

TITLE: FUNDAMENTALS OF BIOCHEMISTRY-I

Date: 25/11/17; Saturday **Time: 2:00 PM TO 4:00 PM** **TOTAL MARKS: 70**

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

1) Which of the following fluid is present maximum in our body?
   a) ICF b) ECF c) ITF d) None of these
2) Stimulating the kidney for the retention of water is the function of _____hormone.
   a) ADH b) Aldosterone c) Kinine d) All of these
3) _____ receptor is sensitive to variation in plasma or ECF volume.
   a) Osmo receptor b) Chemo receptor
   c) Baro receptor d) Stretch receptor
4) RNA requires following carbohydrates as its component.
   a) Ribulose b) Ribose
   c) Arithrose d) Glucose
5) Cane sugar is made up of _____ &_____ monosaccharides.
   a) glucose, glucose b) glucose, galactose
   c) glucose, fructose d) fructose, fructose
6) Cellobiose has following glycosidic linkage.
   a) α-1-4 b) α-1-6 c) β-1-4 d) β-1-6
7) PI of glycine amino acid is _____.
   a) 2.34 b) 5.97 c) 4.9 d) 9.6
8) From the following, all amino acids are glucogenic except _____.
   a) Aspartate b) Glycine c) Leucine d) Alanine
9) Unit for angular velocity is _____.
   a) radiant/sec b) radiant/min c) rotation/min d) rotation/sec
10) Visualizing reagent used in paper chromatography is _____.
   a) Chromo protein b) HCL c) Ninhydrin d) All of these

Q2. Answer in short. **[20]**

1. Give reason: Structure of water is V-shaped.
2. Write the causes of water intoxication.
3. Define: Minimum excretory volume and homeostasis.
4. Draw cyclic and acyclic structure of ribose.
5. What is asymmetric carbon?
6. Milk sugar is reducing in nature. Give reason.

Contd. Page 2

7. Draw the structure of valine and leucine.
8. What is the basis of classification of amino acids into ketogenic and glucogenic?
9. Write the name of aromatic aminoacids.
10. Write the formula for partition co-efficient and effective distributive co-efficient.
11. Which are the factors affecting on sedimentation rate?
12. Write general principle for chromatography.

Q3. Write short note on:

a. Structure of water. **[5]**
b. Distribution of body water. **[5]**

OR

Q3.Explain in short:

a. Distribution of electrolytes in the body. **[5]**
b. Normal water balance. **[5]**

Q4. Write short note on:

a. Lactose **[5]**
b. Maltose. **[5]**

OR

Q4.Explain in short:

a. Sources and occurrence of carbohydrates. **[5]**
b. Function of carbohydrates. **[5]**

Q5. Explain:

a. Amphoteric nature of amino acid. **[5]**
b. Metabolic fat dependent classification of amino acids. **[5]**

OR

Q5. Write short note on:

a. Denaturation of protein. **[5]**
b. Non-protein amino acids. **[5]**

Q6. Derive equation for sedimentation and write application of centrifuge. **[10]**

OR

Q6. Discuss principle method and application of TLC. **[10]**

———— ✕ ————

SC

SEAT No._____

No. of Printed Pages : 02

[A-34]

SARDAR PATEL UNIVERSITY

B.Sc. THIRD SEMESTER (BATCH 2010) NOT CLEAR EXAMINATION

2017

TUESDAY 21st NOVEMBER

Time 2:00 pm to 4:00pm

USO3EBIO 01

(CYTOGENETICS AND PLANT BIOLOGY)

Marks: 70

Q.1. Select the correct answer and write it in the answer sheet. **[10]**

1.Plasma membrane is composed of _____

(a) Protein (b) Lipid (c) Cellulose (d) Protein & Lipid

2. In DNA Adenine normally pairs with _____

(a) Guanine (b) Cytosine (c) Thymine (d) Uracil

3. Cell organelle containing hydrolytic enzyme is called as _____

(a) Peroxysome (b) Ribosome (c) Lysosome (d) Mesosome

4. _____ is regarded as father of Genetics

(a) Morgan (b) Whatson (c) Morison (d) Mendel

5. Cross of F_1 hybrid with recessive parent is called _____

(a) Reciprocal cross (b) Back cross (c) Test cross (d) Crossing over

6. Mandel's experimental material was _____

(a) *Pisum sativum* (b) *Oryza sativa* (c) *Mirabilis jalappa* (d) *Cannabis sativa*

7. _____ is the family of aromatic plants_____

(a) Asteraceae (b) Brassicaceae (c) Lamiaceae (d) Euphorbiaceae

8. Calotropis belongs to _____ family

(a) Asclepiadiceae (b) Asteraceae (c) Euphorbiaceae (d) Brassicaceae

9. In photosynthesis, the site of dark reaction is_____

(a) Grana (b) Stroma (c) Thylakoid (d) both (a) & (b)

10. _____ is considered as necessary evil

(a) Transpiration (b) Respiration (c) Photorespiration (d) Photosynthesis

(P.T.O.)

Q.2. Answer the following questions in brief (Any 10) [20]

1. Explain eukaryotic cell nucleus
2. Discuss the types of chromosome based on position of centromere
3. Write in brief about function of cell wall
4. Give reasons for selection of pea plant for experimentation by Mendel
5. Explain test cross
6. What is Mendel's law of dominance ?
7. Give the economic importance of family Asclepidiaceae
8. What is binomial nomenclature?
9. Explain the inflorescence in family Asteraceae
10. What is Crassulacean Acid Metabolism?
11. Define 'Transpiration' and name its types
12. Define the term "Photosynthesis"

Q.3. (a) Discuss the types of Lysosomes and add a note on functions [05]

(b) Explain the ultrastructure of cellmembrane with suitable model [05]

OR

Q.3. (a) Explain the structure and role of organelle Mitochondrion [05]

(b) Discuss on plant cell wall composition [05]

Q.4. (a) Explain Mendel's Law of Independent Assortment giving example [06]

(b) What is back cross? Explain with suitable example [04]

OR

Q.4. (a) Write a note on dominant epistasis [06]

(b) Explain the Law of Segregation [04]

Q.5. Enlist the distinguishing characters of family Brasiccaeae and state the economic importance of family [10]

OR

Q.5. Discuss the general characters of family Lamiaceae and its economic importance [10]

Q.6. Write note on:

(a) Give an illustrated account of Calvin cycle [06]

(b) Explain the structure and function of Stomata [04]

OR

Q.6. (a) Discuss non- cyclic photophosphorylation [06]

(b) Write in brief about C_4 cycle [04]

———X———

SEAT No._____ [33 & A-32]

SARDAR PATEL UNIVERSITY

B.Sc. THIRD SEMESTER EXAMINATION

TUESDAY 21st NOVEMBER, 2017

02:00 pm to 04:00 pm

USO3EBIO 01

(CYTOGENETICS AND PLANT BIOLOGY)

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. Unit membrane model of plasma membrane was proposed by _____

(a) Robertson (b) Danielli and Davson (c) Singer and Nicholson (d) Morgan

2. _____particles meant for ATP synthesis are present on inner surface of inner mitochondrial membrane

(a) F1 (b) A1 (c) T1 (d) P1

3. Nucleoplasm is also known as _____

(a) Cytoplasm (b) Protoplasm (c) Karyolymph (d) Endoplasm

4. Recessive epistasis modify the classical dihybrid ratio of 9:3:3:1 into _____

(a) 12:3:1 (b) 9:7 (c) 9:6:1 (d) 9:3:4

5. Mendel's law of _____ is known as law of purity of gametes

(a) Segregation (b) Dominance

(c) Independent assortment (d) Gravity

6. Gynostagium is a characteristic of family _____

(a) Asteraceae (b) Asclepiadiceae (c) Lamiaceae (d) Brassicaceae

7. Scientific names are always written in _____

(a) Calibri (b) Aerial (c) Italics (d) Bold

8. Non cyclic photophosphorylation is also known as _____ scheme

(a) M (b) N (c) W (d) Z

9. Stomata are guarded by _____

(a) Guard Cells (b) Accessory Cells

(c) Subsidiary Cells (d) None of these

10. End products of photosynthesis are _____

(a) Oxygen and Fat (b) Oxygen and Hexose Sugar

(c) Carbon dioxide and Carbohydrate (d) Carbon dioxide and Protein

(P.T.O.)

Q.2. Answer the following questions in brief (Any 10) [20]

1. Mitochondria is known as power house of cell. Justify
2. Define metacentric and sub metacentric chromosomes
3. Write the chemical composition of cell wall
4. State Mendel's law of segregation
5. Write note on test cross
6. Define the term genotype and phenotype
7. What do you mean by binomial nomenclature?
8. Give the economic importance of any two plants of Asteraceae family
9. Define cyathium inflorescence
10. Define photosynthesis
11. Write about C4 plants
12. State the importance of osmosis in plants

Q.3. (a) Describe the different types of lysosomes [06]

(b) Explain the ultra-structure of mitochondria [04]

OR

Q.3. (a) Describe the structure and functions of nucleus [06]

(b) Discuss the fluid mosaic model of plasma membrane [04]

Q.4. (a) Explain Mendel's Laws of Independent assortment [06]

(b) Write note on incomplete dominance [04]

OR

Q.4. (a) Explain dominant epistasis giving suitable example [06]

(b) Why Mendel selected pea plant for his experiments? [04]

Q.5. Discuss the general characters and economic importance of family Brassicaceae [10]

OR

Q.5. Describe the general characters of family Lamiaceae [10]

Q.6. Explain C3 Cycle [10]

OR

Q.6. (a) Explain Cyclic photophosphorylation [05]

(b) Define transpiration and explain the different types of transpiration [05]

—— X ——

No. of Printed Pages : 02

[28 C A-20] SARDAR PATEL UNIVERSITY

B. Sc. (3rd Semester)

BOTANY-US03EBOT01

(Phytodiversity and Plant Biotechnology)

Date-23/11/17 Time:2.00-4.00p.m.

Day- Thursday Marks-70

Q-1 Multiple Choice Questions. (10)

(i)A lot of researches in genetics and cytology have been carried out on:

(a)*Acetabularia* (b)*Nostoc* (c)*Anabaena* (d)*Chlorella*

(ii)School of algology at Banaras Hindu University was set up by:

(a)Bhardwaj (b)M.O.P.Iyengar (c)Desikacharya (d)B.R.Vashista

(iii)The globule in *Chara* consists of:

(a)4-shield cells (b)8-shield cells (c)16-shield cells (d)24-shield cells

(iv)Fruiting body in *Aspergillus* is known as:

(a)perithecium (b)basidium (c)cleistothecium (d)apothecium

(v)Mycorrhiza is an example of:

(a)parasitism (b)predation (c)hypoparasitism (d)symbiosis

(vi)Aflatoxins are produced by:

(a)fungus (b)virus (c)bacterium (d)nematode

(vii)Mixed cropping helps-

(a)to increase the nitrogen content of the soil

(b)in effective control of the spread of infectious diseases

(c)to increase the phosphorous content of the soil

(d)to increase the yield

(viii)The pathogen, after entering the host, secretes some enzymes and toxins which kill the host tissue. This is known as:

(a)canker (b)rusts (c)necrosis (d)damping off

(ix)Plants containing nucleus of one species and cytoplasm of both the fusion parents are known as:

(a)hybrids (b)cytoplasts (c)clones (d)cybrids

(x)Conservation of species in their natural habitat is:

(a)In-situ conservation (b)Ex-situ conservation

(c)In-vitro conservation (d)none of these

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

(i)Write the contributions of the scientist M.O.P.Iyengar.

(ii)Write the thalius structure of Scytonema.

(iii)Draw a labeled diagram of Gleotrichia thallus.

(iv)What is the role of R.S.Singh in Mycology?

(v)Define:Mycorrhizae.

(vi)Name the different types of spores in Puccinia.

(vii)Define:Canker symptoms.

(viii)What is pathogenesis?

(ix)Write notes on:Ex-situ conservation.

(x)Define:Biotechnology.

(xi)What is protoplast culture?

(xii)Define-Ex-plants.

C.P.T.O.)

Q-3(a)Describe sexual reproduction in Ulothrix. (05)

(b)Describe various types of branching in Scytonema. (05)

OR

Q-3Explain the method of sexual reproduction and describe the structure of sex organs in Chara. (10)

Q-4(a) Differentiate between teleutospore and uredospore of Puccinia. (05)

(b)Write about the contribution of R.S.Singh in mycology. (05)

OR

Q-4Write a note on: Economic importance of fungi. (10)

Q-5Describe any one plant disease studied by you giving symptoms,characters of causal organism and control measures. (10)

OR

Q-5What is disease? Describe the various symptoms caused by plant diseases. (10)

Q-6(a)What are the sources of explants? (05)

(b)What is cellular totipotency? (05)

OR

Q-6(a)Write the procedure of protoplast culture. (05)

(b)What are the reasons of concern for loss of bio-diversity? (05)

——X——

SC

SEAT No._____

No. of printed pages: 02

[28]

SARDAR PATEL UNIVERSITY

Third Semester

B.Sc. EXAMINATION (CBCS)

US03ECHE01 Analytical Chemistry

Date: 24th November 2017, Friday

Time: 2.00 to 4.00 pm

Note: figures to the right indicate marks.

Maximum Marks: 70

Q-1 Multiple Choice Questions. **10**

1 R_F value depends upon _____.
(A)Solvent used (B) Temperature (C) Nature of mixture (D) All of above

2 Highest polarity solvent is _____.
(A) Toluene (B) Water (C) Benzene (D) N- butane

3 What is silica gel, utilized in TLC?
(a)solvent (b)mobile phase (c)stationary phase (d)catalyst

4 How much length a capillary column should have?
(a)10 to 100 m (b)25 to 100 m (c)50 to 100 m (d)60 to 100 m

5 In gas chromatography, which of the following is used as mobile phase?
(a) solid (b)liquid (c)gas (d)none of these

6 What is the range of visible radiation?
(a) 200 to 400 nm (b)400 to 800 nm (c)100 to 200 nm (d)100 to 1000 nm

7 Which source is used for radiation in uv and visible part?
(a) Hg vapour lamp (b)Hg arc lamp (c)Hollow cathode lamp (d)Globular lamp

8 Which is not detector amongst following?
(a)ECD (b) FID (c) DTDC (d)none of these

9 How much moisture does a sample can have in distillation method?
(a)0.1 % (b)0.03 % (c)0.06 % (d)0.08%

10 In which solvent do I2 and SO_2 are dissolved?
(a) Methanol & pyridine (b)Ethanol & pyridine (c) butanol & pyridine (d) propanol & pyridine

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

1 What is migration parameter?

2 List out the types of parer chromatography.

3 Discuss on adsorbents in TLC.

4 Discuss principle of GC.

5 Discuss in short on career gas used in GC.

6 What is retention volume?

7 State the range of uv radiations and write the names of sources used for them.

8 Discuss on types of electrons in organic molecules.

9 Name the parts of spectrophotometer.

10 What is food adulteration and contamination?

11 Why food analysis is important?

12 What do we mean by oils and fats?

(P.T.O.)

Q-3		
(a)	Discuss on types of paper chromatography.	**05**
(b)	Discuss on thin layer chromatography.	**05**
	OR	
Q-3		
(a)	Write a note on column chromatography.	**05**
(b)	Discuss applications of TLC.	**05**
Q-4		
(a)	Discuss on instrumentation of GC.	**10**
	OR	
Q-4		
(a)	Discuss on detectors in detail used in Gas Chromatography .	**10**
Q-5		
(a)	Discuss Lambert's –Beer's Law.	**05**
(b)	Discuss the theory of UV absorption.	**05**
	OR	
Q-5		
(a)	Write a note on spectrophotometer.	**05**
(b)	Discuss applications of uv-visible spectroscopy.	**05**
Q-6		
(a)	How protein in milk is estimated? Explain.	**05**
(b)	Explain on analysis of reducing sugar.	**05**
	OR	
Q-6		
(a)	How moisture in oil and fat is estimated? Explain.	**05**
(b)	Discuss the method of estimation of ash in spices.	**05**

—X—

Seat No.: _____

[294 A-21] Sardar Patel University

B. Sc. (Semester – III) Examination

Industrial Chemistry & Industrial Chemistry Vocational

COURSE NO: US03ECHE04 (Organic Chemistry)

Date: 23-11-2017, Thursday Time: 02:00pm to 04:00pm

Total marks: 70

Q.1 Answer the following MCQs (All are compulsory) (10)

1. Acid is a substance that gives up _____
   a. Electron b. Neutron
   c. Proton d. All of these

2. Homolytic cleavage occurs between atoms of _____
   a. Same electronegativity b. Different electronegativity
   c. Both a and b d. Either a or b

3. Alkyl radical has _____ type structure.
   a. Square planner b. Planner
   c. Linear d. Octahydral

4. Phenol reacts with excess bromine water to give
   a. o- bromo phenol + *p*-bromo phenol b. Bromobenzene
   c. 2,4,6-tribromophenol d. m-bromophenol

5. Resorcinol on distillation with zinc dust gives
   a. Benzene b. Cyclohexane
   c. Toluene d. m-xylene

6. Which group forms the strongest H-bond to water molecules?
   a. Alcohols b. Ethers
   c. Phenols d. All equally strong

7. Which of the following will have the highest boiling point?
   a. Methanal b. Ethanal
   c. Propanal d. Butanal

8. The melting points aldehydes and ketones tend to;
   a. Decrease with increase molecular weight
   b. Increase with increasing molecular weight
   c. Remain unchanged with increasing molecular weight
   d. Be unpredictable due to resonance

9. Which amine is NOT soluble in water?
   a. Methylamine b. Dimethylamine
   c. Trimethylamine d. All are water-soluble

10. Consider a 1°, 2° and 3° amine, all of equivalent molecular weight. Which amine is most likely to have lowest boiling point?
    a. 1° amine b. 2° amine
    c. 3° amine d. Not enough information to determine

Q.2 Answer the following short questions (Any Ten) (20)

1. Explain why HF has a higher boiling point than HCl?
2. Why acetic acid is a weaker acid than formic acid?
3. 2-chlorobutanoic acid is a stronger acid than butanoic acid.
4. "Boiling point of alcohol is higher than comparable ether. Explain.
5. Write uses of "Oxymercuration-demercuration".
6. Write a reaction for addition of Grignard reagent in carbonyl compound.
7. Define Transesterification.
8. Write a reaction for Hell-Volhard-Zelinsky reaction.
9. Give synthesis of Mesitoic acid from Mesitylene.
10. Why an aliphatic amine is more basic than ammonia?
11. Write a reaction of primary amine with nitrous acid.
12. Write a reagent used for Hinsberg Test.

