SEAT No._____

No. of Printed Pages : 02

[60/A-397]

SARDAR PATEL UNIVERSITY

B.Sc.-IV Semester Examination-2017
Tuesday, 11th April
02.00 p.m. to 05.00 p.m.
Subject Code: US04CBCH01
Title: Biochemistry of Biomolecules-2

Total Marks: 70

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

1) Peptide bond is_____:

a) Rigid b) Planar c) Partially double bond in nature d) All of these

2) Strucutre of haemoglobin is _____ in nature:

a) Primary b) Secondary c) Tertiary d) Quaternary

3) Which of the following is a not a protein?

a) Ferritin b) Fibrinogen c) Haematin d) Albumin

4) Which of these is a monounsaturated fatty acids?

a) Arachidonic acid b) Oleic acid c) Linolenic acid d) Linoleic acid

5) Which of these tests can measure the degree of unasturation in a lipids?

a) Saponification test b) Reichert-Meissi Number test
c) Iodine Number Test d) Acid Number test

6) Specific gravity of lipids is approximately_____:

a) 0.2 b) 0.8 c) 1.0 d) 1.5

7) Which of the following molecules is a carrier of anticodon?

a) mRNA b) rRNA c) Small nuclear RNA d) tRNA

8) Which of the following is a left handed DNA?

a) A-DNA b) Z-DNA c) B-DNA d) All of these

9) The term apoenzyme represents_____:

a) Functional enzyme b) Protein part of conjugated enzyme
c) Organic cofacter of conjugated enzyme d) Inorganic cofacter of conjugated enzyme

10) Which of these scientists coined the term enzyme?

a) Buchner b) Berzelius c) James Sumner d) Kuhne

Q2. Answer the following (any ten): [20]

1) What do you understand by quaternary structure of proteins?
2) What are derived proteins? Explain giving suitable examples.
3) What is salting out?
4) Define: (i) Emulsification (ii) Hydrogenation
5) What is hydrolytic rancidity?
6) Give structure of: (i) Cephalin (ii) Chlolesterol
7) Define Chromosome and what are its different types?
8) What is Chargaff's rule?
9) Write a short note on mRNA.
10) What is a multienzyme complex? Give example.
11) Write a short note on active site of enzyme.
12) Discuss effect of temperature on enzyme activity.

Q3. (a) Discuss secondary structure of proteins. [06]
(b) Write a note on denaturation of proteins. [04]

OR

Q3. (a) How is peptide bond formed? Discuss its chemical nature. [06]
(b) Discuss structure of Haemoglobin. [04]

Q4. (a) Write short notes on following: (i) Saponification (ii) Chylomicrons [06]
(b) Discuss Bloor's classification of lipids. [04]

OR

Q4. (a) Write Short notes on: (i) Reichert-Meissi Number (ii) Solubiity of lipids [06]
(b) What is meant by amphipathic lipids? Write their significance. [04]

Q5. Draw secondary structure of DNA and write its characteristics. [10]

OR

Q5. (a) Write a note on plamids. [05]
(b) Discuss structure of tRNA. [05]

Q6. (a) Give a detailed account of classification of enzymes with suitable examples. [06]
(b) Write a note on Isoenzymes. [04]

OR

Q6. (a) Write a note on specificity of enzymes. [06]
(b) How does substrate concentration affect the rate of enzyme catalyzed reaction? Explain. [04]

*********Best of Luck*********

SEAT No._____ No. of Printed Pages: 02

[81/A-40]

SARDAR PATEL UNIVERSITY

SECOND YEAR B.Sc.(FOURTH SEMESTER) EXAMINATION

2017

TUESDAY, 11TH APRIL

2:00 TO 5:00 pm

USO4CBIO 01 (CONCEPTS OF 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 labelled diagrams wherever necessary

Q.1. Select the correct answer and write it in the answer sheet. **[10]**

1. _____ chromosome has unequal length of chromatids.
(a) metacentric (b) sub- metacentric (c) acrocentric (d)telocentric
2. Chromomere is a part of _____ .
(a) cell wall (b) cell membrane (c) chromosome (d) None of these
3. Heterochromatin is _____ stained.
(a) lightly (b) darkly (c) both (d) none
4. DNA has_____ sugar .
(a) pentose (b) hexose (c) both (d) none
5. _____is a giant chromosome.
(a) X chromosome (b) Y chromosome (c) polytene chromosome (d) none
6.The number of nitrogenous bases in DNA is _____ .
(a) 2 (b) 3 (c) 4 (d) 5
7. _____ enzyme unwinds the DNA in replication.
(a) polymerase (b)helicase (c) ligase (d) topoisomerase
8.Okazaki fragment is found in _____ strand.
(a) leading (b) lagging (c) both (d) None of these
9. _____transcribes the copy of DNA.
(a)mRNA (b) tRNA (c) rRNA (d) None of these
10. Translation occurs in _____ .
(a) Nucleus (b) cytoplasm (c) golgi body (d) mitochondria

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

1. Write a note on acrocentric chromosome.
2. What are sex chromosomes?
3. What is a giant chromosome?
4. Write down the nitrogenous bases present in DNA.
5. Write the function of mRNA .
6. Mention the hydrogen bonds of DNA.
7. What is Okazaki fragment?
8. What is the function of DNA ligase?
9. Explain the use of helicase?
10. What is transcription?

11. What is translation?
12. Write the function of tRNA in protein synthesis.

Q.3.
(a) Explain the structure of Chromosome. **[05]**
(b) Write about lampbrush chromosome. **[05]**

OR

Q.3.
(a) Discuss about Euchromatin. **[05]**
(b) Explain all about polytene chromosome. **[05]**

Q.4. (a)Describe the Watson & Crick model of DNA. **[06]**
(b)Explain about rRNA **[04]**

OR

Q.4.(a) Explain the structure of nitrogenous bases of DNA. **[06]**
(b)Write about the chemical composition of DNA. **[04]**

Q.5.
(a) Write about DNA polymerase. **[05]**
(b) Write about the leading strand of DNA relication in eukaryotes. **[05]**

OR

Q.5.
(a) Write about enzymes and proteins involved in DNA replication. **[05]**
(b) Write a note on lagging strand of DNA replication in Eukaryotes. **[05]**