Q.3. Write a notes on following: (10)

A. Postulates of Resonance theory
B. Carbnions and Carbocations.

OR

Q.3. Write a notes on following: (10)

A. Hydrogen bonds.
B. Inductive effect.

Q.4. Write a notes on following: (10)

A. Oxymercuration-demercuration reaction.
B. Williamson Synthesis of ethers.

OR

Q.4. Discuss the following: (10)

A. Base catalyzed cleavage of Epoxide.
B. Different preparation of alcohol.

Q.5. Explain the following: (10)

A. Nucleophilic addition to aldehydes and ketones can be catalyzed by acid.
B. Aldol condensation rreaction.

OR

Q.5. Write notes on following: (10)

A. Reimer-Tiemann reaction.
B. Cannizaro reaction.

Q.6. Write a note on different methods of diazotization. (10)

OR

Q.6. Write a Synthesis of following. (10)

1. *m*- bromophenol from nitrobenzene
2. p- bromo aniline from aniline
3. 1,2,3-tribromobenzene from *p*-nitroaniline.

—X—

SEAT No._____ No. of printed Pages : 02

[29 & A-23] Sardar Patel University

S. Y. BSc. (Semester – III) Examination

24-11-2017, Friday Time: 02:00 to 04:00pm

Industrial Chemistry & Industrial Chemistry Vocational

US03ECHE05 (Basic Analytical 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 determination of value on the same day and identical conditions and short time gap is called as.....
   A. Repeatable value
   B. Reproducible value
   C. Observed Value
   D. None of them
2. The errors which can be avoided or whose magnitude can be determined are known as....
   A. Systematic error
   B. Random error
   C. Functional error
   D. None of these
3. The systematic error includes ....
   A. Manual error
   B. Methodic error
   C. Reagent error
   D. All of them
4. Which solution is used to maintain constant pH. if a small amount of acid or base is added to it?
   A. Strong acid
   B. Strong base
   C. Buffer
   D. None of these
5. Saponification value test is used for the determination of...
   A. Buffers
   B. Acids
   C. Bases
   D. Oils and fats.
6. Which of the following statement is wrong?
   A. $KMnO_4$ is a powerful oxidizing agent
   B. $KMnO_4$ is a weak oxidizing agent
   C. $K_2Cr_2O_7$ is an oxidizing agent
   D. NaOH is a strong base
7. Which of the following acid is added in the titration of $KMnO_4$?
   A. H_2SO_4
   B. HCl
   C. HNO_3
   D. All of them
8. While preparing the solution of iodine, KI is added; which forms ____complex.
   A. EDTA
   B. I_3^-
   C. I^-
   D. None of these.
9. Increasing the size of the precipitates and reducing the co-precipitation can be done with the help of.....
   A. Digestion
   B. Washing
   C. Ignition
   D. Drying
10. The contamination of the precipitate by substance which is soluble in mother liquor is termed as....
   A. Co-precipitation
   B. Impurity
   C. Precipitate
   D. None of these.

(P.T.O.)

Q.2 Answer the following short questions (Any TEN) (20)

1. Define the term "Error"
2. What meant by Absolute Error?
3. Define term "Reproducible Analysis".
4. Define the term "Titrant".
5. Define term "End point"
6. Define term "Buffer solution".
7. Why H_2SO_4 is used for $KMnO_4$ titration in place of HCl?
8. Why, $KMnO_4$ is also used in alkaline medium?
9. Potassium Dichromate is primary standard or not? Justify your answer.
10. Discuss conditions which govern the choice of a suitable adsorption indicator.
11. Write advantages of Gravimetric Method.
12. Explain term "Colloidal state".

Q.3 Write a short notes on following: (10)

A. Errors and its complete classification.
B. "T-test" with its equation.

OR

Q.3 Explain the following: (10)

A. Primary and Secondary Standards and
B. Linear Regression

Q.4 Discuss the following: (10)

A. Types of reactions involved in titrimetric analysis.
B. Kjeldahl's procedure for the determination of organic nitrogen.

OR

Q.4 Explain the following: (10)

A. Principle involved in determination of boric acid.
B. Saponification value of oils.

Q.5 Discuss the following: (10)

A. Stability of metal complexes.
B. Role of starch in titration involving iodine.

OR

Q.5 Discuss the following: (10)

A. Method for determination of total hardness of water samples.
B. Titration mixture with respect to selectivity, masking-demasking agents.

Q.6 Write a short notes on following: (10)

A. Supersaturation and precipitate formation.
B. Lyophobic colloids and lyophilic colloids.

OR

Q.6 Write a short notes on following: (10)

A. Mohr's Method.
B. The conditions for "precipitation".

——X——

SC

SEAT No._____

[37 & A-26]

No. of Printed Pages : 02

Sardar Patel University

B.Sc. 3rd Semester, External Examination

US03ECSC01 : Digital Computer Electronics

22nd November, Wednesday - 2017

Time : 02:00 PM to 04:00 PM

Total Marks : 70

Q.1 Select an appropriate option. 10

1. The _____ gate has two or more input signals. All inputs must be low to get a low output.
   (a) AND (b) OR (c) Both (a) & (b) (d) NOR
2. De Morgan's first theorem says that a NOR gate is equivalent to a _____.
   (a) bubbled OR (b) bubbled NOR
   (c) bubbled AND (d) AND bubbled
3. The relationship between a function and binary variables can be represented in _____.
   (a) truth table (b) decoder (c) encoder (d) multiplexer
4. In k-map, octet eliminates _____ variables.
   (a) one (b) two (c) three (d) four
5. In Comparator, _____ gate is use for comparing bits in word.
   (a) XOR (b) AND (c) NOR (d) XNOR
6. Half Adder consist of _____ and _____ gates.
   (a) XOR, AND (b) XOR, OR (c) XNOR,AND (d) XNOR,OR
7. A combinational circuit that performs the arithmetic addition of two bits is called _____.
   (a) Full Adder (b) Half adder (c) Binary Adder (d) Decoder
8. In half adder AND Gate's output is _____.
   (a) CARRY (b) SUM (c) REMAINDER (d) NONE
9. In D flip-flop, when CLK is high then output is_____.
   (a) high (b) low (c) invert of input (d) same as input
10. Ring counter producing words with 1 high bit, which shifts _____ position per clock pulse.
    (a) one (b) two (c) three (d) none

Q.2 Answer in short. **(Attempt any TEN)** 20

1. Define terms Gate and Inverter.
2. Explain NAND gate with truth table and circuit.
3. Write truth table for : AB'+BC'+AC.
4. What is SOP? Write steps to derive SOP equation.
5. Explain Quad in k-map.
6. Draw a logic circuit for Comparator.

(P.T.O.)

7. Do as directed: (i) 110010+010101 (ii) 10010 - 01101
8. Draw a block diagram of Multiplexer.
9. Find 2's complement of number 1101.
10. Define the terms Register and Buffered Register?
11. Draw a logic circuit of D-Latch.
12. What is clocked D-Flipflop?

Q.3 [a] Draw a logic circuit of XOR and XNOR gates with truth table. 5

[b] State and prove De-Morgan's theorems. 5

OR

Q.3 [a] Explain basic gates with truth table. 5

[b] Explain Distributive and Associative law. 5

Q.4 What is k-map? Write steps to derive POS equation. Derive SOP and POS equation for $F(A,B,C,D) = \Sigma(1,3,5,6,8,11,15)$. Which is less expensive? 10

OR

Q.4 Write notes on Encoder and Decoder. 10

Q.5 [a] Explain Full-adder in detail. 5

[b] Draw a logic circuit for binary adder. Find addition of two binary numbers A(1100) and B(1001) using binary adder circuit. 5

OR

Q.5 [a] Explain 8x1 Multiplexer in detail. 5

[b] Write detail notes on Binary adder-subtractor. 5

Q.6 [a] Write short note on shift right register. 5

[b] Explain ring counter in detail. 5

OR

Q.6 [a] Explain controlled buffer register. 5

[b] Explain shift left register in detail. 5

----- X ----- X -----

5C

SEAT No._____ No. of Printed Pages : 02

[1D 6A-12] SARDAR PATEL UNIVERSITY V.V.NAGAR

S.YB.Sc. Sem-III, EXAMINATION

SUB. CODE:-US03EELE01 SUB: Fundamentals of Computer Hardware

DATE:-28/11/2017 TIME:-2:00 pm to 4:00 pm MARKS-70

Q-1 Choose correct answer [10]

1. Human Language converted to Computer Language by _____
   (A) Control Unit (C) Input Unit
   (B) CPU (D) None of these
2. Conversion of Computer Coded Language into Human Acceptable form is done by _____
   (A) Input Unit (C) ALU
   (B) Output Unit (D) None of these
3. Popular type of hand held computer is _____
   (A) Desktop Computer (C) PDA
   (B) Smart Phone (D) None of these
4. Diskettes spin at about _____RPM
   (A) 300 (C) 30
   (B) 3 (D) None of these
5. The process of mapping a magnetic disk surface is called_____
   (A) Scanning (C) Accessing
   (B) Formatting (D) None of these
6. Intelligent smart card contains their own _____
   (A) Microprocessor (C) Flash
   (B) Keyboard (D) None of these
7. _____is not a modifier key.
   (A) Shift (C) Backspace.
   (B) Ctrl (D) ALT.
8. Barcode reader is special type of_____
   (A) Printer (C) Game-pade
   (B) Scanner (D) None of these.
9. Size of monitor is measured _____
   (A)Horizontally (C) Diagonally
   (B) Vertically (D) none of above
10. Colour Inkjet Printer is also known as _____Printer.
    (A) Two Colour (C) Non-Impact
    (B) CMYK (D) None of these

Q-2 Short answer type question. (any ten) [20]

1. List different types of computers that are designed for use by single person.
2. Name computers that are designed for organization.
3. What is Cache Memory?
4. Explain Seek and Latency Time.
5. Explain Flash Memory.
6. List different types of registers used in computer.
7. Explain Smart cards.
8. Write a note on digital camera.
9. Write a note on digital barcode reader.
10. Explain monitor and state its types.
11. Give classification of printers.
12. Explain Dot Pitch

C.P.T.O.

Q.3	Draw the block diagram showing basic organization of computer system & Explain function of each block	[10]
	OR	
Q.3	Explain fixed and variable word length storage.	[10]
Q.4	List different Optical Storage Devices and explain in detail any one.	[10]
	OR	
Q.4	Write a note on Magnetic tape	[10]
Q.5	What is mouse? Explain it in brief.	[10]
	OR	
Q.5	List different types of keys on keyboard and explain three in detail	[10]
Q.6 (A)	Write a note on Laser Printer	[05]
(B)	Explain in detail Dot-Matrix Printer.	[05]
	OR	
Q.6	Explain CRT monitors in brief.	[10]

—X—

[10 / A-12 (Guj.)] Seat No.: _____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
B. Sc. (III Semester) Examination
Tuesday, 28th November 2017
US03EELE01 – Fundamentals of Computer Hardware
02.00 p.m. – 04.00 p.m.

કુલ ગુણ : ૭૦

પ્ર. ૧ સાચો જવાબ પસંદ કરો. (૧૦)

૧. માનવ ભાષાનું કોમ્પ્યુટર ભાષામાં _____ દ્વારા રૂપાંતરણ કરવામાં આવે છે.
અ) કંટ્રોલ યુનિટ બ) આઉટપુટ યુનિટ
ક) એ. એલ. યુ. ડ) આમાંથી એકેય નહીં

૨. કોમ્પ્યુટર કોડેડ ભાષાનું માનવ ભાષામાં રૂપાંતરણ _____ થી કરવામાં આવે છે.
અ) કંટ્રોલ યુનિટ બ) આઉટપુટ યુનિટ
ક) એ. એલ. યુ. ડ) આમાંથી એકેય નહીં

૩. લોકપ્રિય પ્રકારનું હેન્ડ હેલ્ડ કોમ્પ્યુટર _____ છે.
અ) ડેસ્કટોપ કોમ્પ્યુટર બ) પીડીએ ક) સ્માર્ટ ફોન ડ) આમાંથી એકેય નહીં

૪. ડિસ્કેટ _____ સ્પીડથી ફરે છે.
અ) ૩૦૦ બ) ૩૦ ક) ૩ ડ) આમાંથી એકેય નહીં

૫. મેગ્નેટીક ડિસ્કની સરફેસને મેપીંગ કરવાની પ્રક્રિયાને _____ કહે છે.
અ) સ્કેનીંગ બ) ફોરમેટીંગ ક) એસેસીંગ ડ) આમાંથી એકેય નહીં

૬. ઈન્ટેલીજન્ટ સ્માર્ટ કાર્ડ પોતાનું _____ ધરાવે છે.
અ) માઈક્રો પ્રોસેસર બ) કી-બોર્ડ ક) ફ્લેશ ડ) આમાંથી એકેય નહીં

૭. _____ મોડીફાયર કી નથી.
અ) શીફ્ટ બ) કંટ્રોલ ક) બેકસ્પેસ ડ) અલ્ટર

૮. બારકોડ રીડર વિશેષ જાતનું _____ છે.
અ) પ્રિન્ટર બ) સ્કેનર ક) ગેમ પેડ ડ) આમાંથી એકેય નહીં

૯. મોનીટરની સાઈઝ _____ રીતે માપવામાં આવે છે.
અ) હોરિઝોન્ટલી (આડું) બ) વર્ટીકલી (ઉભું)
ક) ડાયાગોનલી (ત્રાંસું) ડ) આમાંથી એકેય નહીં

૧૦. કલર ઈન્કજેટ પ્રિન્ટરને _____ થી ઓળખવામાં આવે છે.
અ) બે કલરનું પ્રિન્ટર બ) નોન-ઈમ્પેક્ટ પ્રિન્ટર
ક) સી. એમ. વાય. કે. ડ) આમાંથી એકેય નહીં

પ્ર. ૨ ટૂંકા પ્રશ્નોઃ **(કોઈપણ દસ)** (૨૦)

૧. એક વ્યક્તિના વપરાશ માટે બનાવવામાં આવેલા જુદાં-જુદાં પ્રકારના કોમ્પ્યુટરનું લિસ્ટ આપો.
૨. સંસ્થા માટે વપરાતા કોમ્પ્યુટરનાં નામ લખો.
૩. કેશ (Cache) મેમરી શું છે? તે સમજાવો.
૪. સીક (Seek) અને લેટન્સી (Latency) ટાઈમ સમજાવો.
૫. ફ્લેશ (Flash) મેમરી ટૂંકમાં સમજાવો.

૬. કોમ્પ્યુટરમાં વપરાતા વિવિધ પ્રકારનાં રજીસ્ટરનાં પ્રકાર જણાવો.
૭. સ્માર્ટ કાર્ડ વિશે સમજાવો.
૮. ડિજીટલ કેમેરા વિશે ટૂંકમાં લખો.
૯. ડિજીટલ બારકોડ રીડર વિશે ટૂંકમાં લખો.
૧૦. મોનીટર શું છે? તે સમજાવો અને તેના વિવિધ પ્રકારો જણાવો.
૧૧. પ્રિન્ટરનું વર્ગીકરણ કરો.
૧૨. ડોટ પીચ (Dot Pitch) વિશે સમજાવો.

પ્ર. ૩ કોમ્પ્યુટરનો બ્લોક ડાયાગ્રામ દોરો અને દરેક બ્લોકનું કાર્ય સમજાવો. (૧૦)

અથવા

પ્ર. ૩ ફિક્સ્ડ અને વેરીએબલ વર્ડ લેન્થ સ્ટોરેજ સમજાવો. (૧૦)

પ્ર. ૪ ઓપ્ટીકલ સ્ટોરેજ ડિવાઇસના પ્રકાર જણાવો અને કોઇપણ એક વિશે વિગતવાર સમજાવો. (૧૦)

અથવા

પ્ર. ૪ ચુંબકીય (મેગ્નેટીક) ટેપ વિશે નોંધ લખો. (૧૦)

પ્ર. ૫ માઉસ (Mouse) શું છે? તેના વિશે ટૂંકમાં સમજાવો. (૧૦)

અથવા

પ્ર. ૫ કી-બોર્ડની વિવિધ પ્રકારની કી (Key)ની ચાદી બનાવો અને કોઇપણ ત્રણ વિશે વિગતવાર સમજૂતી આપો. (૧૦)

પ્ર. ૬

(અ) લેસર પ્રિન્ટર વિશે નોંધ લખો. (૦૫)

(બ) ડોટ-મેટ્રિક્સ પ્રિન્ટર વિશે વિગતવાર સમજાવો. (૦૫)

અથવા

પ્ર. ૬ સીઆરટી મોનિટર વિશે ટૂંકમાં માહિતી આપો. (૧૦)

5C

SEAT No._____ No. of Printed Pages : 02

[1D 6A-12] SARDAR PATEL UNIVERSITY V.V.NAGAR

S.YB.Sc. Sem-III, EXAMINATION

SUB. CODE:-US03EELE01 SUB: Fundamentals of Computer Hardware

DATE:-28/11/2017 TIME:-2:00 pm to 4:00 pm MARKS-70

Q-1 Choose correct answer [10]

1. Human Language converted to Computer Language by _____
   (A) Control Unit (C) Input Unit
   (B) CPU (D) None of these
2. Conversion of Computer Coded Language into Human Acceptable form is done by _____
   (A) Input Unit (C) ALU
   (B) Output Unit (D) None of these
3. Popular type of hand held computer is _____
   (A) Desktop Computer (C) PDA
   (B) Smart Phone (D) None of these
4. Diskettes spin at about _____RPM
   (A) 300 (C) 30
   (B) 3 (D) None of these
5. The process of mapping a magnetic disk surface is called_____
   (A) Scanning (C) Accessing
   (B) Formatting (D) None of these
6. Intelligent smart card contains their own _____
   (A) Microprocessor (C) Flash
   (B) Keyboard (D) None of these
7. _____is not a modifier key.
   (A) Shift (C) Backspace.
   (B) Ctrl (D) ALT.
8. Barcode reader is special type of_____
   (A) Printer (C) Game-pade
   (B) Scanner (D) None of these.
9. Size of monitor is measured _____
   (A)Horizontally (C) Diagonally
   (B) Vertically (D) none of above
10. Colour Inkjet Printer is also known as _____Printer.
    (A) Two Colour (C) Non-Impact
    (B) CMYK (D) None of these

Q-2 Short answer type question. (any ten) [20]

1. List different types of computers that are designed for use by single person.
2. Name computers that are designed for organization.
3. What is Cache Memory?
4. Explain Seek and Latency Time.
5. Explain Flash Memory.
6. List different types of registers used in computer.
7. Explain Smart cards.
8. Write a note on digital camera.
9. Write a note on digital barcode reader.
10. Explain monitor and state its types.
11. Give classification of printers.
12. Explain Dot Pitch

C.P.T.O.