Q.6. Explain the process of Transcription in Eukaryotes. **[10]**

OR

Q.6. Explain the process of Translation in Eukaryotes. **[10]**

SEAT No._____ No. of Printed Pages:02

[538A30]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc EXAMINATION, IVth Semester
Saturday, 08th April 2017, 2.00p.m to 05.00p.m
BIOTECHNOLOGY: US04CBIT01 [Fundamentals of Biotechnology]

NOTE- Figures in the right indicate full marks. **Maximum Marks-70**

Q.1. Multiple Choice Questions (10 marks- One Mark for Each MCQ) **[10]**

1. The promoter is:

A) A factor involving in translational process
B) Associated with repressor in an inducible operon
C) A sequence located at the 3' end of a gene
D) The binding site for RNA polymerase

2. Which of the following genes is not a structural gene of the lac operon?

A) lacA B) lac I C) lacY D) lacZ

3. Attenuation of the trp operon:

A) Occurs when transcription is complete before translation begins.
B) Is mediated by the trp repressor protein.
C) Occurs in the presence of high levels of tryptophan.
D) All of the above.

4. Where is the amino-acid binding site located on the tRNA molecule?

A). in the middle of the loop B). at the end of the 3′ end of the molecule
C). in the first loop D) along the longest stretch of base pairing in the molecule

5. In Translation polypeptide chain elongation takes place in

A) N→ C Terminal B) C → N Terminal C) In both terminal D) All the above.

6. Sequences in DNA that restriction enzymes bind to and cut are mostly

A) Random sequences B) antiparallel C) palindromic D) All of the above.

7. Restriction endonucleases are enzymes which

A) Remove nucleotides from the ends of the DNA molecule
B) Make cuts at specific positions within the DNA molecule
C) Recognize a specific nucleotide sequence for binding of DNA
D) Restrict the action of the enzyme DNA polymerase

8. Which of these cells can kill tumorous cells:

A) B-cells B) NK cells C) CTL's D) Both B & C

9. Immunological memory is a feature of:

A) B Cell B) T Cell C) Both B & T Cell D) Phagocytes

10. Plasma cell is derived from:

A) B cell B) T Cell C) macrophages D) Antigen Presenting Cell

(PTO)

Q.2. Short Question (any 10 question X 2 marks each) [20]

1. What is Operon? Enlist the enzyme coded by Trp Operon.
2. Describe prokaryotic RNA polymerase?
3. What is leader sequence, describe its significance.
4. What is Shine-Dalgarno Sequence?
5. What is aminoacyl transferase? Describe its function.
6. How many high energy phosphate bonds are required for incorporation of 1 amino acid?
7. What do you mean by type I restriction? Explain it with suitable example.
8. Define Hexacutters with suitable examples.
9. Write short notes on application of restriction enzymes.
10. Enumerate various features of antigen antibody reactions.
11. What are the features and functions of NK cells?
12. Give a comparative account of B and T cells.

Q.3.a. Describe the fine regulation of Trp Operon. [5]
Q.3.b. Describe the termination of prokaryotic transcription. [5]

OR

Q.3.a. Describe the negative regulation of Lac Operon. [5]
Q.3.b. Describe the initiation of prokaryotic transcription. [5]

Q.4.a. Describe the elongation of prokaryotic translation. [5]
Q.4.b. Describe the termination of prokaryotic translation. [5]

OR

Q.4.a. Describe the initiation of prokaryotic translation. [5]
Q.4.b. Describe the significance of prokaryotic translation. [5]

Q.5.a. Explain the nomenclature of restriction enzymes. [5]
Q.5.b. Describe restriction modification system with its importance. [5]

OR

Q.5.a. Enlist the important properties of restriction enzymes. [5]
Q.5.b. Give a brief overview about Type-II restriction endonuclease. [5]

Q.6.a. Write a brief note on Precipitation reaction in gels. [5]
Q.6.b. Briefly explain hemagglutination reaction and its application. [5]

OR

Q.6a. Write a note on macrophages and their functions. [5]
Q.6.b. Give a comparative account of agglutination and precipitation reaction. [5]

—X—

SEAT No._____

[76/A-32]

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY
Theory Examination - March 2017
B.Sc. Biotechnology IVth Semester
US04CBIT02 (Applications of Biotechnology –II)
Monday, 10-04-2017
02:00 p.m. to 5:00 p.m.

Q.I **Multiple choice questions:** **Total marks: 70**

1 _____rediscovered the mendel's law. **(10)**
a) Hugo de varies
b) Erich Tschenmack
c) karl correns
d) All of these

2 Mendel's principle of segregation means that the germ cells always receive.
a) one pair of allele
c) one quarter of genes
b) one of the paired allele
d) any pair of the allele

3 An allele is dominant or recessive is dependent on
a) Weather it is inherited
c) How common allele is relative to another allele
b) Where it or other allele determines phenotype where both are present
d) Whether or not it is linked to other genes

4 What act as a transporter for recombinant DNA?
a) Vector
c) Host
b) DNA fragment
d) None of these

5 Blue-White screening is used in molecular cloning for
a) To identify desired chromosomal DNA insert in plasmid vectors
b) To detect host DNA in situ
c) To detect gene mutation
d) To screen for recombinant vectors

6 _____culture technique is widely accepted to achieve virus free plants.
a) Meristem
c) Anther
b) Shoot
d) Embryo

7 Preembryonic determined cells are involved in_____.
a) Indirect embryogenesis
b) Direct embryogenesis
c) Indirect organogenesis
d) Direct organogenesis

8 To obtain homozygous diploid plants from haploid culture, _____ treatment is applied.
a) Sodium hypochlorite
b) Colchicine
b) Sodium nitrite
d) none

9 Which stain is used to observe viability of Protoplast.
a) Floresein diacetate
c) Phenosafranine
b) Colcoflour White
d) All of these

10 Cybridization involve the fusion of
a) Only nucleus of both parents
c) Only cytoplasm of both parents
b) Nucleus from one & cytoplasm of both parents
d) None of these