Q.3	Draw the block diagram showing basic organization of computer system & Explain function of each block	[10]
	OR	
Q.3	Explain fixed and variable word length storage.	[10]
Q.4	List different Optical Storage Devices and explain in detail any one.	[10]
	OR	
Q.4	Write a note on Magnetic tape	[10]
Q.5	What is mouse? Explain it in brief.	[10]
	OR	
Q.5	List different types of keys on keyboard and explain three in detail	[10]
Q.6 (A)	Write a note on Laser Printer	[05]
(B)	Explain in detail Dot-Matrix Printer.	[05]
	OR	
Q.6	Explain CRT monitors in brief.	[10]

—X—

[10 / A-12 (Guj.)] Seat No.: _____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
B. Sc. (III Semester) Examination
Tuesday, 28th November 2017
US03EELE01 – Fundamentals of Computer Hardware
02.00 p.m. – 04.00 p.m.

કુલ ગુણ : ૭૦

પ્ર. ૧ સાચો જવાબ પસંદ કરો. (૧૦)

૧. માનવ ભાષાનું કોમ્પ્યુટર ભાષામાં _____ દ્વારા રૂપાંતરણ કરવામાં આવે છે.
અ) કંટ્રોલ યુનિટ બ) આઉટપુટ યુનિટ
ક) એ. એલ. યુ. ડ) આમાંથી એકેય નહીં

૨. કોમ્પ્યુટર કોડેડ ભાષાનું માનવ ભાષામાં રૂપાંતરણ _____ થી કરવામાં આવે છે.
અ) કંટ્રોલ યુનિટ બ) આઉટપુટ યુનિટ
ક) એ. એલ. યુ. ડ) આમાંથી એકેય નહીં

૩. લોકપ્રિય પ્રકારનું હેન્ડ હેલ્ડ કોમ્પ્યુટર _____ છે.
અ) ડેસ્કટોપ કોમ્પ્યુટર બ) પીડીએ ક) સ્માર્ટ ફોન ડ) આમાંથી એકેય નહીં

૪. ડિસ્કેટ _____ સ્પીડથી ફરે છે.
અ) ૩૦૦ બ) ૩૦ ક) ૩ ડ) આમાંથી એકેય નહીં

૫. મેગ્નેટીક ડિસ્કની સરફેસને મેપીંગ કરવાની પ્રક્રિયાને _____ કહે છે.
અ) સ્કેનીંગ બ) ફોરમેટીંગ ક) એસેસીંગ ડ) આમાંથી એકેય નહીં

૬. ઈન્ટેલીજન્ટ સ્માર્ટ કાર્ડ પોતાનું _____ ધરાવે છે.
અ) માઈક્રો પ્રોસેસર બ) કી-બોર્ડ ક) ફ્લેશ ડ) આમાંથી એકેય નહીં

૭. _____ મોડીફાયર કી નથી.
અ) શીફ્ટ બ) કંટ્રોલ ક) બેકસ્પેસ ડ) અલ્ટર

૮. બારકોડ રીડર વિશેષ જાતનું _____ છે.
અ) પ્રિન્ટર બ) સ્કેનર ક) ગેમ પેડ ડ) આમાંથી એકેય નહીં

૯. મોનીટરની સાઈઝ _____ રીતે માપવામાં આવે છે.
અ) હોરિઝોન્ટલી (આડું) બ) વર્ટીકલી (ઉભું)
ક) ડાયાગોનલી (ત્રાંસું) ડ) આમાંથી એકેય નહીં

૧૦. કલર ઈન્કજેટ પ્રિન્ટરને _____ થી ઓળખવામાં આવે છે.
અ) બે કલરનું પ્રિન્ટર બ) નોન-ઈમ્પેક્ટ પ્રિન્ટર
ક) સી. એમ. વાય. કે. ડ) આમાંથી એકેય નહીં

પ્ર. ૨ ટૂંકા પ્રશ્નોઃ **(કોઈપણ દસ)** (૨૦)

૧. એક વ્યક્તિના વપરાશ માટે બનાવવામાં આવેલા જુદાં-જુદાં પ્રકારના કોમ્પ્યુટરનું લિસ્ટ આપો.
૨. સંસ્થા માટે વપરાતા કોમ્પ્યુટરનાં નામ લખો.
૩. કેશ (Cache) મેમરી શું છે? તે સમજાવો.
૪. સીક (Seek) અને લેટન્સી (Latency) ટાઈમ સમજાવો.
૫. ફ્લેશ (Flash) મેમરી ટૂંકમાં સમજાવો.

૬. કોમ્પ્યુટરમાં વપરાતા વિવિધ પ્રકારનાં રજીસ્ટરનાં પ્રકાર જણાવો.
૭. સ્માર્ટ કાર્ડ વિશે સમજાવો.
૮. ડિજીટલ કેમેરા વિશે ટૂંકમાં લખો.
૯. ડિજીટલ બારકોડ રીડર વિશે ટૂંકમાં લખો.
૧૦. મોનીટર શું છે? તે સમજાવો અને તેના વિવિધ પ્રકારો જણાવો.
૧૧. પ્રિન્ટરનું વર્ગીકરણ કરો.
૧૨. ડોટ પીચ (Dot Pitch) વિશે સમજાવો.

પ્ર. ૩ કોમ્પ્યુટરનો બ્લોક ડાયાગ્રામ દોરો અને દરેક બ્લોકનું કાર્ય સમજાવો. (૧૦)

અથવા

પ્ર. ૩ ફિક્સ્ડ અને વેરીએબલ વર્ડ લેન્થ સ્ટોરેજ સમજાવો. (૧૦)

પ્ર. ૪ ઓપ્ટીકલ સ્ટોરેજ ડિવાઇસના પ્રકાર જણાવો અને કોઇપણ એક વિશે વિગતવાર સમજાવો. (૧૦)

અથવા

પ્ર. ૪ ચુંબકીય (મેગ્નેટીક) ટેપ વિશે નોંધ લખો. (૧૦)

પ્ર. ૫ માઉસ (Mouse) શું છે? તેના વિશે ટૂંકમાં સમજાવો. (૧૦)

અથવા

પ્ર. ૫ કી-બોર્ડની વિવિધ પ્રકારની કી (Key)ની ચાદી બનાવો અને કોઇપણ ત્રણ વિશે વિગતવાર સમજૂતી આપો. (૧૦)

પ્ર. ૬

(અ) લેસર પ્રિન્ટર વિશે નોંધ લખો. (૦૫)

(બ) ડોટ-મેટ્રિક્સ પ્રિન્ટર વિશે વિગતવાર સમજાવો. (૦૫)

અથવા

પ્ર. ૬ સીઆરટી મોનિટર વિશે ટૂંકમાં માહિતી આપો. (૧૦)

SEAT No._____ 02 SC

[306 A-25] **SARDAR PATEL UNIVERSITY**

Vallabh Vidyanagar - 388120

B.Sc. (3RD Sem) Examination - 2017

24th November, 2017 (Friday)

02:00 PM - 04:00 PM

US03EELE02

Instrumentation

Maximum Marks: 70

Que 1 Each question below gives a multiple choice of answers. Choose the most appropriate one. **[10]**

1 _____: is Due to Either Carelessness of the Person or Due to Improper Adjustment of the Appratus.

a) Gross Error **b)** Systamatic Error

c) Personal Error **d)** Random Error

2 _____: Unit of Resistance (of Resistor).

a) Ohm **b)** Mho

c) Ampere **d)** Volt

3 _____ cm = 1 Foot.

a) 30.48 **b)** 12

c) 0.3333 **d)** 3.048

4 _____: Smallest Change in Measured Value to Which Instrument Respond.

a) Hysteris **b)** Threshold

c) Resolution **d)** Error

5 _____: Unit of Area.

a) Meter/Second **b)** Meter/Second^2

c) Meter^2/Second **d)** None of These

6 Multimeter can Measure _____.

a) Voltage **b)** Current

c) Resistance **d)** All of These

7 1 Watt = _____ HP (Horse Power).

a) 0.860421 **b)** 0.0136

c) 0.001341 **d)** 3.412142

8 _____: Refers to the Closeness of a Measurement to the True Value of the Physical Quantity.

a) Accuracy **b)** Precision

c) Contant Error **d)** Instrumental Error

9 _____: Difference Between True Value and Measured Value of the Quantity.

a) Precision **b)** Error

c) Accuracy **d)** Arithmetic Mean

10 The Sensitivity of Voltmeter Specified on the Meter Dial Specifies the _____ of the Meter For One Volt Range.

a) Resistance **b)** Conductance

c) Inducatance **d)** Capacitance

(P.T.O.)

Que 2 Short Questions (Attempt any TEN). **[20]**

1 What Do You Mean By Self - Generating Type Instrument?
2 Give Classification of Instruments.
3 What are the Advantages of Automatic Type of Instruments?
4 The Resistance R=V/I, Where V=100±5 V and I=10±0.2 A. Find the Percentage Error in R.
5 Define: Accuracy and Precision.
6 Differentiate: Systematic Error and Random Error.
7 The Radius of Gold Nucleus is 41.3 Fermi. Express its Volume in $Meter^3$.
8 The Young's Modulus of Steel is 1.9×10^{11} N/m^2. Express it in $Dyne/cm^2$.
9 The Density of a Material is 0.8 gm/cm^3. Express it in SI Unit.
10 Define Voltmeter Sensitivity.
11 What is PMMC?
12 What is Multimeter?

Que 3 **[A]** Write on Typical Applications of Instrument Systems. **[05]**
[B] Give an Account of Null and Deflection Type Instruments. **[05]**
OR
[C] Explain Functional Elements of Measurement Systems. **[05]**
[D] Write a Note on Analog and Digital Instruments. **[05]**

Que 4 **[A]** The Length of a Rod as Measured in an Experiment was Found to be 2.48 m, 2.46 m, 2.49 m, 2.50 m and 2.48 m. Find the Average Length, the Absolute Error in Each Observation and the Percentage Error. **[05]**
[B] Enlist Types of Errors. Explain Any Two in Detail. **[05]**
OR
[C] In an Experiment, Refractive Index of Glass Was Observed to be 1.45, 1.56, 1.54, 1.44, 1.54 and 1.53. Calculate Fractional Error and Percentage Error. **[05]**
[D] The Length, Breadth and Height of a Rectangular Block of Wood Were Measured to be $l = 12.13 \pm 0.02\ cm$; $b = 8.16 \pm 0.01\ cm$ and $h = 3.46 \pm 0.01\ cm$. Determine the Percentage Error in the Volume of the Block. **[05]**

Que 5 **[A]** What Are Physical Quantities? Distinguish Between Fundamental and Derived Quantities. **[05]**
[B] State the Advantages of SI (The International System of Units) Over Other Systems of Units. State the Rules That Are Followed in Writing SI Units in Symbolic Form. **[05]**
OR
[C] What is System of Units? Mention the Various Types of System of Units. **[05]**
[D] Give an Account of Electrical And Magnetic Units. **[05]**

Que 6 **[A]** Write a Detailed Note on DC Ammeter. **[05]**
[B] Explain Direct Current Indicating Instruments. **[05]**
OR
[C] Discuss Aytron Shunt DC Voltmeter. **[05]**
[D] With Necessary Circuit Diagram, Explain Shunt Resistor. **[05]**

——X——

SE

SEAT No._____ No. of Printed pages: 02

[32 & A-22] SARDAR PATEL UNIVERSITY

B.Sc. Examination- Semester–III (CBCS)

Monday, 27th November-2017

US03EFSC01: PRINCIPLES OF FORENSIC SCIENCE

Time- 02:00 pm – 05:00pm Total Marks- 70

Q-1 Multiple Choice Questions: (10)

1) Indian Evidence Act is not applicable in _____
   (a) Gujarat (b) Meghalaya
   (c) Jammu & Kashmir (d) Telangana

2) Circular paper Chromatography is also known as _____ paper Chromatography
   (a) Triangular (b) Peculiar
   (c) Radial (d) Nanotech

3) In ballistics, Flechette is also known as a _____
   (a) Arrow (b) Sword
   (c) Pin (d) Endpoint

4) The civil and political rights are considered to be the _____ generation of Human Rights.
   (a) Third (b) Fifth
   (c) Second (d) First

5) _____ is the main criminal code in India.
   (a) IPC (b) IEA
   (c) IED (d) None of the above.

6) Whatmann filter papers have a content of 99% _____ cellulose.
   (a) μ (b) ¥
   (c) α (d) Θ

7) The first French republic was established in the year of _____
   (a) 1784 (b) 1949
   (c) 1879 (d) 1789

8) The main drawback of a prism is that they give _____ dispersion.
   (a) Linear (b) Non Linear
   (c) Protonic (d) Electronic

9) Legally there are _____ types of Kidnapping.
   (a) Two (b) Three
   (c) One (d) Four

10) Eye Piece is also known as a _____
   (a) Repeater (b) Paradox
   (c) Nocular (d) Ocular

(P.T.O.)

Q-2 Short Questions: (Attempt Any Ten) (20)

1. State the special units of police force.
2. Draw the organizational structure of Courts in India.
3. Write about any two sources of Ultraviolet Radiation.
4. Explain the forensic significance of Paper Chromatography.
5. Define propellant & ammunition.
6. Write about the types of bullets as per the shape of base head.
7. Explain Negative and Positive Human Rights.
8. Explain Evidence act and state any section of Evidence Act.
9. Explain Section 300 of Indian Penal Code.
10. State briefly about Bright Field Microscopy.
11. Explain protection in respect of conviction of Offences
12. What do you infer by Child Labour Act?

Q-3(A) Explain the structure of police system in India. (5)
(B) Explain the various records of Modus Operandi Bureau with proper example. (5)

OR

Q-3(A) Write a note on Culpable Homicide and Murder. (5)
(B) Explain Public Nuisance and Grievous Hurt as per IPC (5)

Q-4(A) Explain the principle of Colorimetry. (5)
(B) Elaborate the principle of Thin Layer Chromatography with diagram. (5)

OR

Q-4(A) Differentiate between Dark and Bright Field Microscopy. (5)
(B) Explain absorption filters and properties of Cell Holders in brief. (5)

Q-5 Define & Classify firearms. Also explain various parts of a pistol in detail. (10)

OR

Q-5 Explain the types of magazine loaders and hammerless firearms and bullets as per shapes and sizes. (10)

Q-6(A) Write a short note on Historical development of Human Rights & its philosophy. (5)
(B) What are the specific sectors wherein child labour is legally banned? (5)

OR

Q-6(A) Which rights are commonly found in the International Human Rights ? (5)
(B) How are victims classified demographically & state the role of victimologists? (5)

SC

SEAT No._____

No. of Printed Pages : 02

[A-35]

Sardar Patel University

B. Sc. (Semester – III – Examination) (2010 Batch)

21-11-2017, Tuesday

Time: 02:00pm to 04:00pm

Industrial Chemistry & Industrial Chemistry Vocational

US03EGCH01 (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. What is the state of hybridization of carbon in carbanion?
   A. sp^2
   B. Sp
   C. Sp^3
   D. sp^3d
2. The decreasing order of the size of the three hybrid orbitals would be....
   A. $sp^2>sp>sp^3$
   B. $Sp>sp^2>sp^3d$
   C. $sp^3> sp^2>sp$
   D. None of these
3. A Nucleophile is _____
   A. Lewis acid
   B. Electron deficient species
   C. An electron rich speciesd.
   D. None of these
4. Which group forms the strongest H-bond to water molecules?
   A. Phenols
   B. Alcohols
   C. Ethers
   D. All equally strong
5. Phenol reacts with excess bromine water to give...
   A. 2,4,6-tribromophenol
   B. o- bromo phenol + p-bromo phenol
   C. Bromobenzene
   D. None of these
6. Ketones are prepared by oxidation of
   A. Primary alcohol
   B. Secondary alcohol
   C. Tertiary alcohol
   D. None of these
7. Amines are generally classified as
   A. Strong acids
   B. Weak bases
   C. Weak acids
   D. Strong bases
8. The appearance of a silver mirror in Tollen's test indicates presence of:
   A. An alcohol
   B. An alkene
   C. An aldehyde
   D. A ketone
9. Aromatic primary amines react with cold nitrous acids to form...
   A. Diazonium salts
   B. Nitriles
   C. Alcohols
   D. Nitroalkanes
10. The hybridization of Nitrogen in Amine is...
    A. Sp_4
    B. Sp
    C. Sp^3
    D. Sp^2

(P.T.O.)

Q.2 Answer the following short questions (Any Ten) (20)

1. Define term Inductive effect.
2. Why, HF has a higher boiling point than HCl.?
3. Explain acidic character of 2-chlorobutanoic acid.
4. Give structure and physical properties of ethers.
5. Write a reaction for indicating an acidity of phenol.
6. Write a reaction for "Williamson Synthesis" of ethers.
7. Why, lower aldehyde are appreciable soluble in water.
8. Define term "Transesterification".
9. Write a reaction for acidity of α- hydrogen of aldehydes.
10. Write uses of Diazonium Salt.
11. Why Aniline is a weaker base than ammonia? Explain.
12. Define term Exhaustive methylation.

Q.3 Write a notes on following: (10)

A. Postulates of Resonance theory
B. Inductive effect.

OR

Q.3 Write a notes on following: (10)

A. Carbnions and Carbocations.
B. Hydrogen bonds.

Q.4 Write a notes on following: (10)

A. "Oxymercuration-demercuration" for preparation of alcohol.
B. Acid & base catalyzed cleavage of Epoxide.

OR

Q.4 Discuss the following: (10)

A. Addition of Grignard reagent in carbonyl compound
B. The ring substitution of phenol.

Q.5 Explain the following statements. (10)

1. Nucleophilic addition to aldehydes and ketones can be catalyzed by acid.
2. Aldehyde and ketones have lower boiling points than comparable alcohols or carboxylic acids.

OR

Q.5 Write notes on following: (10)

1. Grignard synthesis of a carboxylic acid.
2. Hell-Volhard-Zelinsky reaction.

Q.6

A. Discuss the reactions of amine with nitrous acid. (05)
B. Write a note on methods of diazotization. (05)

OR

Q.6 Write a synthesis o-Bromo toluene, *m*-Bromo toluene and *p*-Bromo toluene from Toluene. (10)

—X—

SEAT No._____

[31]

No. of printed pages : 02

SARDAR PATEL UNIVERSITY

B. Sc. (Third Semester Examination)

Saturday, 25th November, 2017

US03EICH01 – Traditional Methods of Analysis

Time: 2.00 p.m. to 4.00 p.m. CHEMISTRY Total Marks : 70

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

i. The third substance added during acid base titration for the detection of end point by color change is...
(a)Strong acid
(b) indicator
(c)reagent
(d) buffer

ii. If a small amount of acid or base is added to it, there is no change in pH of solution is
(a) strong acid
(b) strong base
(c) buffer
(d) indicator

iii. Mixture of ammonium chloride & ammonium hydroxide is----------.
(a) complexing agent
(b) indicator
(c) buffer
(d)basic buffer

iv. A complexing agent can be....
(a) monodentate
(b) Polydentate
(c)electron pair acceptor
(d) all of these

v. Which of the following acid is added in the titration of $KMnO_4$?
(a)H_2SO_4
(b) HCl
(c) HNO_3
(d) phosphoric acid

vi. Which of the following is not a redox titration?
(a) titration of HCl with NaOH
(b) titration of ferrous sulphate with $KMnO_4$
(c) titration of oxalic acid with $KMnO_4$
(d) all of these

vii The temporary hardness of water due to calcium bicarbonate can be removed by
(a)adding calcium chloride
(b)boiling
(c)filtration
(d)adding HCl

viii Indicator used to determine sulphate in hard water by EDTA titration is
(a)phenolphthalein
(b) diphenyl amine
(c) Eriochrome black T
(d)Eosin

contd .. Page 2

ix Molarity is
a) number of moles solute dissolved per liter of solution
b) number of moles of solute dissolved per liter of solvent
c) number of moles of solute dissolved per Kg of solvent
d) number of moles of solute dissolved per Kg of solution.

x Oxidation involves
(a)gain of electrons
(b)addition of hydrogen
(c)decrease in oxidation number
(d)loss of electrons

Q.2. Answer any ten: [20]

i. Define: Primary standard solution and Titration error.
ii. Define: Equivalence point and End point.
iii. Define: Chelate & Stability constant.
iv. Discuss back titration used for EDTA titration.
v. Define: Reducing agent & Voltage
vi. Sulphuric acid is used for potassium permanganate titration in place of hydrochloric acid.
vii Distinguish clearly between temporary hard water and permanent hard water.
viii Explain the principle of measurement of electrical conductivity of water.
ix Give method and calculation to determine chloride in water.
x Write the conditions fulfilled by common titrimetric methods of analysis.
xi Define Monodentate ligand and give two examples.
xii Distinguish clearly between oxidation and reduction with example.

Q.3. By taking example of strong acid and strong base titration, discuss the neutralization curve .Also give color change range of some indicators. [10]

OR

Q.3. Show that at the color change interval, pH of the system is $pH = pK_{In} \pm 1$. Also discuss desirable properties of primary standard solution. [10]

Q.4. Explain stability constant and formation of complex ion by taking proper example. How will you determine hardness (calcium and magnesium) of water samples? [10]

OR

Q.4. What are the requirements for metal ion indicator for use in visual detection of end point? Also explain working of metal ion indicator for EDTA titration. [10]

Q.5. Explain titration curve for iron (II) & cerium (IV) in detail. [10]

OR

Q.5. Write in detail on internal redox indicators, explaining working of Diphenyl amine indicator. [10]

Q6(a) What do you understand by water pollution? Classify the types of water pollution. [10]

(b) What is the origin of waste water? Describe the water pollutants and their effects.

OR

Q6 Discuss the methods to analyze the presence of color, turbidity, total dissolved solids, hardness and acidity in water sample. [10]

Seat No. _____ 5E

No. of Printed Pages : 02

[30] **SARDAR PATEL UNIVERSITY**

B. Sc. Examination (Third Semester)

Thursday, 23rd November-2017

2.00 pm to 4.00 pm

Industrial Chemistry-I (US03EICH02)

Total Marks: 70

Q-1 Choose the most appropriate option for each of the following. **[10]**

1. The material and _____ calculations are basic tools for process design work.
   (a) phase balance (b) mass balance (c) energy balance (d) chemical balance
2. The law of conservation of mass states that the total _____ of various components involved remains constant during an unit operation.
   (a) mass (b) volume (c) energy (d) pressure
3. The heat transfer equipment which consists of two concentric pipes is called as _____ heat exchanger.
   (a) plate type (b) double pipe (c) finned tube (d) shell and tube
4. Volute converts the _____ energy of the liquid imparted by the impeller to pressure energy.
   (a) mechanical (b) kinetic (c) potential (d) translational
5. The impeller blades of the centrifugal pump in revolving produce a reduction in _____ at the eye of the impeller.
   (a) pressure (b) temperature (c) volume (d) resistance
6. Mercury-in-glass thermometer cannot be used below _____ °F.
   (a) 27 (b) 38 (c) 50 (d) 72
7. A pressure spring of bronze is used in the pressure range up to about _____ psi.
   (a) 100 (b) 600 (c) 400 (d) 50
8. Lime-Soda process of water purification uses _____ .
   (a) $CaCO_3/Na_2CO_3$ (b) $Ca(OH)_2/Na_2CO_3$ (c) $Ca(OH)_2/NaOH$ (d) $CaCl_2/NaOH$
9. Hardness due to 162 mg/lit$Ca(HCO_3)$is equal to _____ .
   (a) 50 ppm (b) 100 ppm (c) 150 ppm (d) 200 ppm
10. Blow down is process of _____ .
    (a) precipitation of impurities (b) heat treatment
    (c) chemical purification (d) replacing the impure water

Q-2 Attempt any ten question of following. **[20]**

1. Give the classification of material balance problems.
2. Define the following terms: (i) Selectivity (ii) Open system.
3. Explain by-passing streams.
4. Define the following terms: (a) Priming (b) Casing
5. Give the types of reciprocating pumps.
6. Give the classification of shell and tube heat exchanger.
7. Give the types of expansion thermometer.

PTO

8. Explain about capillary and armor which are used in industrial pressure spring thermometer.

9. Give the methods of selecting lead wires.

10. Give the factors regarding water supply in selecting a proper site for a factory.

11. What are the major boiler troubles due to use of unsuitable water?

12. Define (a) Carry over (b) Priming

Q-3 List different step which will guide in solving material balance problem. **[10]**

OR

Q-3 Write a note on Recycle operation and its importance. **[10]**

Q-4 Attempt the following **[10]**

(a) Give the comparison of centrifugal pump with reciprocating pump.

(b) Write notes on Gear pump.

OR

Q-4 Attempt the following **[10]**

(a) Explain the various losses occurring during the operation of a centrifugal pump.

(b) Write in brief on plate type heat exchanger.

Q-5 Attempt the following **[10]**

(a) Give the brief account on bimetallic thermometer.

(b) Write notes on radiation pyrometers.

OR

Q-5 Attempt the following **[10]**

(a) Write notes on optical pyrometers.

(b) Give the advantage and disadvantage of industrial thermocouples.

Q-6 Attempt the following **[10]**

(a) Write note on: Determination of hardness.

(b) Discuss the prevention of scale formation in boilers.

OR

Q-6 Attempt the following **[10]**

(a) Write notes on blow down.

(b) Calculate the amount of Lime - soda needed for the treatment of 1,000 Liters of water containing the following:
$CaCO_3$ = 120 mg/l; $MgCO_3$ = 42 mg/l, $Mg(NO_3)_2$ = 148 mg/l; $CaCl_2$ = 111 mg/l; and KCl = 50 mg/l

—— X ——

SC

SEAT No._____ No. of Printed Pages : 02

[34d A-33]

Sardar Patel University

B.Sc- Semester examination-2017

B.Sc 3rd Semester **Subject – Bioinformatics**

Course no. US03EMBI0I **Date - 21.11.2017**

Molecular biology-I

Time – 2hrs (2:00 pm - 4:00 pm) **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. DNA are polymer of
(A) Amino acid (B) sugars
(C) Fatty acid (D) Nucleotides

1.b. Which of the following bases are examples of purines ?
(A) Adenine and Guanine (B) Adenine and Thymine
(C) Cytosine and Thymine (D) Cytosine and Guanine

1.c. Select the Nitrogen bases present in RNA
(A) AUCG (B) AUTC
(C) ATUG (D) ATCG

1.d. What is mode of DNA replication
(A) Semiconservative (B) Conservative
(C) Dispersive (D) Semidispersive

1.e. Enzyme required for removing RNA primer during DNA replication is
(A) Primase (B) Ligase
(C) DNA polymerase I (D) DNA polymerase III

1.f. Which of the following proteins is not involved in DNA repair?
(A) Primase (B) DNA ligase
(C) Uracil DNA glycosylase (D) DNA polymerase-I

1.g Select the DNA polymerase responsible for DNA repair
(A) Klenow polymerase (B) DNA polymerase III
(C) DNA polymerase IV (D) DNA polymerase I

1..h. In a given population of bacteria only few will undergo transformation because they have
(A) Sporulating (B) Competent (C) Flagella (D) Pilai

1..i. The process of mutation is called
(A) Mutagenesis (B) Carcinogenesis
(C) Oogenesis (D) Mutation rate

1.j Which of the following are examples of structural changes of chromosome
(A) Translocation
(B) Monosomics
(C) Polyploidy
(D) Nullisomics

P.T.O

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

[1] Give the function of DNA.
[2] Enlist the various classes of RNA .
[3] What is genetic code?
[4] Why DNA ligase is important in replication?
[5] Write a brief notes on replication fork.
[6] What do you mean by semidiscontinuous replication ?
[7] Give the reasons for possible cause of DNA damage.
[8] Write comments on significance of DNA repair.
[9] Briefly discuss the role of rec protein in DNA repair.
[10] Define transformation.
[11] What do you understand by numerical changes of chromosomes?
[12] Differentiate between Duplication and Deletion.

Q3.a. Describe Watson and Crick model of DNA double helix with neat diagram. [05]
Q3.b. What is genetic code? Enlist the various properties of genetic code. [05]

OR

Q.3.a. Explain the classes and properties of mRNA. [05]
Q.3.b. Differentiate between DNA and RNA. [05]
Q.4.a. Write notes on role of enzymes in DNA replication. [05]
Q.4.b. Explain the semiconsevative modes of DNA replication. [05]

OR

Q.4.a. What is elongation? Explain digrammatically. [05]
Q.4.b. Write notes on requirements of DNA replication. [05]
Q.5.a.How DNA repairs occurs through photoreactivation? Explain. [05]
Q.5.b.What is SOS repair? Explain. [05]

OR

Q.5.a. Explain different types of excision repair in brief. [05]
Q.5.b. Write notes on mechanism of recombinational repair. [05]

Q.6.a. Explain process of transformation with neat diagram. [05]
Q.6.b. Write a brief notes chromosomal translocation. [05]

OR

Q.6. a. Explain various types of conjugation with neat diagram [05]
Q.6. b. What is gene mutation? Briefly explain the various classes of point mutation. [05]

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SEAT No._____

[38 & A-25]

No. of printed page : 3

SARDAR PATEL UNIVERSITY
B.Sc. EXAMINATION (SEMESTER - III)
Wednesday, 22nd November , 2017
US03EMTH01 (Calculus)

Time : 02.00 p.m. to 04.00 p.m.

Maximum Marks:70

Que.1 Attempt the following. 10

(1) $\int_{-1}^{1} \frac{1}{x-1} dx$ is .....

(a) Proper Integral (b) Improper integral of 1st kind (c) Improper integral of 2nd kind (d) none

(2) $\int_{a}^{\infty} \frac{dx}{x^{\mu}}$ $(a > 0)$ is convergent if and only if .....

(a) $\mu > 1$ (b) $\mu < 1$ (c) $\mu = 1$ (d) None

(3) $\Gamma n =$ .....

(a) $\int_{0}^{\infty} x^{n-1}e^{-x}dx$ (b) $\int_{0}^{1} x^{n-1}e^{-x}dx$ (c) $\int_{0}^{\infty} x^{n-1}e^{x}dx$ (d) $\int_{0}^{1} x^{n+1}e^{-x}dx$

(4) If $n = 6$ then $\Gamma n =$ .....

(a) 6 (b) 120 (c) 720 (d) 5

(5) $\beta(p,q) = \beta(p+1,q)$.....$\beta(p,q+1)$

(a) + (b) − (c) · (d) =

(6) $\overline{\nabla} =$ .....

(a) $\sum \bar{i}\frac{\partial}{\partial x}$ (b) $\sum \bar{i}\frac{\partial f}{\partial x}$ (c) $\sum \bar{i}$ (d) $\sum x$

(7) ..... is called Laplace's equation.

(a) $\nabla^2 f \geq 0$ (b) $\nabla^2 f \leq 0$ (c) $\nabla^2 f = 0$ (d) $\nabla^2 f$

(8) If $f(x,y,z) = x^3 + 2y + 6z$ then $\overline{\nabla} f =$ .....

(a) $3x^2\bar{i} + 2\bar{j} + 6\bar{k}$ (b) $x^2\bar{i} + 2\bar{j} + 6\bar{k}$ (c) $x^3\bar{i} + 2\bar{j} + 6\bar{k}$ (d) $3x^2\bar{i} + 2y\bar{j} + 6\bar{k}$

(9) Primitive period of $\sin mx$ is .....

(a) $\frac{\pi}{m}$ (b) $\frac{2\pi}{m}$ (c) $\frac{2m}{\pi}$ (d) $\frac{\pi}{2}$

(10) Each term of trigonometric series has the period .....

(a) π (b) 2π (c) 3π (d) $\frac{\pi}{2}$

(P.T.O.)

Que.2 Attempt the following **(Any Ten)** 20

(1) Evaluate $\int_1^\infty \frac{dx}{1+x^2}$.

(2) Evaluate $\int_1^\infty \frac{dx}{\sqrt{x}}$.

(3) Evaluate $\int_0^1 \frac{dx}{x^2}$.

(4) Prove that $\beta(m,n) = \beta(n,m)$.

(5) Prove that $\Gamma n = (n-1)\Gamma(n-1)$.

(6) Evaluate $\int_0^{\pi/2} \sin^7\theta \cos^9\theta \, d\theta$.

(7) Prove that $\nabla(f \pm g) = \nabla f \pm \nabla g$.

(8) Prove that $\nabla.(\nabla f) = \nabla^2 f$.

(9) Prove that $\nabla \times (\nabla f) = \bar{0}$.

(10) Find the smallest period (primitive period) of the following function $f(x) = \sin 2\pi$.

(11) Find the smallest period (primitive period) of the following function $f(x) = \cos mx$.

(12) Define Half range expansions .

Que.3 [a] If $f(x)$ and $F(x)$ are two positive function for all $x \geq a$, $\lim_{x\to a} \frac{f(x)}{F(x)} = l$ where l is neither zero nor infinite then prove that $\int_a^\infty f(x)\,dx$ and $\int_a^\infty F(x)\,dx$ either both converges or both do not converges . 6

[b] Examine convergence of $\int_1^\infty \frac{dx}{x^{1/3}(1+x)^{1/2}}$ 4

OR

Que.3 [c] Prove that the integral $\int_a^b \frac{dx}{(b-x)^\mu}$ is convergent if and only if $\mu < 1$. 6

[d]Examine convergence of $\int_0^1 \frac{dx}{[(x-1)^6(x-2)]^{1/5}}$. 4

Que.4 [a] Prove that $\int_0^{\pi/2} \sin^p\theta \cos^q\theta \; d\theta = \frac{1}{2}\beta\left(\frac{p+1}{2}, \frac{q+1}{2}\right)$. 6

[b] Evaluate $\int_0^\infty \frac{x^4(1+x^5)}{(1+x)^{15}}\,dx$. 4

OR

Que.4 [c] Prove that $\beta(m,n) = \int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}\, dx.$ 6

[d] Evaluate $\int_0^1 x^5(1-x^3)^{10}\, dx.$ 4

Que.5 [a] Prove that $\overline{\nabla}\cdot(f\overline{\nabla}g) = f\overline{\nabla}^2 g + \overline{\nabla}f\cdot\overline{\nabla}g$. Hence evaluate $\overline{\nabla}\cdot(f\overline{\nabla}g - g\overline{\nabla}f)$. 5

[b] Find directional derivative of $f(x,y,z) = 4xz^3 - 3x^2y^2z$ at point $(2,-1,2)$ in the direction of $\bar{a} = 2\bar{i} - 3\bar{j} + 6\bar{k}$. 5

OR

Que.5 [c] Verify $\overline{\nabla}\cdot(f\bar{v}) = f(\overline{\nabla}\cdot\bar{v}) + \bar{v}\cdot\overline{\nabla}f$ for $f = e^{xyz}$ and $\bar{v} = x\bar{i} - 2y\bar{j} - 3z\bar{k}$. 6

[d] Prove that $\overline{\nabla}f(r) = f'(r)\overline{\nabla}r = f'(r)\,\frac{\bar{r}}{r}$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$. 4

Que.6 [a] Find Euler's constant a_n, b_n for Fourier series of a function $f(x)$ over $[-\pi,\pi]$. 6

[b] Find Fourier coefficient of periodic function $f(x) = x^2$, $-\pi < x < \pi$. 4

OR

Que.6 [c] Find Fourier coefficient of periodic function $f(x) = \begin{cases} 1 & \text{if } -\pi/2 < x \le \pi/2 \\ -1 & \text{if } \pi/2 < x < 3\pi/2. \end{cases}$ 6

[d] Represent the function $f(t) = t^2$, $0 < t < l$ by Fourier cosine series . 4

SEAT No._____ No. of Printed Pages : 02

[9, A-8- Eng] **SARDAR PATEL UNIVERSITY**

B.Sc.(SEMESTER-III)EXAMINATION-2017

November 30, 2017, Thursday

2:00 p.m. to 4:00 p.m.