Q.II		**Answer the following (Attempt Any ten)**	**(20)**
	1.	Write the difference between monohybrid and dihybrid cross.	
	2.	What do you understand by genotype and phenotype?	
	3.	What do you meant by maternal effect?	
	4.	Enlist the functions of X-gal.	
	5.	Write about competent cells.	
	6.	Define the term of r- DNA.	
	7.	Define: a) Embryogenic potential b) Embryoid	
	8.	Write about Androgenesis and Gyanogenesis	
	9.	Give significance of Meristem culture.	
	10.	Define Osmoticum. With its example.	
	11.	Write about co-culturing method.	
	12.	Write the difference between somatic hybrid and cybrid.	
Q.III	**(a)**	State and Explain the Mendel law of segregation.	**(05)**
	(b)	What do you mean by Extrachromosomal inheritance? Explain coiling of shell in snail.	**(05)**
		OR	
	(a)	Explain the law of independent assortment.	**(05)**
	(b)	Discuss about maternal inheritance in Limnaea.	**(05)**
Q.IV	**(a)**	How can you prepare and use competent cell?	**(05)**
	(b)	Write a note on Blue and White selection.	**(05)**
		OR	
	(a)	Enlist different methods of Transformation and explain any one.	**(05)**
	(b)	Explain the method of constructing a recombinant for cloning	**(05)**
Q.V		Describe the anther and Pollen culture in detail with labeled diagram.	**(10)**
		OR	
	(a)	Write about Meristem culture.	**(05)**
	(b)	Give a note on somatic Embryogenesis.	**(05)**
Q.VI	**(a)**	Discuss about induced methods of Protoplast fusion.	**(05)**
	(b)	Discuss about cybridization with the help of diagram.	**(05)**
		OR	
Q.VI		Write a detailed note on screening and selection of somatic hybrids.	**(10)**

— X —

No. of Printed Pages: 02

SEAT No._____

[82/A-44]

( ) SARDAR PATEL UNIVERSITY

External Examination

Class- S.Y. B. Sc. IV Semester

Date: - 11-04-2017, Day: - Tuesday,

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

Course: - US04CBNF01 Subject: Bioinformatics Title: - Bioinformatics Sequence Analysis

Total Marks: 70

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

(1) _____ is a database similarity search tool.
a) BLAST b) CLUSTAL W c) CLUSTAL X d) RASMOL

(2) Continuous set of spaces in the sequence
a)Match b) Gaps c) Mismatch d) None of the above

(3) Smith and Watermann algorithm is used for
a) Local alignment b) Global alignment c) Structure prediction d) All

(4) The _____ tool compares translated nucleotide query sequence against protein databases.
a) blastp b) tblastn c) blastx d) tblastx

(5) Which alignment is useful to detect the highly conserved regions?
a) Local b) Global c) Pairwise sequence d) Multiple sequence.

(6) The ClustalW uses step for multiple alignment is :
a) guide tree formation b) the order they are entered into the program
c) the percent identity d) the organisms they come from

(7) The imino acid found in the protein is
a) Proline b) Glycine c) Valine d) Aspartic acid

(8) Which of the following pairs of amino acids is basic in nature?
a) histidine b) alanine c) leucine d) glutamatic acid

(9) Sequence alignment helps scientists
a) to trace out evolutionary relationships b) to infer the functions of newly synthesized genes
c) to predict new members of gene families d) all of these

(10) The _____ the E-value, the more significant the hit.
a) lower b) higher c) average d) superior

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

(1) Differentiate local and global alignment.
(2) Give the biological significance of Gaps.
(3) Enlist different types of Edit operations used in sequence alignment
(4) Give the abbreviation for: BLAST, NCBI, PAM, BLOSUM.
(5) Differentiate between Needleman Wunch and Smith Watermann algorithm.
(6) Align the sequence i) ATCGCCCAATTCT ii) ATCGCCAAAATTC
Given match score: 5 and mismatch score: -2
(7) Give the name of all polar amino acids along with its codes.
(8) Give different types of bonds present in protein structure.
(9) How Clustal W tool is used? Give different steps.
(10) Explain the utility of BLAST.
(11) Differentiate PAM and BLOSUM.
(12) Diagrammatically show α helix and β sheets.

P.T.O

Q3. What is Sequence alignment? Explain in detail about its types and importance [10]

OR

Q3. Discuss local alignment. Explain any one tool in detail for it. [10]

Q4. (i) What is progressive method? Explain the algorithm. [05]

(ii) Elaborate different types of BLAST. [05]

OR

Q4. Explain scoring matrix and its types with example. [10]

Q5. Explain DP algorithm and its type with an example. [10]

OR

Q5. Use Needleman/Wunsch algorithm for aligning following sequences [10]
G A A T T C A G T T A (sequence #1)
G G A T C G A (sequence #2)
so M = 11 and N = 7 (the length of sequence #1 and sequence #2, respectively)
GIVEN: Match score : +1 , Mismatch : 0, Gap penalty: 0
Find score and all possible alignments.

Q6. What are proteins? Discuss its properties and structure in detail. [10]

OR

Q6. Explain Chou Fasman method in detail for protein structure prediction [10]

**********§**********

[65/A-36] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

S.Y.Bsc. Examination, 2017

Semester-IV Subject code - US04CBOT01

Higher cryptogams,Pharmacognosy & Environmental Biology

Date : 17/04/2017 **Day:Monday**

Time: 12-00 to 5-00p.m. **Total Marks: 70**

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

Q. 1	Choose the correct answer from the given options{10x1}	10

1) Nostoc colony is found in the thallus of---------.
a) Notothylus b) Marchantia c) Pogonatum d) Pellia

2) The mature archegonia are inverted with their necks downwards in.....
a) Selaginella b) Notothylus c) Marchantia d) Pellia

3) Basal elaterophore is present in --------
a) Psilotum b) Selaginella c) Pellia d) Pogonatum

4) Leaves of which plant have a ligule?
a) Pogonatum b) Notothylus c) Selaginella d) Marsilea

5) Spore producing organ in Psilotum is.
a) Strobilus b) Sorus c) Synangium d) None of these.

6) Gnetum, when not in flowering , can be easily mistaken for a.....
a) Dicot plant b) Monocot plant c) Thalloid plant d) Tree fern

7) Gum and mucilage are the example of.
a) Underground drug b) Organised drug c) Simple drug d) None of the above.

8)Bark used as a crude drug in.....
a) Coffee b) Cenchona c) Vinca d) Saffron.

9) Sunken stomata are found in the leave of.
a)Nerium b) Maize c) Neem d) None of these.