US03EMTH05(MATHEMATICS)

(Calculus and Algebra - 1)

Maximum Marks: 70

Q.1 Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

(1) $\lim_{x\to 0} \frac{\sin 6x}{2x}$ =...
(a) ∞ (b) 1 (c) 2 (d) 3

(2) $\lim_{x\to 0} \frac{5x^2 \tan^2 x}{10}$ =...
(a) 0 (b) 1 (c) 2 (d) 1/2

(3) $z = \dfrac{2x^3 + 3xy^2}{xy}$ is a homogeneous function of degree....
(a) 0 (b) 1 (c) 2 (d) z is not homogeneous

(4) If $z = 11xy^2 + 13x^2y$, then $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y}$ = ...
(a) 0 (b) z (c) $2z$ (d) $3z$

(5) If $z = 9x^2 - 4y^2$, then $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2}$
(a) 0 (b) $2z$ (c) 10 (d) 18

(6) A square matrix A is said to be Skew-symmetric if....
(a) $A^T = A$ (b) $A^T = -A$ (c) $A^{-1} = A$ (d) $AA^T = I$

(7) If $A = \begin{pmatrix} 2 & 3+2i \\ 5-i & 7i \end{pmatrix}$, then $\overline{A}$ = ...
(a) $\begin{pmatrix} 2 & 3+2i \\ 5-i & 7i \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 5-i \\ 3+2i & 7i \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 3-2i \\ 5+i & -7i \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 5+i \\ 3-2i & -7i \end{pmatrix}$

(8) $A = \begin{pmatrix} 3 & 5 \\ 0 & 1 \end{pmatrix}$ and $B\begin{pmatrix} 1 & 0 \\ 4 & 6 \end{pmatrix}$, then $A + 3B$ = ...
(a) $\begin{pmatrix} 4 & 5 \\ 12 & 18 \end{pmatrix}$ (b) $\begin{pmatrix} 6 & 5 \\ 12 & 19 \end{pmatrix}$ (c) $\begin{pmatrix} 4 & 5 \\ 12 & 19 \end{pmatrix}$ (d) $\begin{pmatrix} 6 & 5 \\ 12 & 18 \end{pmatrix}$

(9) If $A = \begin{pmatrix} 3 & 2 \\ 5 & 0 \end{pmatrix}$, then A^2 = ...
(a) $\begin{pmatrix} 19 & 15 \\ 6 & 10 \end{pmatrix}$ (b) $\begin{pmatrix} 9 & 4 \\ 25 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 19 & 6 \\ 15 & 10 \end{pmatrix}$ (d) $\begin{pmatrix} 9 & 6 \\ 25 & 10 \end{pmatrix}$

(10) If $|A - 6I| = 0$, then one of the characteristic root of A is .....
(a) 0 (b) 1 (c) 6 (d) -6

Q.2 Attempt any Ten: [20]

(1) Evaluate: $\lim_{x\to 0} \dfrac{\tan \frac{\pi x}{6}}{x}$.

(2) Evaluate: $\lim_{x\to 0} \dfrac{\log(1-x^2)}{\log(\cos x)}$.

(3) Evaluate: $\lim_{x\to 2} \dfrac{\sin(x^2-4)}{x-2}$.

(4) For $u = x^3y^2 + 3xy^2$, find $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2}$.

(5) Find degree of the homogeneous function $z = \frac{x^3+xy^2}{xy}$.

(6) If $z = 3x^2y^2 + 11xy^3$, then find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$.

(7) If $A = \begin{pmatrix} 5 & -7 & 4 \\ 0 & 1 & 7 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -3 & 5 \\ 9 & 0 & 5 \end{pmatrix}$ then find $6A + 4B$.

(8) Define Skew-symmetric matrix with an example.

CP.T.O.

(9) If U and V are two symmetric matrices, then show that U-V is Skew-symmetric.

(10) State Reversal and Distributive law for product of matrices.

(11) If $A = \begin{pmatrix} 3 & 12 & -11 \\ 0 & 5 & -123 \\ 0 & 0 & 6 \end{pmatrix}$ then find $|A|$ and $|A^T|$.

(12) If $A = \begin{pmatrix} 2 & 27 \\ 0 & 2 \end{pmatrix}$ then find characteristic equation of A.

Q.3

(a) Evaluate: $\lim_{x\to\infty} \left[\frac{1^{\frac{1}{x}} + 2^{\frac{1}{x}} + 3^{\frac{1}{x}}}{3}\right]^{3x}$. [5]

(b) Evaluate: $\lim_{x\to 0} \frac{\tan x \tan^{-1} x - x^2}{x^6}$. [5]

OR

Q.3

(c) Evaluate: $\lim_{x\to 0} \frac{e^x + \log(1-x) - 1}{\tan x - x}$. [5]

(d) Evaluate: $\lim_{x\to a} (2 - \frac{x}{a})^{\tan(\frac{\pi x}{2a})}$. [5]

Q.4

(a) State and prove Euler's theorem for functions of two variables. [5]

(b) If $z = f(x, y)$ and $u = e^x \cos y$, $v = e^x \sin y$ then prove that $\frac{\partial f}{\partial x} = u\frac{\partial f}{\partial u} + v\frac{\partial f}{\partial v}$. [5]

OR

Q.4

(c) If $z = f(x, y)$, $x = r\cos\theta, y = r\sin\theta$ then prove that $\left[\frac{\partial z}{\partial x}\right]^2 + \left[\frac{\partial z}{\partial y}\right]^2 = \left[\frac{\partial z}{\partial r}\right]^2 + \frac{1}{r^2}\left[\frac{\partial z}{\partial \theta}\right]^2$. [5]

(d) Verify Euler's theorem and find $x^2\frac{\partial^2 z}{\partial x^2} + 2xy\frac{\partial^2 z}{\partial x \partial y} + y^2\frac{\partial^2 z}{\partial y^2}$ for $z = 5x^3y^4 + 7x^5y^2$. [5]

Q.5

(a) Prove that every square matrix can be expressed in one and only one way as the sum of a symmetric and a skew symmetric matrix. [5]

(b) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 3 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} -3 & -2 \\ 1 & -5 \\ 4 & 3 \end{pmatrix}$ then find a matrix D such that $A + B + D = 0$. [5]

OR

Q.5

(c) If A and B are both symmetric then prove that AB is symmetric iff A and B commute. [5]

(d) If $A = \begin{pmatrix} 2+i & 3-i & 4+5i \\ 1+3i & 2i & 5-6i \\ 3+i & 6-5i & 1+i \end{pmatrix}$ then find A^θ, $A - A^\theta$ and $A + A^\theta$. [5]

Q.6

(a) State and prove Cayley-Hamilton theorem. [5]

(b) If $A = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$ then show that $A^k = \begin{pmatrix} 1+2k & -4k \\ k & 1-2k \end{pmatrix}$ where k is any positive number. [5]

OR

Q.6

(c) If $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ then find out the values of α, β such that $(\alpha I + \beta A)^2 = A$. [5]

(d) If $A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ then find characteristic equation of matrix A. [5]

—X—

SEAT No.________

[૧ ૬ A-8-૦૫જૂ.] સરદાર પટેલ વિશ્વવિદ્યાલય

બી.એસ.સી. સેમેસ્ટર –III પરીક્ષા -2017

નવેમ્બર 30, 2017, ગુરૂવાર 2.00 p.m. to 4.00 p.m.

US03EMTH05(MATHEMATICS)

(Calculus and Algebra - 1)

કુલ ગુણ: 70

Q.1 નીચેના પ્રશ્નોમાં ખરો વિકલ્પ પસંદ કરીને તે વિકલ્પને તમારી ઉતરવાહીમાં લખો. [10]

(1) $\lim_{x\to 0}\frac{\sin 6x}{2x} = ...$
(a) ∞ (b) 1 (c) 2 (d) 3

(2) $\lim_{x\to 0}\frac{5x^2\tan^2 x}{10} = ...$
(a) 0 (b) 1 (c) 2 (d) 1/2

(3) સમપરિમાણીય વિધેય $z = \dfrac{2x^3+3xy^2}{xy}$ ની ઘાત........ છે.
(a) 0 (b) 1 (c) 2 (d) z સમપરિમાણીય નથી

(4) જો $z = 11xy^2 + 13x^2y$ હોય તો $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = ...$
(a) 0 (b) z (c) $2z$ (d) $3z$

(5) જો $z = 9x^2 - 4y^2$ હોય તો $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2}$
(a) 0 (b) $2z$ (c) 10 (d) 18

(6) જો ચોરસ શ્રેણિક A વિસંમિત હોય તો........થાય.
(a) $A^T = A$ (b) $A^T = -A$ (c) $A^{-1} = A$ (d) $AA^T = I$

(7) જો $A = \begin{pmatrix} 2 & 3+2i \\ 5-i & 7i \end{pmatrix}$, તો $\overline{A} = ...$
(a) $\begin{pmatrix} 2 & 3+2i \\ 5-i & 7i \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 5-i \\ 3+2i & 7i \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 3-2i \\ 5+i & -7i \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 5+i \\ 3-2i & -7i \end{pmatrix}$

(8) જો $A = \begin{pmatrix} 3 & 5 \\ 0 & 1 \end{pmatrix}$ અને $B \begin{pmatrix} 1 & 0 \\ 4 & 6 \end{pmatrix}$ હોય તો $A + 3B = ...$
(a) $\begin{pmatrix} 4 & 5 \\ 12 & 18 \end{pmatrix}$ (b) $\begin{pmatrix} 6 & 5 \\ 12 & 19 \end{pmatrix}$ (c) $\begin{pmatrix} 4 & 5 \\ 12 & 19 \end{pmatrix}$ (d) $\begin{pmatrix} 6 & 5 \\ 12 & 18 \end{pmatrix}$

(9) જો$A = \begin{pmatrix} 3 & 2 \\ 5 & 0 \end{pmatrix}$ તો $A^2 = ...$
(a) $\begin{pmatrix} 19 & 15 \\ 6 & 10 \end{pmatrix}$ (b) $\begin{pmatrix} 9 & 4 \\ 25 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 19 & 6 \\ 15 & 10 \end{pmatrix}$ (d) $\begin{pmatrix} 9 & 6 \\ 25 & 10 \end{pmatrix}$

(10) જો $|A - 6I| = 0$ હોય તો શ્રેણિક A નું એક લાક્ષણિક મૂલ્ય .... હોય.
(a) 0 (b) 1 (c) 6 (d) -6

Q.2 Attempt any Ten: [20]

(1) શોધો: $\lim_{x\to 0}\dfrac{\tan\frac{\pi x}{6}}{x}$.

(2) શોધો: $\lim_{x\to 0}\dfrac{\log(1-x^2)}{\log(\cos x)}$.

(3) શોધો: $\lim_{x\to 2}\dfrac{\sin(x^2-4)}{x-2}$.

(4) જો $u = x^3y^2 + 3xy^2$ હોય તો $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2}$ શોધો.

(5) સમપરિમાણીય વિધેય $z = \frac{x^3+xy^2}{xy}$ ની ઘાત શોધો.

(6) જો $z = 3x^2y^2 + 11xy^3$ હોય તો $\frac{\partial z}{\partial x}$ અને $\frac{\partial z}{\partial y}$ શોધો.

(7) જો $A = \begin{pmatrix} 5 & -7 & 4 \\ 0 & 1 & 7 \end{pmatrix}$ અને $B = \begin{pmatrix} 2 & -3 & 5 \\ 9 & 0 & 5 \end{pmatrix}$ હોય તો $6A + 4B$ શોધો.

(પાન ઉલટાવો)

(8) વિસંમિત શ્રેણિક ઉદાહરણ સાથે વ્યાખ્યાયિત કરો.

(9) જો U અને V બે સંમિત શ્રેણિક હોય તો બતાવો કે $U - V$ એ વિસંમિત શ્રેણિક છે.

(10) શ્રેણીકો માટેનો રિવર્સલ નિયમ, તથા વિભાજનનો નિયમ લખો.

(11) જો $A = \begin{pmatrix} 3 & 12 & -11 \\ 0 & 5 & -123 \\ 0 & 0 & 6 \end{pmatrix}$ હોય તો $|A|$ અને $|A^T|$ શોધો.

(12) જો $A = \begin{pmatrix} 2 & 27 \\ 0 & 2 \end{pmatrix}$ હોય તો શ્રેણિક A માટેનું લાક્ષણિક સમીકરણ શોધો.

Q.3

(a) શોધો: $\lim_{x\to\infty} \left[\frac{1^{\frac{1}{x}} + 2^{\frac{1}{x}} + 3^{\frac{1}{x}}}{3}\right]^{3x}$. [5]

(b) શોધો: $\lim_{x\to 0} \frac{\tan x \tan^{-1} x - x^2}{x^6}$. [5]

Q.3

(c) શોધો: $\lim_{x\to 0} \frac{e^x + \log(1-x) - 1}{\tan x - x}$. [5]

(d) શોધો: $\lim_{x\to a} (2 - \frac{x}{a})^{\tan(\frac{\pi x}{2a})}$. [5]

Q.4

(a) ઓઈલરનું પ્રમેય લખો અને સાબિત કરો. [5]

(b) જો $z = f(x, y)$ અને $u = e^x \cos y$, $v = e^x \sin y$ હોય તો સાબિત કરો કે $\frac{\partial f}{\partial x} = u\frac{\partial f}{\partial u} + v\frac{\partial f}{\partial v}$. [5]

Q.4

(c) જો $z = f(x, y)$ અને $x = r\cos\theta, y = r\sin\theta$ હોય તો સાબિત કરો કે $\left[\frac{\partial z}{\partial x}\right]^2 + \left[\frac{\partial z}{\partial y}\right]^2 = \left[\frac{\partial z}{\partial r}\right]^2 + \frac{1}{r^2}\left[\frac{\partial z}{\partial \theta}\right]^2$. [5]

(d) વિધેય $z = 5x^3y^4 + 7x^5y^2$ માટે ઓઈલરનું પ્રમેય ચકાસો અને તેના પરથી $x^2\frac{\partial^2 z}{\partial x^2} + 2xy\frac{\partial^2 z}{\partial x \partial y} + y^2\frac{\partial^2 z}{\partial y^2}$ મેળવો. [5]

Q.5

(a) સાબિત કરો કે દરેક ચોરસ શ્રેણિક ને સંમિત અને વિસંમિત શ્રેણિક ના સરવાળા તરીકે એક અને માત્ર એક રીતે લખી શકાય. [5]

(b) જો $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 3 & 6 \end{pmatrix}$ અને $B = \begin{pmatrix} -3 & -2 \\ 1 & -5 \\ 4 & 3 \end{pmatrix}$ હોય તો એવી શ્રેણિક D શોધો કે જેથી $A + B + D = 0$ થાય. [5]

Q.5

(c) જો A અને B બન્ને સંમિત શ્રેણિક હોય તો સાબિત કરો કે AB સંમિત હોવા માટેની આવશ્યક અને પર્યાપ્ત શરત $AB = BA$ છે. [5]

(d) જો $A = \begin{pmatrix} 2+i & 3-i & 4+5i \\ 1+3i & 2i & 5-6i \\ 3+i & 6-5i & 1+i \end{pmatrix}$ હોય તો A^θ, $A - A^\theta$ અને $A + A^\theta$ શોધો. [5]

Q.6

(a) કેલે-હેમિલ્ટનનું પ્રમેય લખો અને સાબિત કરો. [5]

(b) જો $A = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$ હોય તો બતાવો કે $A^k = \begin{pmatrix} 1+2k & -4k \\ k & 1-2k \end{pmatrix}$ જ્યાં k કોઈ પણ ધન પૂર્ણાંક સંખ્યા છે. [5]

Q.6

(c) જો $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$, તો α, β ના એવા મુલ્યો શોધો કે જેથી $(\alpha I + \beta A)^2 = A$. [5]

(d) જો $A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ હોય તો શ્રેણિક A માટેનું લાક્ષણિક સમીકરણ શોધો. [5]

——— X ———

SEAT No._____

No of printed pages : 3

[A-27]

SARDAR PATEL UNIVERSITY

B.Sc.(SEMESTER - III) (2010-BATCH)(NC) EXAMINATION

Wednesday , 22nd November,2017

SUBJECT CODE : US03EMTH05

(CALCULUS AND ALGEBRA - I)

Time : 2:00 p.m. to 4:00 p.m. Maximum Marks : 70

Que.1 Attempt the following. 10

(1) $\lim_{x\to 0}\frac{\sin x}{2x}$ = ...

(a) 0 (b) x (c) $\frac{1}{2}$ (d) none

(2) $\lim_{x\to 0}\frac{\log(\cos x)}{\sin x}$ is of the form .....

(a) $\frac{0}{0}$ (b) $\infty-\infty$ (c) $\frac{\infty}{\infty}$ (d) $0\cdot\infty$

(3) $\lim_{x\to 0}\frac{e^x-1}{x^2}$ is of the form .....

(a) $\infty-\infty$ (b) $\frac{0}{0}$ (c) $\frac{\infty}{\infty}$ (d) $0\cdot\infty$

(4) If $u=x^3y+xy^3$ then u_x = ...

(a) $3x^2y+y^3$ (b) $3y^2x+y^3$ (c) $3x^2y+x^3$ (d) x^2y+y^3

(5) If $f(x)=\sin x$ then f_{xx} = ...

(a) $\sin x$ (b) $\cos x$ (c) $-\cos x$ (d) $-\sin x$

(6) $F=\frac{xy}{x+y}$ is homogeneous function of degree .....

(a) 0 (b) 1 (c) 2 (d) None

(7) If $A=\begin{bmatrix}1&3\\4&6\\0&4\end{bmatrix}$ then order of A is .....

(a) 2x3 (b) 3x3 (c) 2x2 (d) 3x2

(8) The matrix $B=\begin{bmatrix}3&0&0\\0&6&0\\0&0&i\end{bmatrix}$ is ..... matrix .

(a) Diagonal (b) Column (c) Unit (d) Symmetric

(9) If A & B are not commutative to each other then $(A+B)^2$ = ...

(a) $A^2-2AB+B^2$ (b) A^2+B^2 (c) $A^2+2AB+B^2$ (d) $A^2+AB+BA+B^2$

(10) Distributive law for matrix is.....

(a) $(AB)C=A(BC)$ (b) $A(BC)=A(CB)$ (c) $A(B+C)=AB+AC$ (d) $A(B+C)=CA+AB$

(P.T.O.)

Que.2 Attempt the following.(Any Ten) 20

(1) Evaluate $\lim_{x\to 2} \dfrac{\sin(x^2-4)}{x-2}$.

(2) Evaluate $\lim_{x\to 0} \dfrac{e^x+\log(1-x)}{\tan x+1}$.

(3) Evaluate $\lim_{x\to 0} \dfrac{\log(\sin 2x)}{\log(\sin x)}$.

(4) For $u = x^3 - 3xy^2$ prove that $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = 0$.

(5) Define Homogeneous function. Let $f : R^2 \setminus \{(x,y) : y = -x\} \to R$ defined by $f(x,y) = \dfrac{x-y}{x+y}$ then check whether f is homogenous function or not.

(6) Find $\dfrac{\partial u}{\partial x}$ and $\dfrac{\partial u}{\partial y}$ for $u = \log(x^2+y^2)$.

(7) If $A = \begin{pmatrix} -2 & -1 \\ 1 & 0 \\ 3 & -4 \end{pmatrix}$, $B = \begin{pmatrix} 0 & 3 \\ 2 & 0 \\ -4 & -1 \end{pmatrix}$ and $2X + 3A = B$ then find X .

(8) If A and B are symmetric matrices of same order then prove that $A + B$ is also symmetric.

(9) If A and B are hermitian matrices of same order, does A - B hermitian ? Verify it .

(10) Define Determinant and Minor of matrix with example.

(11) State Reversal and Distributive law for matrix.

(12) If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ then find A^3 .

Que.3 (a) Evaluate $\lim_{x\to 0} \dfrac{e^x+\log(1-x)-1}{\tan x - x}$. 5

(b) Evaluate $\lim_{x\to 0} \left(\dfrac{1}{2x^2} - \dfrac{\cot^2 x}{2}\right)$. 5

OR

Que.3 (a) Evaluate $\lim_{x\to 0} \left[\dfrac{\tan x}{x}\right]^{\frac{5}{3x^2}}$. 5

(b) Evaluate $\lim_{x\to 0} \dfrac{\log_{\sin x}(\cos x)}{\log_{\sin(\frac{x}{2})}(\cos\frac{x}{2})}$. 5

Que.4 (a) State and prove Euler's theorem for function of two variables . 5

(b) Prove that $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = 0$,where $u = e^{ay}\cos ax$. 5

OR

Que.4 (a) State and prove Euler's theorem for function of three variables . 5

(b) Verify Euler's theorem and find $x^2\dfrac{\partial^2 z}{\partial x^2} + 2xy\dfrac{\partial^2 z}{\partial x \partial y} + y^2\dfrac{\partial^2 z}{\partial y^2}$ for $z = x^n \log\frac{y}{x}$. 5

Que.5 (a) For $A = \begin{pmatrix} 0 & 2m & n \\ l & m & -n \\ l & -m & n \end{pmatrix}$ where $l = \frac{1}{\sqrt{2}}, m = \frac{1}{\sqrt{6}}, n = \frac{1}{\sqrt{3}}$, prove that $AA^T = I$. 5

(b) Prove that Every square matrix can be expressed in one and only one way as the sum of a symmetric and skew symmetric matrix. 5

OR

Que.5 (a) Prove that Every square matrix can be expressed in one and only one way as $P + iQ$, where P and Q are Hermitian matrices. 5

(b) If $A = \begin{pmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ -2 & 2 & -3 \end{pmatrix}$, $B = \begin{pmatrix} -1 & 2 & 2 \\ 1 & -2 & 1 \\ -1 & 1 & 0 \end{pmatrix}$ then prove that $(AB)^T = B^T A^T$. 5

Que.6 (a) State and prove Cayley-Hamilton theorem. 5

(b) For $A = \begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 7 \\ 5 & 8 \end{pmatrix}$, $C = \begin{pmatrix} -1 & 5 \\ 0 & 2 \end{pmatrix}$,

prove that (i) $(BA)C = B(AC)$ (ii) $(B + C)A = BA + CA$ 5

OR

Que.6 (a) Verify cayley-Hamilton theorem for $A = \begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$. 5

(b) If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ then find $A^2 - 5A + 2I$. 5

SEAT No._____ US 03

[31]

SARDAR PATEL UNIVERSITY

Third Semester B.Sc. EXAMINATION-2017

24^{th} November 2017, Friday

2:00 p.m. to 4:00 p.m.

US03EMTH06(MATHEMATICS)

(Operation Research-I)

Maximum Marks: 70

Q.1 Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

(1) $Maximize(Z)$.....
(a) $Minimize(Z)$ (b) $-Minimize(Z)$ (c) $-Minimize(-Z)$ (d) none of these

(2) In the definition of LPP m stands for number of constraints and n for number of variables, then which of the following relations can hold?
(a) $m = n$ (b) $m \leq n$ (c) $m \geq n$ (d) all of these

(3) The Optimum solution to LPP give below is,
$MaximizeZ = 3x_1 + 2x_2$,
subject to: $5x_1 + 6x_2 \leq 30$, $x_1 \geq 0$, $x_2 \geq 0$
(a) Unbounded solution (b) Max Z = 18 (c) Max Z = 22 (d) Max Z = 10

(4) In the simplex method the variable leaves the basis if the ratio is....
(a) maximum (b) minimum (c) 0 (d) none of these

(5) The coefficient of slack variable in the objective function is
(a) $-M$ (b) M (c) 0 (d) 1

(6) A variable which does not appear in the basic variable (BV) column of simplex table has value.....
(a) 1 (b) 0 (c) infinity (d) none of these

(7) In a non-degenerate basic feasible solution of an $m \times n$ transportation problem, the number of allocated cells are.....
(a) not equal to $m + n - 1$ (b) equal to $m + n - 1$
(c) equal to $m + n + 1$ (d) equal to mn

(8) The Penalty in VAM represents difference between.....cost of row/column.
(a) two largest (b) two smallest (c) largest and smallest (d) none of these

(9) The optimum solution of a transportation problem can be obtained by.....method.
(a) Hungarian (b) North-west corner (c) Big-M (d) Modified distribution

(10) In Transportation problem the preferred method of obtaining either optimal or very close to the optimal solution is.....
(a) north west corner rule (b) least cost method
(c) Vogels approximation method (d) simplex method

Q.2 Attempt any Ten: [20]

(1) Write the algorithm to solve LPP using Graphical method for maximization of profit.

(2) Define: (i) Basic solution (ii) Unbounded solution.

(3) Solve the following LPP using graphical method:
$MaximizeZ = 5x_1 + 3x_2$
subject to: $x_1 \leq 5$, $3x_2 \leq 18$, $x_1 \geq 0$, $x_2 \geq 0$.

(4) Define slack and surplus variable.

(P.T.O.)

(5) Express the following LPP in standard form:
$MaximizeZ = x_1 + 3x_2$
subject to: $x_1 + 3x_2 \leq 4,\ 3x_1 + 4x_2 \geq 6,\ x_1 \geq 0,\ x_2 \geq 0.$

(6) Find dual of the following LPP:
$MaximizeZ = 4x_1 + 5x_2$
subject to: $x_1 + 4x_2 \leq 5,\ 4x_1 + 2x_2 \leq 7,\ x_1 \geq 0,\ x_2 \geq 0.$

(7) Write steps for North-West Corner Method.

(8) Write mathematical form of transportation problem.

(9) Obtain an initial basic feasible solution of the following Transportation Problem using North-West corner method.

	I	II	III	Supply
A	3	8	10	5
B	6	5	8	5
C	4	6	11	7
Demand	6	3	8	

(10) Obtain an initial basic feasible solution of the following Transportation Problem using least cost method.

	I	II	III	Supply
A	6	8	11	6
B	9	13	7	8
Demand	4	5	5	

(11) Why Vogel's Approximation method is considered to be the best method for obtaining initial basic feasible solution?

(12) What is unbalanced Transportation Problem? How to convert it into balanced one?

Q.3

(a) A firm manufactures headache pills in two sizes A and B. Size A contains 2 grains of aspirin , 5 grains of bicarbonate and 1 grain of codeine. Size B contains 1 grain of aspirin, 8 grains of bicarbonate and 6 grains of codeine. It is found by users that it requires atleast 12 grains of aspirin, 74 grains of bicarbonate and 24 grains of codeine for providing immediate effect. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a LPP. [5]

(b) Using Graphical method: $MinimizeZ = 7x_1 + 8x_2$ [5]
subject to: $3x_1 + x_2 \geq 8,\ x_1 + 3x_2 \geq 11,\ x_1 \geq 0,\ x_2 \geq 0.$

OR

Q.3

(c) A manufacturer has two machines A and B. He manufactures two products P and Q on these two machines. For manufacturing product P he has to use machine A for 3 hours and machine B for 6 hours, and for manufacturing product Q he has to use machine A for 6 hours and machine B for 5 hours. On each unit of P he earns Rs. 14 and on each unit of Q he earns Rs. 10. How many units of P and Q should be manufactured to get the maximum profit? Each machine cannot be used for more than 2100 hours. Formulate as LPP. [5]

(d) Solve the following LPP using Graphical method: [5]
$MaximizeZ = 3x_1 + 2x_2$
subject to: $x_1 - x_2 \leq 1,\ x_1 + x_2 \geq 3,\ x_1 \geq 0,\ x_2 \geq 0.$

Q.4

(a) Solve the following LPP using Simplex method: [6]
$MaximizeZ = 7x_1 + 5x_2$
subject to: $x_1 + 2x_2 \leq 6,\ 4x_1 + 3x_2 \leq 12,\ x_1 \geq 0,\ x_2 \geq 0.$

(b) Convert the following LPP into its standard form [4]

(i) $MaximizeZ = x_1 + 2x_2 + 3x_3$

subject to: $5x_1 + 2x_2 + x_3 \leq 12,\ 3x_1 + 2x_3 \leq 4,\ x_1 + 7x_2 \leq 23,\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0.$

(ii) $MaximizeZ = 5x_1 + 7x_2$

subject to: $5x_1 - 8x_2 \leq 11,\ 7x_1 + 2x_2 \geq 12,\ x_1 \geq 0,\ x_2 \geq 0.$

OR

Q.4

(c) Solve the following LPP using Simplex method: [5]

$MaximizeZ = 3x_1 + 5x_2$

subject to: $x_1 + x_2 \leq 4,\ 3x_1 + 2x_2 \leq 18,\ x_1 \geq 0,\ x_2 \geq 0.$

(d) Solve the following LPP using Big-M method: [5]

$MaximizeZ = 3x_1 - x_2 + 4x_3$

subject to: $-3x_1 + x_2 + x_3 \geq 2,\ -5x_1 - 2x_2 \leq 3,\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0.$

Q.5

(a) Obtain an initial basic feasible solution of the following Transportation Problem using least cost method. [5]

	D_1	D_2	D_3	D_4	Supply
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Demand	6	10	15	4	

(b) Obtain an initial basic feasible solution of the following Transportation Problem using Vogel's approximation method. [5]

	D_1	D_2	D_3	D_4	Supply
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Demand	20	40	30	10	

OR

Q.5

(c) Obtain an initial basic feasible solution of the following Transportation Problem using Vogel's approximation method. [6]

	I	II	III	IV	Supply
A	2	3	11	7	6
B	1	0	6	1	1
C	5	8	15	10	10
Demand	7	5	3	2	

(d) Write the steps of Matrix Minima Method for finding initial basic feasible. [4]

Q.6 Obtain the Optimum solution of the following Transportation Problem [10]

	I	II	III	IV	Supply
A	15	10	17	18	2
B	16	13	12	13	6
C	12	17	20	11	7
Demand	3	3	4	5	

OR

Q.6 Obtain the Optimum solution of the following Transportation Problem [10]

	D_1	D_2	D_3	D_4	Supply
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Demand	4	6	8	6	

X

SC

SEAT No._____ No. of Printed Pages : 02

[43]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc. Examination, THIRD Semester
Monday, 20TH November 2017
Time : 2.00 pm To 4.00 pm
Physics Course Code : US03EPHY02
Course Title : Basic Geophysics

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 outermost layer of the Earth which is 200 kilometers thick is called
(a) monosphere (b) radiosphere (c) ionosphere (d) lithosphere

(2) According to____principle the universe looks the same to all observers at all times.
(a) geological (b) metrological (c) cosmological (d) Physical

(3) Fred Hoyle, Thomas Gold, and H. Bondi put forth a theory that has come to be known as _____ theory.
(a)steady state (b)solid state (c) geological (d)morphological

(4) The steady increase of temperature with depth is known as the _____ gradient.
(a) physical (b) chemical (c) electrical (d) geothermal

(5) The location where two earth plates meet is called
(a) plate boundary (b) breaking point (c) meeting boundary (d) plate tectonics

(6) The stress that acts to lengthen the object is called _____.
(a) tension (b) compression (c) activation (d) sedimentation

(7) The hypocenter of an earthquake is also called
(a) center (b) cardinal (c) focus (d) main center

(8) The location below the earth's surface where the earthquake starts is called
(a) epicenter (b) hypocenter (c) shift-center (d) motion-center

(9) The stress that acts perpendicular to the surface is called ____ stress.
(a) shear (b) normal (c) tensile (d) perpendicular

(10) An earthquake of magnitude 'x' results in seismic waves having amplitude ___ .
(a) 10^{x} (b) 10^{2x} (c) 10^{3x} (d) 10^{4x}

Q-2 Answer the following questions in brief. (Answer any Ten Questions) [20]

(1) Write a short note on continental drift.
(2) Enlist any four branches of Geology.
(3) Discuss about the lithosphere in brief.
(4) Write a short note on continental drift.
(5) Write a brief note on convergent boundaries.
(6) Write a brief note on transform boundaries.
(7) Enlist the different types of joints.
(8) Define stress and strain.
(9) What is reef?
(10) Write a short note on Rayleigh waves.
(11) Define : foreshocks and aftershocks.
(12) Write a short note on seismic waves.

PTO

Q-3	(a)	Discuss about the origin of solar system.	[5]
	(b)	Explain the Big Bang theory of origin of universe in detail.	[5]
		OR	
Q-3	(a)	Write a note on the origin of universe.	[5]
	(b)	With the help of different arguments explain the Binary Star theory in detail.	[5]
Q-4	(a)	Discuss Wegner's theory of continental drift in detail.	[5]
	(b)	Write a note on plate tectonics.	[5]
		OR	
Q-4	(a)	Write a note on polar wandering.	[5]
	(b)	Write a note on sea-floor spreading.	[5]
Q-5	(a)	Write a note on Dip-slip fault and Oblique-slip fault.	[5]
	(b)	Define stress and explain it in connection to geology. Also explain the different types of stress.	[5]
		OR	
Q-5	(a)	Discuss the concept of strain in relation to geology. Also explain in detail about the various types of strain.	[5]
	(b)	Write a detailed note on folds.	[5]
Q-6	(a)	Give a detailed account of the origin of earthquakes and also explain how the tectonic plates and plate boundaries affect them.	[5]
	(b)	Write a note on epicenter.	[5]
		OR	
Q-6	(a)	Write a note on body waves.	[5]
	(b)	Write a note on hypocenter.	[5]

SC

SEAT No._____ No. of Printed Pages : 04

[328 A-24] SARDAR PATEL UNIVERSITY

B.Sc. Semester – III Examinations

24th November, 2017

Friday

Course Code: - US03ESTA01

(Operation Research-I)

Time:-02:00 P.M. to 04:00 P.M. Marks: - 70

Note: - Simple/ Scientific calculator is allowed.