10)Pioneer community of hydrosere is.
a) Reed swamp stage b) Phytoplankton stage c) Forest stage d) Wood land stage.

Q. 2	Answer the following question (Any ten). 1. Write a note on gemma cup of Marchantia. 2. Sketch and label female gametophyte with sporophyte of Pogonatum. 3. Write two methods of vegetative reproduction in bryophytes. 4. What is stele. 5. Write microsporophyll of Pinus. 6. Classify Marsilea. 7. Write medicinal uses of Isopgul. 8. Define the terms organized and un organized drug. 9.Name of common fumigants used for storage of crude drug. 10.What is migration. 11.Define: Ecosystem. 12. Write about Aggregation.	20
Q. 3	Describe the sporophyte of Marchantia OR	10
Q. 3	Describe in detail sporophyte of Notothylus.	10
Q. 4	Write note on: a) Explain L.S. of Selaginella strobilus with diagram. b) Types and evolution of stele. OR	 05 05
Q. 4	Write note on: a) The structure of sporocarp of Marselia. b) Draw the internal structure of pinus needle	05 05 05
Q. 5	Give a Botanical name, family , chemical constituents and uses of Neem & vasaka. OR	10
Q. 5	Write note on: a) Morphological and chemical classification of crude drugs. b) Cultivation and collection of herbal drugs.	 05 05
Q. 6	Explain: a) The energy flow of ecosystem. b) Causes of forest degradation. OR	 05 05
Q. 6	Explain the anatomical adaptations in xerophytes and hydrophytes.	10

— x — x —

[61] SEAT No._____ No. of Printed pages: 2

SARDAR PATEL UNIVERSITY
B.Sc. (IV Sem) Examination
18 th April, 2017 2.00p.m to 5.00p.m
US04CBOT-02(BASIC AND APPLICATIONS OF PLANT SCIENCE)

Total Marks: - 70

Q-1 MULTIPAL CHOICE QUESTION (10)

(1)Which of the following is a protective tissue?

(a)Periderm (b) Parenchyma (c) Chlorenchyma (d) Xylem

(2)The vascular cambium is an example of_____

(a)Apical meristem (b) Primary meristem (c) Lateral meristem (d) Intercalary meristem

(3)Floral nectaries associated with.....

(a)Flowers (b) Roots (c) Leaves (d) Stem

(4)A monosporic embryo sac which does not have any antipodal cell is.....

(a)Peporima type (b) Oenothera type (c) Allium type (d) Polygonum type

(5)The fertilized egg is called _____

(a)Seed (b) Ovule (c) Zygote (d) Embryo

(6)Endothecium and tapatum in anther are derived from.....

(a)Primary sporoginous layer (b) Primary parietal cell (c) Both (a) &(b) (d) None of these

(7)Linkage group in human is _____

(a) 24 (b) 44 (c) 22 (d)23

(8)T H Morgan worked on.....

(a)Cucumber (b) Maize (c) Drosophila (d) Pea

(9) Gene therapy is used to _____

(a)Produce medicines (b) Destroy micro-organism from atmosphere

(c)Treat &diagnose the disease (d)) None of these

(10) Bt toxins are not toxic to.....

(a)Beetles (b)Moth larva (c)Mammals (d) None of these

[P.T.O]

Q-2 Answer the following in brief (ANY TEN) (20)

(1) What are extra floral nectaries?
(2) What is intraxylary phloem?
(3) Define: Stomata
(4) Draw a label diagram of typical angiosperm ovule.
(5) Explain: Syngamy
(6) What is pollination?
(7) Define: Linkage group.
(8) Define-Incomplete Dominance
(9) What is Test cross?
(10) Define: Totipotency
(11) What is gene therapy?
(12) List the approaches of sterilization.

Q-3 (a) Describe the anomalous secondary growth in Boerhaavia stem (07)

(b)Write a note on Nectaries (03)

OR

Q-3(a) Describe the structure and types of stomata studied by you (07)

(b)Write note on Laticifers (03)

Q-4 Explain in detail development of male gametophyte (10)

OR

Q-4 (a) Describe the different types of endosperm (07)

(b) Write note on types of monosporic embryo sac (03)

Q-5 Describe Dominant and recessive epistasis with suitable examples (10)

OR

Q-5 Explain complete and incomplete linkage with suitable example and add its significance. (10)

Q-6 Give brief general techniques in plant tissue culture (10)

OR

Q-6 (a) Describe isolation and culture of mesophyll protoplast (05)

(b)Explain the application of biotechnology in industry (05)

SEAT No._____ No. of Printed Pages : 2

[54]

SARDAR PATEL UNIVERSITY
V.V.NAGAR
EXTERNAL EXAMINATION(2017)
S. Y. Bsc (BNF)-4th Semester

Exam Date :- 8/04/2017 Course :-US04CCBI01
Total Marks :- 70 Time:2:00pm – 5.00pm

Subject: - Web Designing and Application Using HTML

Q.1 Multiple Choice Questions [10]

1. LAN is operated at _____ distance.
   a. Limited b. Wide
   c. Unlimited. d. None of the Above.
2. A _____ is a device use for modulation and demodulation.
   a. Internet b. Computer
   c. Modem d. None of the Above.
3. URL stands for _____
   a. Universal Resource Location. b. Uniform Resource Locator.
   c. Universal Resource Link. d. None of the above.
4. _____tag insert a single blank line between the two paragraphs
   a.
 b. <PRE>
   c. <S> d. <P>
5. _____ tag is used to make hyperlink.
   a. <IMG> b. <A>
   c.
 d. None of the Above.
6. <LI> tag is sub tag of
   a. <OL> b. <UL>
   c. <DD> d. both a and b.
7. _____ attributes sets the amount of space between the two adjacent cell.
   a. CELLSPACING b. CELLPADDING
   c. WIDTH d. None of the above.
8. Image tag accepts _____ and _____ picture format.
   a. .gif and .jpg b. .gif and .psd
   c. .jpg and .doc d. None of the above/
9. _____ attribute indicates what the method of transmitting the form data is.
   a. href b. action
   c. src d. method
10. Microsoft Frontpage is a _____ HTML editor
    a. WYISWYG b. WYSIWYG
    c. WYSWIYG d. WUSISUG

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

1. Explain the radio button control.
2. Explain the reset button control.
3. Write the steps inserting <form> and specifying its property.
4. Explain the frameset tag with all its attributes.
5. Discuss <TH> tag.
6. Explain <A> tag in short.
7. Explain B, I, U, STRIKE tags.
8. Write a short note on MARQUEE tag.
9. What are special characters? Explain how you create it?
10. What is Internet?
11. What do you mean by a web-server?
12. Briefly explain commands in File menu.