Q.1. Select an appropriate answer from the given choices. [10]

1. Which of the following constraints is not linear?
   a) $7A - 6B \leq 45$ b) $X + Y + 3Z = 35$ c) $2X + 10Y \geq 60$ d) $2XY + X \geq 15$
2. What is the solution to this linear programming problem in terms of the respective quantities of X and Y to be produced if profits are to be maximized?
   a) X = 4, Y = 5 b) X = 5, Y = 0 c) X = 0, Y = 5 d) X = 5, Y = 2
3. Assumptions of linear programming include
   a) linearity b) additive c) certainty d) all of the above
4. A decision variables which does not appear in the basic variable (B) column of simplex table is
   a) never equal to zero b) always equal to zero c)a basic variable d)a non-basic variable.
5. The dual of the primal maximization LP problem having m constraints and n non-negative variables should
   a)have n constraints and m – non-negative variables b) have n constraints and n – non-negative variables c) have m constraints and m – non-negative variables d) none of these
6. The methods for IBFS in a T.P. are
   a) North-West Corner method b)Least cost method c) Vogel's approximation method d) All of above
7. The solution to a transportation problem with n-rows and n-columns is feasible if number of positive allocations are
   a) n+n b)n x n c)2 n -1 d)all of the above.
8. While applying Vogel's approximation method for obtaining IBFS the penalties is the_____
   a)difference between smallest and next smallest cost. b) Difference between largest and next largest cost. c) Difference between largest and smallest cost. d) none of these
9. Degeneracy occur in the T.P. having m-origins and n-destination whenever number of occupied cell is _____ m + n – 1
   a) greater than b) equal to c) less than d) none of these
10. The formula of cost difference dij for all non-occupied cells is _____
    a) dij = cij + ui b) dij = cij + vi c) dij =cij– (ui+vj) d) none of these

Q.2. Attempt any **Ten** questions from the following questions:- [20]

1. Define slack and surplus variables as involved in the LPP.

C.P.T.O.)

2. How will you decide feasible region when solving LPP by graphical method.
3. State the characteristics of standard form of LPP.
   Express the following LPP in standard form:-

$$\begin{aligned} \text{Min } z &= x_1 - 2x_2 + x_3 \\ \text{s.t. } & 2x_1 + 3x_2 + 4x_3 \geq -4 \\ & 3x_1 + 5x_2 + 2x_3 \geq 7 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

4. What is a Simplex method?
5. State the conditions for the Optimality test.
6. State Dual problem and Primal problem. Also state the general rules for converting any Primal LPP into its Dual.
7. Define Transportation Problem (T.P.)? List the various methods that can be used for obtaining an initial basic feasible solution for a T.P.
8. Why Vogel's Approximation method is considered to be the best method for obtaining initial basic feasible solution.
9. Give a brief outline of the procedure for solving a T.P.
10. State the basic step for reaching towards optimum solution of T.P.
11. Give the two properties for examining the IBFS for non-degeneracy.
12. How would you test optimality of a given solution for the T.P.

Q.3.(a) The agricultural research institute suggested the farmer to spread out at least 4800 kg of special phosphate fertilizer and not less than 7200 kg of a special nitrogen fertilizer to raise the productivity of crops in his fields. There are two sources for obtaining these - mixtures A and mixtures B. Both of these are available in bags and they cost Rs.40 and Rs.24 respectively. Mixture A contains phosphate and nitrogen equivalent of 20kg and 80 kg respectively, while mixture B contains these ingredients equivalent of 50 kg each. Write this as an LPP and determine how many bags of each type the farmer should buy in order to obtain the required fertilizer at minimum cost. Formulate the LPP. [05]

(b) Solve the following linear program by Graphical method : [05]

Maximize $5x_1 + 6x_2$

subject to

$x_1 + x_2 \leq 10$

$x_1 - x_2 \geq 3$

$5x_1 + 4x_2 \leq 35$

$x_1, x_2 \geq 0$

OR

Q.3.(a) A manufacturer produces two types of models M1 and M2.Each model of the type M1 requires 4 hours of grinding and 2 hours of polishing; whereas each model of M2 requires 2 hours of grinding and 5 hours of polishing. The manufacturer has 2 grinders and 3 polishers. Each grinder works for 40 hours a week and each polisher works 60 hours a week. Profit on M1 model is Rs.3.00 and on model M2 is Rs.4.00.Whatever produced in a week is sold in the market. How should the manufacturer allocate his production capacity to the two types of models, so that he makes maximum profit in a week? [05]

(b) Write the steps for solving Linear Programming Method by Graphical method. [05]

Q.4.(a) Solve the given problem by Simplex method. [05]

$$\text{Max } z = 3x_1 + 2x_2$$
$$\text{s.t. } x_1 + x_2 \leq 4$$
$$x_1 - x_2 \leq 2$$
$$x_1, x_2 \geq 0$$

(b) Solve the given problem by Simplex method. [05]

$$\text{Max } z = 5x_1 + 3x_2$$
$$\text{s.t. } 3x_1 + 5x_2 \leq 15$$
$$5x_1 + 2x_2 \leq 10$$
$$x_1, x_2 \geq 0$$

OR

Q.4.(a) Explain about Artificial variables? Also how will you resolve the Maximization and Minimization case for removing Artificial variables. [04]

(b) Solve the LPP by Simplex method. [06]

$$\text{Max } z = 30x_1 + 23x_2 + 29x_3$$
$$\text{s.t. } 6x_1 + 5x_2 + 3x_3 \leq 26$$
$$4x_1 + 2x_2 + 6x_3 \leq 7$$
$$x_1, x_2, x_3 \geq 0.$$

Also read the solutions to the dual of the above problem from the final table.

Q.5.(a) An oil corporation has got three refineries P,Q and R and it has to send petrol to four different depots A,B,C and D. The cost of shipping 1 gal. of petrol and the available petrol at the refineries are given in the table. The requirement of the depots and the available petrol at the refineries are also given. Obtain the initial basic feasible solution by VAM method. [05]

Refinery\ Depot	A	B	C	D	Available
P	10	12	15	8	130
Q	11	11	9	10	150
R	20	9	7	18	170
Required	90	100	140	120	

(b) Three fertilizer factories X, Y and Z located at different places of the country produce 6, 4 and 5 lakh tones of urea respectively. Under the directive of the Central government, they are to be distributed to 3 states A,B and C as 5,3 and 7 lakh tones respectively. The transportation cost per tone in rupees is given below: [05]

	A	B	C
X	1	7	6
Y	5	2	4
Z	2	2	5

Obtain the initial basic feasible solution by North west corner method.

OR

Q.5.(a) Write the steps for solving T.P. by North-West Corner method. [05]

(b) Apply Vogel's method by obtaining IBFS to the following T.P. [05]

Origin\ Destination	D_1	D_2	D_3	D_4	Supply
O_1	21	16	15	13	11
O_2	17	18	14	23	13
O_3	32	27	18	41	19
Demand	6	10	12	15	

(P.T.O.)

Q.6.(a) Obtain the optimum basic feasible solution for the given problem. [06]

To

From	1	2	3	Available
X	2	7	4	5
Y	3	3	1	8
Z	5	4	7	7
A	1	6	2	14
Required	7	9	18	

(b) The following table shows all the necessary information on the available supply to each warehouse, the requirement of each market and the unit transportation cost from each warehouse to each market. [04]

Market

Warehouse	I	II	III	IV	Supply
A	5	2	4	3	22
B	4	8	1	6	15
C	4	6	7	5	8
Requirement	7	12	17	9	

The shipping clerk has worked-out the following schedule from experience: 12 units from A to II, 1 unit from A to III, 9 units from A to IV, 15 units from B to III, 7 units from C to 1 and 1 unit from C to III. Find the optimal schedule and minimum total shipping cost.

OR

Q.6.(a) Explain briefly about unbalanced in transportation problem. [05]

(b) Explain briefly about uv method of obtaining optimum solution of TP. [05]

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SEAT No._____ No. of Printed Pages :

[39 & A-24]

Sardar Patel University

B.Sc. Semester - III Examination

Wednesday, 22nd November, 2017

Time: 2.00 to 4.00 p.m | US03ESTA04 | M.Marks: 70

(Biostatistics – I)

Note: (i) Simple/Scientific calculator is allowed (ii) Graph paper will provided on request.
(iii) Statistical table will be allowed/provided on request (iv) Q.3 to 6, each sub question has 5 marks

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Q.1 Multiple Choice Questions (10×1)

(1) Which one of the following measurement divides a set of observations in to equal parts?
(a) Standard deviation (b) Skewness (c) Mean (d) Median

(2) Which of the following can be described as categorical variable?
(a) Taste of food (b) Pulse rate
(c) Time spent on mobile (in hours) (d) Morality rate

(3) The most commonly used device of presenting business and economical data is
(a) Pie diagram (b) Bar diagrams (c) Line diagrams (d) None of the above

(4) The formula for computing the number of classes in construction of grouped frequency distribution is
(a) $3.322\ log(N)$ (b) $1 + 0.322\ log(N)$ (c) $1 - 3.322\ log(N)$ (d) $1 + 3.322\ log(N)$

(5) The first step in tabulation is
(a) Foot note (b) Source note (c) Captions (d) Classification

(6) If A and B are two independent events then $P(A \cap B)$ is _____
(a) $P(A) + P(B)$ (b) $P(A) \cdot P(B)$ (c) $P(A) + P(B) - P(A \cap B)$ (d) None of these

(7) The standard deviation of 4,4,4,4,4,4,4,4 is
(a) 1 (b) -1 (c) 0 (d) 4

(8) Let $X \sim b(7,0.3)$ then $P(X > 1) =$ _____
(a) 0.0824 (b) 0.6471 (c) 0.3294 (d) 0.6706

(9) For a symmetrical distribution
(a) Mean = Median = Mode (b) Coefficient of skewness is zero
(c) $Q_2 = \frac{Q_1+Q_3}{2}$ (d) All of the above

(10) The mode of a frequency distribution can be determined graphically with the help of
(a) Frequency curve (b) Frequency polygon (c) Histogram (d) Ogives

Q.2 Short Type Questions (Attempt Any Ten) (10×2)

(1) With reference to probability, define the following terms: (a) Sample space (b) Random experiment

(2) Give two examples each of nominal and ordinal data.

(3) Name the diagram do you prefer to represent the following data:

MARKET SHARE OF LOW CALORY SUGAR IN INDIA

Brand	Sugar free	Sacharin	Sweetex	Equal	Zero
Market share (%)	65	13	12	6	4

State its objective(s).

(4) What is tabulation? List out the various parts of table.

(5) Define the probability distribution for which Mean = Variance.

(6) State the importance of diagrams.

(7) List out the various measures of central tendency. According to you, which measure is considered to be best in case of open - end classes?

(P.T.O.)

(8) State an empirical relationship between mean, median and mode. When will you use it?

(9) It is known that 1% of plants produced by a certain species of corn seed will be infertile. In a random sample of 120 such plants, what is the probability that 2 or more will be infertile?

(10) State an additive law of probability for two events. Write down the same in case of both the events are (i) mutually exclusive (ii) independent.

(11) Give two examples each of discrete and continuous variables applicable in the field of biosciences.

(12) The variance of Poisson distribution is 0.8. Find its mean, standard deviation and $P(X = 2)$.

Q.3(a) What is frequency distribution? Write down the points to be kept in mind while constructing grouped frequency distribution.

(b) To investigate the breakfast habits of teenagers, a survey was conducted amongst the students of high school. The results were as follows:

Eat breakfast	Male	Female
Regularly	87	53
Doesn't eat regularly	68	92
Total	155	145

State its objective(s). Present the above data through most suitable diagram.

OR

Q.3(a) Write a note on Bar diagram.

(b) Blood cholesterol levels were recorded for 40 persons sampled in a medical study group and the following data were obtained.

233	212	249	227	249	258	265	196	310	244
256	161	195	233	199	282	286	163	205	176
195	299	210	301	357	195	226	297	227	218
355	234	195	179	174	281	154	330	223	284

(i) Construct a frequency distribution of equal class - width taking 240 - 270 as one of the classes.

(ii) Determine median graphically.

Q.4(a) The albumin blood levels of 11 dialysis patients are

39	36	34	33	30	28	33	34	29	21	32

Calculate mean, median, mode and standard deviation.

(b) From the following frequency distribution, calculate mean and mode.

Weight(in grams)	74 - 77	77 - 80	80 - 83	83 - 86	86 - 89
No. of items	3	6	9	3	4

OR

Q.4(a) Two groups of six guinea pigs each were injected, respectively with 0.5 mg, 1.0 mg of a new tranquilizer and the following are the number of minutes it took to fall asleep:

0.5 mg	21	23	19	24	25	23
1.0 mg	19	21	20	18	22	20

Compute mean, median and mode of both the data sets.

(b) Calculate an appropriate measure of central tendency for the data given below:

Weights(lbs)	Under 109	110 - 129	130 - 149	150 - 169	170 - 189	190 & above
No. of persons	15	188	266	96	17	4

Q.5(a) A researcher collected samples of unit volume and found the bacteria count to be

175	190	215	198	184
207	210	193	196	180

Compute range and standard deviation.

(b) A consumer affairs agency wants to check the average weight of a new product on the market. A random sample of 25 items of the product was taken and the weights (in grams.) of these items were classified as

follows:

Weight(in grams)	74 - 77	77 - 80	80 - 83	83 - 86	86 - 89
No. of items	3	6	9	3	4

Calculate coefficient of variation (C.V.)

OR

Q.5(a) What is Skewness? Explain Skewness by drawing sketches of (i) Positive Skewness (ii) Negative Skewness (iii) Zero Skewness. Write down the formulae to calculate coefficient of skewness.

(b) An analysis of the fat content (%) of a random sample of 175 cheese burgers resulted in the following summarized information:

Fat content (%)	26 - 28	28 - 30	30 - 32	32 - 34	34 - 36	36 - 38	38 - 40
No. of cheese burgers	7	22	36	45	33	28	4

Find Karl – Pearson's coefficient of skewness and comment on it.

Q.6(a) To investigate the breakfast habits of teenagers, a survey was conducted amongst the students of high school. The results were as follows:

Eat breakfast	Male	Female	Total
Regularly	87	53	140
Doesn't eat regularly	68	92	160
Total	155	145	300

If a student is selected at random from this school, find the probability that a selected student is (i) Male (ii) female and eats breakfast regularly (iii) male, given that he regularly eats breakfast.

(b) The probability that a patient will get reaction of a temiflu injection is 0.15. If 12 patients are given that injection, find the probabilities that (i) Exactly 3 (ii) less than 2 (iii) at least 4 (iv) none, will get reaction.

OR

Q.6(a) Define Binomial distribution. State the conditions under which Binomial distribution tends to Poisson distribution.

(b) It was claimed that 1 out of 4 dentists recommend sensodyne tooth paste to his patients to prevent cavities. Suppose that the claim is true. If 10 dentists are selected independently and at random. Let X be the no. of dentists who recommend sensodyne tooth paste to his/her patients.

(i) How is X distributed? (ii) Give the mean and variance of X (iii) Determine $P(X \geq 3)$.

X

SEAT No._____ No of Printed Pages : 02

[35 & A-31 - Eng.]

SARDAR PATEL UNIVERCITY

S.Y.B.Sc (THIRD SEMESTER) EXAMINATION.

Tuesday, 21/11/2017

TIME:2:00 p.m to 4 :00 p.m.

US03EZOO 01 (ZOOLOGY)

Invertebrate,physiology,biotechnology &parasitology

TOTAL MARKS :70

Q-1 **CHOOSE CORRECT ANSWER.** **10**

1 ---------- Is Not related with Nereis :
a.Aciculum. b.Fertilium c.Metamorphosis. d.Cystogenous gland.

2 ---------- Larva leaves te body of snail.
a.Cercaria b. Redia. C. Miracidium d.Sporocyst.

3 Hydrolymph present in ----------.
a.Cockroach b.Earthworm c.Hookworm. d.Sponges.

4 ---------- Possess valves.
a.Veins b.Arteries c.Capillaries. d.All of these.

5 Catecholamines are secreted by :
a.Juxta glomerulus cells. B. Suprarenal gland. C.Pars nervosa. D.Pineal gland.

6 Parathyroid hormone is synthesized by---------- cells.
a.folicular cells. B.Mast cells c.Chief cells. D.Goblet cells.

7 ---------- is relates with Myocardial infraction.
a.Heart attack b Body muscle pain. C.Stomachpain d.Headache

8 Which of the culture media is not used in animal cell culture ?
a.RPMI-1640 B. Hank's media c.Eagle' Media d.MS Media.

9 Lymph hearts of Fishes are of ---------- type.
a.Ampullar b. Chambered c.Tubular d.Pulsatile .

10 Tegument is found in ----------.
a. Nereis. B.Rhesus monkey. C. Liver fluke d.Balantidium coli.

C.P.T.O.)

Q-2		**ANSWER IN SHORT: (ANY TEN)**	**20**
	1	Draw neat and labeled diagrame of flame cell.	
	2	What is Laurer's canal?	
	3	What is epitoky?	
	4	Write physiological significance of blood capillaries.	
	5	Enlist natural and synthetic anticoagulants.	
	6	What is cysterna chyli?	
	7	Write the role of hormone receptors.	
	8	Write about mineralocorticoids.	
	9	Explain : Bypass surgery.	
	10	Write about sleeping sickness.	
	11	Write about HIV.	
	12	Explain : parathyroid gland.	
Q-3		Describe :	
	A	Nervous system of liverfluke.	**05**
	B	Sexually mature form of nereis.	**05**
		OR	
Q-3	A	Describe the larva which enter in the body of lymniaea.	**05**
	B	Explain : External morphology of clamworm.	**05**
Q-4		Describe the lymph and lymphatic system in detail.	**10**
		OR	
Q-4	A	Blood transfusion.	**05**
	B	Write a difference between Arteries and Veins with diagram.	**05**
Q-5		Describe in detail about structural features and hormonal secretions of master gland.	**10**
		OR	
Q-5	A	Explain : Mechanism of action of lipid soluble hormones.	**05**
	B	Cortical hormones of Adrenal.	**05**
Q-6	A	Describe : Sexually transmited diseases.	**05**
	B	Describe : Forensic medicines.	**05**
		OR	
Q-6	A	Write about Balantidium coli.	**05**
	B	Write a note on Transgenic animals.	**05**

—X—

SEAT No._____

35 & A-31 - ઉપર્યું

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

S.Y.B.Sc. THIRD SEMESTER EXAMINATION

Tuesday, 21/11/2017

Time:2:00 p.m to 4 :00 p.m.