(1)

(PTO)

Q.3	a)	List and explain the components of Web-Browser.	[6]
	b)	Explain TelNet in detail.	[4]

OR

Q.3	a)	What do you mean by Search Engine? Discuss it in detail.	[6]
	b)	Explain Electronic mail in detail.	[4]
Q.4	a)	Draw and discuss the structure of HTML Document.	[6]
	b)	How you can create ORDER List? Explain.	[4]

OR

Q.4	a)	Write a note on HTML.	[6]
	b)	How you can create BULLETED list? Explain	[4]
Q.5	a)	Explain TABLE creation of HTML in detail.	[6]
	b)	Write a note on <frame> with all the associated attributes.	[4]

OR

Q.5	a)	Write a detail note on IMAGE tag.	[6]
	b)	How you can create different type of LINK? Explain.	[4]
Q.6		Write a note on <form> tag with all the associated attributes and tags.	[10]

OR

Q.6		Explain atleast 5 GUI components of Microsoft Frontpage.	[10]

All the Best

C2)

SEAT No._____ No. of Printed Pages :

[777]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc. (SEMESTER – IV) EXAMINATION : 2017
BIO INFORMATICS
US04CCBI02: Computer Networking and Internet

Date: 10/04/2017, Monday Time: 02:00pm To 05:00pm Max. Marks: 70

Q.1 Multiple choice of Question: 10

[1] "Interconnected collection of autonomous computers" is known as _____.
(a) Computer network (b) Host
(c) Subnet (d) Server

[2] Traditional LANs run at speeds of _____ to _____ Mbps.
(a) 20 to 100 (b) 10 to 1000
(c) 100 to 1000 (d) 10 to 100

[3] _____ layer is responsible for allowing access to network resources.
(a) Application (b) Presentation
(c) Network (d) Data link

[4] The set of rules that govern data communication is known as _____.
(a) Model (b) Protocol
(c) Agreement (d) None of the above

[5] The physical path by which data travel from sender to receiver is known as
(a) Media (b) Server
(c) Host (d)Workstation

[6] The data elements sent from one device to another per second is known as _____.
(a) Bandwidth (b) Modulation Rate
(c) Data Rate (d) None of these

[7] Which of the following topologies requires maximum number of i/o ports?
(a) Ring (b) Mesh
(c) Tree (d) Star

[8] A set of layers and protocols is called _____
(a) Layer (b) Protocol stack
(c) Protocol (d) Network

[9] XML stands for
(a) Extensible Markup Language (b) Extended Markup Language
(c) Extensible Makeup Language (d) Extended Makeup Language

[10] Which of the following languages is used for Handheld devices?
(a) DHTML (b) HTML
(c) WML (d) XML

Q.2 Answer the following questions in short (Any 10): 20
[1] List the disadvantages of computer networks.
[2] List various categories of Coaxial cable and state their use.
[3] Explain DQDB in brief.
[4] Explain Half duplex transmission.

[5] Explain full duplex transmission.
[6] Define Hosts and Workstations.
[7] Explain Hubs in detail.
[8] Explain Star Topology.
[9] Explain Bridge in detail.
[10] What is ISP?
[11] What is chatting?
[12] What is Cookies?

Q.3 Explain OSI Model in detail. 10

OR

Q.3 What is Computer Network? Explain three categories of network in detail. 10

Q.4 Explain circuit switching and packet switching in detail. 10

OR

Q.4 Write a detailed note on Asynchronous communication and Synchronous communication. 10

Q.5 Explain Time Division Switches and Space Division in detail. 10

OR

Q.5 [A] Write Short note on "Need of Protocol." 5

[B] Explain Repeater in detail. 5

Q.6 [A] Explain Web server in detail. 5

[B] What is Intranet? Explain Advantage of it. 5

OR

Q.6 [A] Explain Web Page in detail. 5

[B] What is Firewall? Explain its categories in detail. 5

—— X ——

(A-17) Seat No.:_____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

4th-Semister B. Sc. EXAMINATION (2010 Batch) (NC)

Wednesday, 15th March 2017

2.00 pm to 5.00 pm

INORGANIC CHEMISTRY

US04CCHE01

Total Marks: 70

Q-1 Multiple choice question **[10]**

(i) Lowest stable +1 oxidation state is for _____ element.
(a) Ag (b) cu (c) Au (d) all of above

(ii) $[Ni(H_2O)_6]^{2+}$ is blue green where as $[Ni(NH_3)_6]^{2+}$ is _____ .
(a) Yellow (b) red (c) blue (d) blue green

(iii) Which of the following compound is not paramagnetic?
(a) $[Zn(NH_3)_4]$ (b) $K_3[TiF_6]$ (c) $Na_3[FeF_6]$ (d) $[Cr(H_2O)_6]SO_4$

(iv) The number of ions present in $K_3[Fe(CN)_6]$ are _____ .
(a) 10 (b) 3 (c) 2 (d) 4

(v) Which of the following would exhibit ionization isomerism?
(a) $[Co(NH_3)_6]$ (b) $K_3[Fe(CN)_6]$ (c) $[CoBr(NH_3)_5]SO_4$ (d) $K_3[Fe(C_2O_4)_3$

(vi) The richest source of rare earth is _____.
(a) monazite sand (b) bastnaesite (c) sea water (d) xenotime

(vii) The most abundant rare earth is _____ .
(a) Gd (b) Yb (c) Ce (d) Lu

(viii) Which of the following is not soft acid?
(a) Li^{3+} (b) Cu^{+} (c) Al^{3+} (d) CO_2

(ix) The oxidation state of metal in metal carbonyls is _____ .
(a) positive (b) negative (c) zero (d) all of these

(x) In the metal carbonyls, _____ bond form between metal and carbonyl.
(a) M→CO (b) M→OC (c) M←CO (d) M←OC

Q-2 Attempt any six **[12]**

(i) Why d-block elements show variable oxidation states?

(ii) Which transition metal complex ions are colourless? Why

(iii) Give application of magnetic moment value.

(iv) Define EAN of central metal ion in coordination compound and calculate EAN of Cr^{3+} ion in $[Cr(NH_3)_6]^{3+}$.

(v) Give condition for a molecule to show optical isomerism.

(vi) What is meant by lanthanide contraction?

(vii) HCl does not behave as an acid in solvent benzene.

(viii) Explain EAN rule with suitable example.

Q-3 Attempt the following **[08]**

(a) Classify d-block elements and discuss any two series.

(b) Discuss the variation in ionization energies of d-block elements as we moving across a period and form top to bottom in group IIIB.

OR

Q-3 Attempt the following **[08]**

(a) What is transition element? Discuss the general characteristics of transition elements.

(b) (i) $K_2[PtCl_6]$ is well known compound of Pt(IV), where as $K_2[NiCl_6]$ does not exist at all. Explain.
(ii) Ti^{4+} is more stable than Ti^{3+}. Explain.

(P.T.O.)

Q-4 Attempt the following [08]

(a) Deduce the formula for calculating the magnetic moment of transition metal complexes.

(b) Give the preparation properties and structure of interstitial nitrides of transition metals.

OR

Q-4 Attempt the following [08]

(a) Explain the purple colour of octahedral $[Ti(H_2O)_6]^{3+}$ ion by d-d transition.

(b) Describe Gouy's method for experimental determination of magnetic susceptibility.

Q-5 Attempt the following [08]

(a) Write the structure of $CoCl_3.6NH_3$, $CoCl_3.5NH_3$, $CoCl_3.4NH_3$ and $CoCl_3.3NH_3$ according to Werner's theory.

(b) On the basis of EAN rule, predict the number of unpaired electrons and calculate magnetic moment of the complexes: (i) $[Cu(NH_3)_4]Cl_2$ (ii) $[Cr(NH_3)_6]Cl_3$.

OR

Q-5 Attempt the following [08]

(a) Describe a chemical method to distinguish between cis and trans isomers of the complex $[Pt(NH_3)Cl_2]^0$.

(b) Draw the structure of all the possible isomers of the $[Cr(NH_3)_2(H_2O)_2Br_2]^+$ complex ion.

Q-6 Attempt the following [08]

(a) What are Lanthanides? Write their atomic numbers, symbols, names, observed and expected electronic configurations.

(b) Describe the ion-exchange method for separation of lanthanides

OR

Q-6 Attempt the following [08]

(a) Discuss the position of Lanthanides in the periodic table.

(b) Give the comparison between lanthanides and actinides.

Q-7 Attempt the following [08]

(a) Give brief account on Arhenious acid-base concept with its utility and limitations.

(b) Explain solvation and solvolysis reaction.

OR

Q-7 Attempt the following [08]

(a) Write a note on Usanovich acid-base.

(b) Discuss HSAB concept in detail with its applications.

Q-8 Discuss the preparation, properties and structure of Di-cobalt octacarbonyl $[Co_2(CO)_8]$. [08]

OR

Q-8 Write a note on Sodium nitroprusside and Nitroso ferrous sulphate [08]

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— X —

SEAT No._____ No. of Printed Pages : 2

[553A28]

SARDAR PATEL UNIVERSITY

S.Y.B.Sc. (SEMESTER – IV) EXAMINATION

SUBJECT : INORGANIC CHEMISTRY, US04CCHE01

DATE : 08-04-2017 **TIME : 02:00 P.M. TO 05: 00 P.M.**

DAY : SATURDAY **TOTAL MARKS : 70**

NOTE : 1. ALL QUESTIONS ARE TO BE ATTEMPTED.

2. FIGURES TO THE RIGHT INDICATE FULL MARKS.

Q.1 CHOOSE THE CORRECT OPTION AND REWRITE THE ANSWER : **[10]**

1. Which elements of second transition series show anomalous electron configuration ?
   (a) Mo,Te,Ru,Rh,Pd,Ag (b) Zr,Nb,Mo,Ru,Rh,Pd
   (c) Nb,Mo,Te,Ru,Rh,Pd (d) Nb,Mo,Ru,Rh,Pd,Ag
2. Which pair of elements of the following shows similar properties and hence difficult to separate them ?
   (a) Y-La (b) Ru-Rh (c) Mo-Re (d) Ru-Os
3. _____ is used as catalyst in the oxidation of SO_2 to SO_3 required for the manufacture of H_2SO_4 by contact process.
   (a) NiO (b) V_2O_5 (c) $VOCl_3$ (d) V_2O_3
4. _____ is likely to show optical activity.
   (a) trans – $[Co(NH_3)_2(en)_2]^{3+}$ (b) trans – $[Co(NH_3)_4Cl_2]^{+}$
   (c) cis – $[Co(NH_3)_2(en)_2]^{3+}$ (d) $[Cr(H_2O)_6]^{3+}$
5. The number of possible isomers of square planar complex $[PtCl\ Br\ I\ (NH_3)]^{+}$ would be _____.
   (a) 3 (b) 4 (c) 2 (d) 6
6. According to Werner's theory, metal atom in complex compounds exhibits_____.
   (a) None of above (b) only primary valency
   (c) secondary valency (d) Both primary and secondary valency
7. _____ depends on the extractability of the various oxidation states of Actinide elements.
   (a) Solvent extraction method (b) Crystalization
   (c) Complex formation (d) Ion exchange method
8. The most abundant rare earth is _____.
   (a) Lu (b) Gd (c) Yb (d) Ce
9. _____ is not liquid at ordinary temperature.
   (a) $[Cr(CO)_6]$ (b) $[Fe(CO)_5]$ (c) $[Ru(CO)_5]$ (d) $[Ni(CO)_4]$
10. All the mono-nuclear carbonyl have _____ M - CO bonds.
    (a) Circular (b) Spiral (c) Linear (d) zig-zag

Q.2 SHORT QUESTIONS :- [ATTEMPT ANY TEN] **[20]**

1. Which transition metal complex ions are colourless ? why ?
2. Which d-block elements of 3d series show anomalous electronic configuration and give their correct configuration ?
3. Why transition metal atom or cation has tendency to form complex compounds ?
4. Using EAN rule predict the molecular formula for the simple carbonyl Fe (Z = 26). Assume that the oxidation state of metal is zero.
5. Give the conditions for a molecule to show optical isomerism.