US03EZOO 01 (Elective zoology)

Invertebrate, Physiology, Biotechnology & Parasitology

Total Marks (70)

પ્રશ્ન.૧ સાચો વિકલ્પ પસંદ કરો. (૧૦)

૧._____ રેતીકીડાને લગતું નથી.

એ. એસીક્યુલામ, બી. ફર્ટીલીયમ, સી. રૂપાંતરણ, ડી. સિસ્થોજીનસ ગ્રંથી.

૨. _____ લારવા ગોકળગાયનું બોડી છોડે છે.

એ. સરકારિયા, બી. રેડીયા, સી.મીરાસીડીયમ , ડી . સ્પોરોસીષ્ટ

૩.હાઇડ્રોલીમ્ફ _____માં હાજર હોય છે.

એ. વંદો, બી. અળસિયું, સી.વાળો , ડી. વાદળી.

૪._____ વાલ્વ ધરાવે છે.

એ. શીરા, બી. ધમની, સી. રૂધીરકેશીકા, ડી. તમામ.

૫. કેતાકોલામાયિનનો સ્રાવ કરે છે :

એ. જક્સ્તાગ્લોમરૂલાસ કોશો, બી.સુપ્રરીનલ ગ્રંથી, સી. પાર્સનર્વોશા, ડી. પીનીયલ ગ્રંથી.

૬. પેરા થાયરોઈડ અન્ત:શસ્ત્રાવ _____કોષો દ્વારા સંશ્લેષણ થાય છે.

એ. ફોલીક્યુલર કોષો, બી. માસ્ટ કોષો, સી. ચીફકોસો, ડી. ગોબ્લેતકોસો.

૭. _____ માંયોકાર્દીયાલ ઈન્ફાક્સોનને લગતું છે.

એ. હાર્ટ એટક, બી. સ્નાયુનો દુખાવો, સી. પેટનો દુખાવો, ડી. માથાનો દુખાવો.

૮. કયું સંવર્ધનમાધ્યમ પ્રાણીકોશ સંવર્ધનમાં વપરાતું નથી.

એ. આરપીએમઆઈ-૧૬૪૦, બી. હેનકનું માધ્યમ, સી. ઇગલનું માધ્યમ, ડી. એમએસ માધ્યમ

૯. માંછલીના લશિકા હૃદય_____પ્રકારના છે.

એ. એમ્પ્યુલાર, બી. ખાનાયુક્ત, સી. નલીકામય, ડી. ધબકતા .

૧૦. ટેગ્યુંમેનટ_____મા જોવા મળે છે.

એ. રેતીકીડો, બી. માંકડું, સી. યકૃતકૃમિ, ડી. બેલેનટીડીયમ.

ધ્યાનું ઉલટાવો)

પ્રશ્ન.૨ ટુકમાં જવાબ આપો. (કોઇપણ દસ) (૨૦)

૧. જ્યોતકોષોની નામ નિર્દેશનવાળી આકૃતિ દોરો.

૨. લોઉરરની નલિકા શું છે ?

૩. એપીટોકી એટલે શું ?

૪. રૂધિર કેશીકાઓની દેહધાર્મિક અગત્યતા લખો.

૫. કુદરતી અને કુત્રિમ એન્ટીકોએગયુંલન્ટના નામ લખો.

૬. સિસ્ટરના ચાઈલી એટલે શું ?

૭. અન્તઃસ્ત્રવી ગ્રાહકોની ભૂમિકા લખો.

૮. મીનરલો કોર્ટીકોઈડસ વિશે લખો.

૯. સમજાવો : બાયપાસ સર્જરી.

૧૦. સ્લીપીંગ શીક્નેશ વિશે લખો.

૧૧. એચ.આઈ.વી વિશે લખો.

૧૨. સમજાવો :પેરાથાઈરોઈડ ગ્રંથી.

પ્રશ્ન.૩ વર્ણવો:

એ. યકૃત્કુમીનું ચેતા તંત્ર. (૫)

બી. રેતીકીડાનું જાતીય પુખ્ત રૂપ. (૫)

અથવા

પ્રશ્ન.૩ એ. લીમ્નીયા ગોકળગાયના શરીરમાં પ્રવેશતા લારવાનું વર્ણન કરો. (૫)

બી. સમજાવો : રેતીકીડાની બહિયાકાળ વિદ્યા. (૫)

પ્રશ્ન.૪ લશીકા અને લશીકાતંત્ર વર્ણવો. (૧૦)

અથવા

પ્રશ્ન.૪ એ. રૂધિરાધાન વિશે લખો. (૫)

બી. ધમની અને શીરા વચ્ચેનો તફાવત આકૃતિ આપી લખો . (૫)

પ્રશ્ન.૫ માસ્ટર ગ્રંથીના માળખાકીય લક્ષણો અને અન્તઃસ્ત્રવી સ્ત્રાવ વિશે લખો (૧૦)

અથવા

પ્રશ્ન.૫ એ. સમજાવો : ચરબીદ્રાવ્યા અંતઃસ્ત્રાવોનું કાર્યપ્રણાલી. (૫)

બી.એડ્રીનલ ગ્રંથીના બહ્યાકના અંતઃસ્ત્રાવો. (૫)

પ્રશ્ન.૬. એ.વર્ણવો જાતીયસબંધથી પ્રસરતા રોગો. (૫)

બી.વર્ણવો: ફોરેન્સીક મેડીસીન્સ. (૫)

અથવા

પ્રશ્ન.૬. એ.વર્ણવો : બેલેનટીડીયમ કોલી. (૫)

બી.વર્ણવો: ટ્રાન્સજેનિક પ્રાણીઓ. (૫)

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SC

SEAT No._____ 03

[248A-21]

Sardar Patel University
B.Sc. Semester - III Examination
Monday, 27th November, 2017

Time: 2.00 to 4.00 p.m | US03FSTA01 | M.Marks: 70

(Foundation of Statistics – I)

Note: (*i*) Simple/Scientific calculator is allowed (*ii*) Graph paper will provided on request.
(*iii*) Statistical table will be allowed/provided on request (*iv*) Q.3 to 6, each sub question has 5 marks

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Q.1 Multiple Choice Questions (10×1)

(1) The numerical information in a statistical table is called the
(a) Body (b) Title (c) Footnote (d) Caption

(2) Which of the following can be described as variable?
(a) BMI (Body Mass Index) (b) Pulse rate
(c) Time spent on mobile (in hours) (d) All of the above

(3) The most commonly used device of presenting business and economical data is
(a) Pie diagram (b) Line diagram (c) Bar diagram (d) None of the above

(4) _____ is one which is collected by the investigator himself for the purpose of specific inquiry or study
(a) Primary data (b) Secondary data (c) Statistical data (d) None of the above

(5) Smoking should be ban in public places? (Strongly agree, agree, disagree, strongly disagree) is an example of
(a) Nominal (b) Ordinal (c) Discrete (d) Continuous

(6) The formula for computing the number of classes in construction of grouped frequency distribution is
(a) $3.322\ log(N)$ (b) $1 + 0.322\ log(N)$ (c) $1 - 3.322\ log(N)$ (d) $1 + 3.322\ log(N)$

(7) Which of the following is not a measure of central tendency?
(a) Mean (b) Median (c) Mode (d) Standard deviation

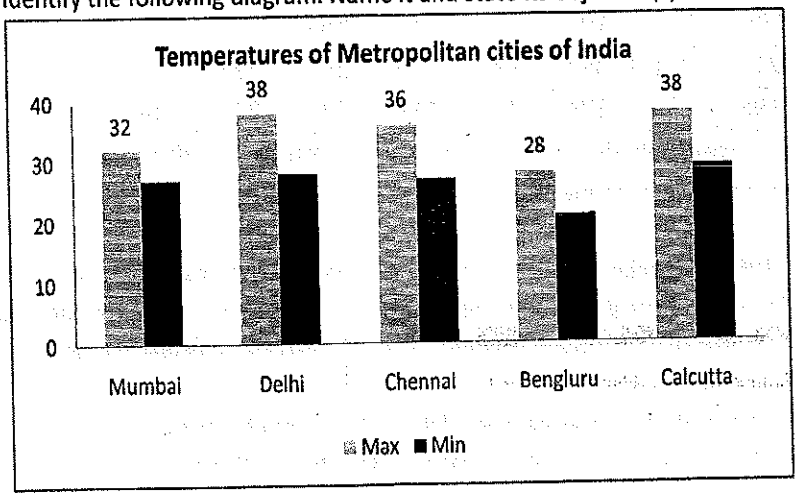
(8) In chronological classification, the data is classified on the basis of
(a) Money (b) Time (c) Location (d) Quality

(9) For a positively skewed distribution
(a) Mean < Median < Mode (b) Mean = Median = Mode
(c) Mean > Median > Mode (d) All of the above

(10) Which of the following cannot be determined graphically?
(a) Standard Deviation (b) Mode (c) Median (d) Mean

Q.2 Short Type Questions (Attempt Any Ten) (10×2)

(1) Identify the following diagram. Name it and state its objective(s).



C.P.T.O.)

(2) Give two examples each of discrete and continuous variables applicable in our day to day life.

(3) With reference to survey method, define the following:
(i) Parameter (ii) Sampling frame

(4) What is tabulation? Write down its importance.

(5) In a village of 300 population, 60% constitutes Hindu, 20% Muslims, 10% Sikhs and 10% Christians. We want to take a sample of 10% of the population to study the eating habits of this population. Which sampling method do you recommend for it? Why?

(6) State the importance of diagrams.

(7) Write down the formulae to calculate mean, median and mode for the given n numbers.

(8) Name the diagram do you prefer to represent the following data:

MARKET SHARE OF LOW CALORY SUGAR IN INDIA

Brand	Sugar free	Sacharin	Sweetex	Equal	Zero
Market share (%)	65	13	12	6	4

State its objective(s).

(9) Write a note on " Lottery Method "

(10) Describe the method of selecting a systematic sample of size n from a population of size N.

(11) Give two examples each of variable and categorical variable.

(12) What is grouped frequency distribution?

Q.3(a) List out the various methods of drawing a sample. If population is homogeneous, which method do you recommend to use it? Write in brief about it.

(b) Give any two definitions of Statistics. Write down its limitations.

OR

Q.3(a) Write a note on " Systematic Sampling "

(b) List out the various applications of Statistics. Write in brief about each one of them.

Q.4(a) Write in brief about Stratified randorn sampling. Write down its merits and demerits.

(b) List out the various methods of collecting Primary data. Write in brief about any one of them.

OR

Q.4(a) What is secondary data? Write down the various sources of secondary data.

(b) Write a note on " Mailed Questionnaire Method ".

Q.5(a) Write a note on:
(i) Classification (ii) Parts of Table

(b) Blood cholesterol levels were recorded for 40 persons sampled in a medical study group and the following data were obtained.

233	212	249	227	249	258	265	196	310	244
256	161	195	233	199	282	286	163	205	176
195	299	210	301	357	195	226	297	227	218
355	234	195	179	174	281	154	330	223	284

(i) Construct a frequency distribution of equal class - width taking 210 - 240 as one of the classes.
(ii) Draw histogram and determine mode.

OR

Q.5(a) A high risk group of 1083 male volunteers were included in a major clinical trial for testing a new vaccine for type - B hepatitis. The vaccine was given to 549 persons randomly selected from the group, and the others were injected with a neutral substance (called placebo). Eleven of vaccinated people and seventy of the non - vaccinated ones later got the disease.
(i) Present the above data in the two - way frequency table (ii) State its objectives.

(b) Present the following data through a most suitable diagram. State its objective(s).

World Crude Birth and Death Rates

Years	CBR	CDR
1975 - 1980	28.4	10.7
1980 - 1985	27.9	10.3
1985 - 1990	27.3	9.7
1990 - 1995	24.7	9.4
1995 - 2000	22.5	8.9

Q.6(a) The albumin blood levels of 11 dialysis patients are

39	36	34	33	30	28	33	34	29	21	32

Calculate mean, median, mode and standard deviation.

(b) An analysis of the fat content (%) of a random sample of 175 cheese burgers resulted in the following summarized information:

Fat content (%)	26 - 28	28 - 30	30 - 32	32 - 34	34 - 36	36 - 38	38 - 40
No. of cheese burgers	7	22	36	45	33	28	4

Calculate mean and standard deviation.

OR

Q.6(a) Two groups of six guinea pigs each were injected, respectively with 0.5 mg, 1.0 mg of a new tranquilizer and the following are the number of minutes it took to fall asleep:

0.5 mg	21	23	19	24	25	23
1.0 mg	19	21	20	18	22	20

Calculate mean and standard deviation of both the groups.

(b) From the following frequency distribution, calculate mean and mode.

Weight(in grams)	74 - 77	77 - 80	80 - 83	83 - 86	86 - 89
No. of items	3	6	9	3	4

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SEAT No._____ No. of Printed Pages : 02

[A-23]

Sardar Patel University

B.Sc. (Semester - III) Examination (NC – 2010 Batch)

Thursday, 23rd November, 2017

Course Code: US03FSTA01

Foundation of Statistics - I

(Foundation Course)

Time: 2 to 4 p.m M.Marks: 70

Note: (*i*) Simple/Scientific calculator is allowed. (*ii*) Graph paper will be provided on request.

Q.1 Multiple Choice Questions **(10 × 1)**

(1) In chronological classification, the data is classified on the basis of
(a) money (b) location (c) quantity (d) time

(2) Which of the following can be described as variable?
(a) Body temperature (b) Waiting time (in minutes)
(c) Time spent on computer(in hours) (d) All of the above

(3) _____must be given at the bottom of the table, if secondary data is used.
(a) Foot note (b) Head note (c) Source note (d) Title

(4) The standard deviation of
15, 22, 27, 11, 9, 21, 14, 9 is
(a) 6.22 (b) 6.12 (c) 6.04 (d) 6.32

(5) _____ is one which is collected by the investigator himself for the purpose of a specific inquiry or study.
(a) Primary data (b) Secondary data (c) Statistical data (d) Published data

(6) The median of a frequency distribution can be determined graphically with the help of
(a) Frequency curve (b) Frequency polygon (c) Histogram (d) Ogives

(7) The most commonly used device of presenting business and economical data is
(a) Pie chart (b) Pictogram (c) Bar diagram (d) Line diagram

(8) The first step in tabulation is
(a) Foot note (b) Source note (c) Captions (d) Classification

(9) The main aim of sample survey is to get reliable information about the _____ in less time and at a lower cost.
(a) Sample (b) Population (c) Both (a) and (b) (d) None of the above

(10) An auto analyst is conducting a satisfaction survey, sampling from a list of 10,000 new car buyers. The list includes 2500 Ford buyers, 3500 Hyundai buyers, 3000 Maruti Suzuki buyers and remaining 1000 Honda buyers. The analyst select a sample of 400 car buyers, which sampling technique would you recommend to use
(a) Simple Random Sampling (b) Systematic Sampling
(c) Stratified Random Sampling (d) All of These

Q.2 Short Type Questions (Attempt Any Ten) **(10 × 2)**

(1) State importance of diagrams.
(2) List out the various parts of tabulation. Write in brief about any one of them.
(3) State the limitations of Statistics.
(4) Give two examples each of variable and categorical variable.
(5) Write in brief about Lottery method.
(6) Define Mean. Write down the formulae to calculate mean.
(7) Give two examples each of nominal and ordinal data.
(8) How will you calculate median?
(9) State any two applications of Statistics.
(10) What is classification? State the rules for classification.
(11) List out the various methods of collecting primary data. If the informants/respondents are literate and spread over a vast area, which method do you consider to be best?

(P.T.O.)

(12) Write in brief about Systematic sampling.

Q.3(a) State the various methods of collecting data. Write in brief about any one of them. (5)

(b) Write a note on Stratified random sampling by giving an example. (5)

OR

Q.3(a) List out the various methods of drawing a sample. Explain any one of them by giving an example. (5)

(b) Describe in brief the application of Statistics in the various fields. (5)

Q.4(a) Write a note on mailed questionnaire method. (5)

(b) What is sample and sample survey? State its advantages. (5)

OR

Q.4(a) What do you mean by questionnaire? State the essential points to be remembered in drafting a questionnaire. (5)

(b) An analysis of the fat content (%) of a random sample of 175 cheese burgers resulted in the following summarized information: (5)

Fat content (%)	26 - 28	28 - 30	30 - 32	32 - 34	34 - 36	36 - 38	38 - 40
No. of cheese burgers	7	22	36	45	33	28	4

Determine mode graphically.

Q.5(a) What is classification? State the purpose of classification. (5)

(b) Present the following data through a most suitable diagram. State its objective(s). (5)

Literacy Rate In Various States Of Urban India

State	1991	2001	2011
Gujarat	76.54	81.84	86.30
Madhya Pradesh	70.81	79.39	82.90
Rajasthan	65.33	76.20	79.70
Maharashtra	79.20	85.48	88.70

OR

Q.5(a) List out the various types of diagrams you have studied. Describe any one of them by giving an example. (5)

(b) In a sample study about the coffee habits in two towns, the following information was received: (5)
Town A: Females were 40%; Total coffee drinkers were 45% and Male non-coffee drinkers were 20%.
Town B: Males were 55%; Males non-coffee drinkers were 30% and females coffee drinkers were 15%. Present the above data in a tabular form.

Q.6(a) State the various measures of central tendency. Define any one of them. Write its merits and demerits. (4)

(b) A consumer affairs agency wants to check the average weight of a new product on the market. A random sample of 25 items of the product was taken and the weights (in grams.) of these items were classified as follows: (6)

Weight(in grams)	74 - 77	77 - 80	80 - 83	83 - 86	86 - 89
No. of items	3	6	9	3	4

Calculate mean and variance.

OR

Q.6(a) List out the various measures of central tendency. According to you which measure do you considered to be best and why? (4)

(b) The albumin blood levels of 11 dialysis patients are (6)

39	36	34	33	30	28	33	34	29	21	32

Calculate mean, median, mode and standard deviation.

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