[P.T.O.]

6. Calculate the EAN of the central metal atom of $[Pt(NH_3)_6]^{4+}$.
(Atomic number , Z of Pt = 78)
7. Give general electronic configuration of Lanthanides and Actinides .
8. What is Lanthanide contraction ?
9. List the modern methods used for the separation of Lanthanides ?
10. Give uses of $[Ni(CO)_4]$.
11. Calculate EAN of $[Co_2(CO)_8]$.
12. Give preparation of metal nitrosyl halides.

Q.3 (a) Give atomic number, name ,symbol, complete and valence shell electronic configuration of 2^{nd} or 4d series transition elements. [05]

(b) Deduce the formula for calculating the magnetic moment of 3d –series transition metal complexes. [05]

OR

Q.3 (a) Write a note on : Metallic or Interstitial hydrides . [05]

(b) Discuss variable oxidation states shown by d-block elements of 1^{st} transition series under headings . [05]
(i) +1 and +2 oxidation states (ii) stability of low oxidation states
(iii) High oxidation states

Q.4 Discuss postulates of Werner's Coordination theory. [10]

OR

Q.4 Discuss Geometrical isomerism in octahedral complexes. [10]

Q.5 (a) Give the name, symbol,atomic number and electronic configuration of Lanthanide elements. [05]

(b) Discuss the Solvent extraction method for separation of Actinide elements. [05]

OR

Q.5 (a) Describe the extraction of Lanthanides from monazite mineral by concentrate H_2SO_4 method. [05]

(b) Write a note on : Actinide contraction. [05]

Q.6 (a) Discuss the nature of M-CO bonding in metal carbonyls. [05]

(b) Discuss the preparation ,properties ,structure and hybridization in $Cr(CO)_6$. [05]

OR

Q.6 (a) Write a note on : sodium nitroprusside . [05]

(b) Discuss the preparation ,properties ,structure and hybridization in $Mn_2(CO)_{10}$. [05]

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

(A-29) Seat No.:_____

No. of printed pages: 03

SARDAR PATEL UNIVERSITY

B. Sc. (SEMESTER IV) EXAMINATION (NC) (2019)

Friday, 17th March, 2017 **Time : 02:00 p.m. to 05:00 p.m.**

US04CCHE02 : APPLIED ASPECTS OF CHEMISTRY

TOTAL MARKS : 70

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

Que:1 Rewrite the following sentences with correct answer. [10]

1 Which of the following is an organosulfur insecticide?
(a) DDT (b) BHC
(c) Ferbam (d) None of these

2 A deficiency of _____ decreases the plant growth accompanied by extensive yellowing of green plants.
(a) Phosphorous (b) carbon
(c) nitrogen (d) Sulphur

3 What is chemical formula of Gypsum?
(a) $CaSO_4$ (b) $CaSO_4$. ½ H_2O
(c) $CaSO_4$. $2H_2O$ (d) $CaSO_4$. $6H_2O$

4 Charcoal is obtained by _____ of wood.
(a) carbonization (b) nitration
(c) pulverization (d) chlorination

5 Which of the following is used as electric insulator?
(a) Polystyrene (b) Bakelite
(c) Teflon (d) None of these

6 Which of the following explosives are known as initiating explosives?
(a) Deflagrating (b) Secondary high
(c) Primary high (d) None of these

7 Which of the following is the coenzyme for vitamin B1?
(a) Thiamine (b) DPN
(c) Coenzyme A (d) Biotin

8 The substances which are added to improve the soil texture are called _____.
(a) Soil improvers (b) natural fertilizers
(c) Artificial fertilizers (d) nitrogenous fertilizer.

9 The frequent use of urea produces $SO4^{-2}$ and NO^{-3} ions makes soil _____.
(a) acidic (b) basic
(c) neutral (d) fertile.

10 The quality of cement produced depends generally on the rate of _____.
(a) Cooling (b) Heating
(c) Setting (d) None of these

Que:2 **Answer the following (Attempt any six) :** [12]

1 Define vitamins and provitamins.
2 List the disease caused due to the deficiency of Vitamin E.
3 Give the characteristics of fertilizer.
4 Give the chemical steps involved in the production of urea.
5 Give a detailed classification of vitamins.
6 Give the synthesis of vulcanized rubber.
7 Give the uses of coal.
8 Write uses of lime.

Que:3

[a] Define free radical polymerization. Give reaction mechanism of free radical polymerization of vinyl chloride. [04]

[b] Give an account of coordination polymerization. [04]

OR

Que:3

[a] Give the reaction mechanism for electrophilic reaction of 2,4-hexadiene with HCl. [04]

[b] Give the classification of polymers. [04]

Que:4

[a] Give the classification of Insecticides based on their chemical nature. [04]

[b] Write advantages and disadvantages of DDT. [04]

OR

Que:4

[a] Write the preparations and uses of vanillin. [04]

[b] Give the preparation and properties of PETN. [04]

Que:5

[a] Discuss synthesis and properties of Vitamin B_2. [04]

[b] Discuss the occurrence and synthesis of Vitamin A_1. [04]

OR

Que:5

[a] Discuss the occurrence, physiological functions and synthesis of Vitamin C. [04]

[b] Give a detailed classification of vitamins. [04]

Que:6

[a] Write a note on mixed fertilizer. [04]

[b] Discuss the manufacturing process of ammonium nitrate. [04]

OR

Que:6

[a] Describe the manufacturing process for super phosphate. [04]

[b] Discuss the importance of calcium cyanamide as a fertilizer. [04]

Que:7 [08]

Discuss the manufacturing process for cement with suitable diagram.

OR

Que:7 [08]

Write note on (i) lime and (ii) plaster of paris

Que:8

[a] Discuss the classification of coal. [04]

[b] Describe the measurement of calorific value of coal using bomb calorimeter. [04]

OR

Que:8

[a] Discuss the estimation of nitrogen and sulphur in coal by ultimate analysis. [04]

[b] Explain the formation of coal in different stages. [04]

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SEAT No._____ No. of Printed pages : 03

[583/A-38]

SARDAR PATEL UNIVERSITY

B.Sc. Examination (Fourth Semester)
Tuesday, 11th April 2017.
02:00 p.m. to 05.00 p.m.
US04CCHE02(Applied Chemistry)

Note : (i) All questions are to be attempted. (ii) Figures to the right indicate marks. **Total Marks : 70**

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

1. The – OH group of _____ is absorbs at 3200 – 3600 cm^{-1} in the I.R. region.
   (a) Phenol (b) Alcohol
   (c) Carboxylic acid (d) All of these
2. _____ is used as a solvent in the U.V visible spectroscopy.
   (a) 1, 3 – Dioxane (b) 95 % propanol
   (c) 95 % Ethanol (d) Cyclohexene
3. Which of the following group is a independent chromophore ?
   (a) Nitro (b) Acetamido
   (c) Ethylenic (d) Methoxy
4. Which of the following is a vitamer of vitamin A ?
   (a) α – Tocopherol (b) Ergosterol
   (c) Ascorbic acid (d) Retinol
5. Vitamin E is described as "_____."
   (a) Sun – shine vitamin (b) most controversial vitamin
   (c) vitamin in search of diseases (d) co-enzyme in collagen formation.
6. Beri-beri disease caused by deficiency of _____.
   (a) Vitamin B_9 (b) Vitamin B_{12}
   (c) Vitamin B_7 (d) Vitamin B_1
7. _____ elements are considered as primary nutrients.
   (a) N, P & K (b) Zn, B & Cu
   (c) Ca, Mg & S (d) Mn, Mo & Cl
8. A deficiency of _____ decrease the plant growth accompanied by extensive yellowing of green plants.
   (a) Carbon (b) Sulphur
   (c) Nitrogen (d) Phosphorus.
9. Which of the following Portland cement is sulphate resisting cement ?
   (a) Modified Portland cement (b) Regular Portland cement
   (c) Low heat Portland cement (d) High early strength Portland cement
10. The chemical formula of Gypsum is _____ .
    (a) $CaSO_4.H_2O$ (b) $CaSO_4.6H_2O$
    (c) $CaSO_4.2H_2O$ (d) $CaSO_4.5H_2O$

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

1. Define the term : Blue shift and Red shift.
2. Explain. Methylalcohol is a good sovent for U.V. determination but not for a IR determination.
3. Classify the following groups into chrompohore and auxochrome.
   - N = O, - NH_2, - Cl, - N=N-, -OH, >C=S, >C=O, - $COCH_3$

4. How vitamin D_2 is synthesized from Ergosterol ?
5. Which vitamin is responsible for formation of Bitot's spots in eyes and how it is developed in the eyes ?
6. Write the structure and systematic name of α – Tocopherol and δ - Tocopherol.
7. Explain. Urea act as a fertilizer.
8. Give the chief requisites of a fertilizer.
9. Describe the importance of fertilizer.
10. Give the list of various types of Gypsum.
11. Give the structure and name of minerals which are consist with Portland cement clinker.
12. Explain the term "White Cement."

Q.3 Attempt the following.

[a] Using Woodward – Fieser rule and calculate the λmax for the following molecules. (i) Carvone (ii) Vitamin A_1 (iii) 2,4 - Hexadiene **[06]**

[b] Discuss the various types of transitions occurs in ultraviolet region and arrange them in order of decreasing energy. **[04]**

OR

Q.3 Attempt the following.

[a] What is vibrational spectra ? Describe important types of fundamental vibrations. **[06]**

[b] Discuss the analytical uses of IR spectroscopy. **[04]**

Q.4 What are vitamins ? Give the classification of vitamins in detail. Also write the biosynthesis of 1, 25 – Dihydroxycholecalciferol from 7 – Dehydrocholesterol. **[10]**

OR

Q.4 Write the biochemical functions of vitamin E. Also give the dietary sources of vitamin E. **[10]**

Q.5 Attempt the following.

[a] Discuss the manufacturing process of $CaCN_2$. Also discuss the action of $CaCN_2$ as a fertilizer. **[06]**

[b] Give an account of mixed fertilizer. **[04]**

OR

Q.5 Attempt the following.

[a] Define "Nitrogenous fertilizer." Discuss the manufacturing process of ammoniumnitrate. **[06]**

[b] Give the preparation method of mono amoniumphosphate and diammoniumphosphate. **[04]**

Q.6 Attempt the following.

[a] Explain the term "Cement". Also Discuss the properties of cement. **[06]**

[b] Write a short – note on : Plaster of Paris. **[04]**

OR

Q.6 Attempt the following.

[a] Discuss the manufacturing process of Lime. Also write the uses of Lime. **[06]**

[b] Write a short note on : Coloured Cement **[04]**

*****

GIVEN DATA FOR EXAMPLES

Absorption Values :

	(λ_{max}) nm
(A) α,β – Unsaturated ketone :	
a) Basic system of parent system	215 nm
b) Increment for C- Substituent of α – carbon	10 nm
c) Increment for C- Substituent of β – carbon	12 nm
d) Increment for C- Substituent of γ – carbon	18 nm
e) Increment for exocyclic double bond	05 nm
(B) Basic value α,β –Unsaturated aldehyde	207 nm
a. Increment for β – carbon substituent	12 nm
b. Increment for γ – carbon substituent	18 nm
(C)	
a. Parent acyclic diene with conjugation	217 nm
b. Ring residue	05 nm
(D) Polyene	
a. Basic value of heteroannular / acyclic diene	214 nm
b. Basic value of hetero annular diene	253 nm
c. Increment for each C- Substituent	05 nm
(D) Parent values	
a. Acyclic conjugated diene and hetertoannular conjugated diene	215 nm
b. Homoannular conjugated diene	253 nm
c. Acyclic triene	245 nm
(E) Increments	
a. Each alkyl substituent or ring residue	05 nm
b. Exocyclic double bond	05 nm
c. Double bond extending conjugation	30 nm

SEAT No._____ No. of Printed Pages : 02

[78fA-29]

SARDAR PATEL UNIVERSITY

S.Y.B.Sc : SEMESTER – IV : 2017

COMPUTER SCIENCE

US04CCSC01: Advanced C Programming and Introduction to Data Structure

Date: 10-04-2017, Monday Time: 02:00pm to 05:00pm Max. Marks: 70

Q.1 Multiple choice of Question: 10

[1] Which of the following statements about releasing memory allocation is false?
(a) To ensure that allocated memory is released, it should be freed before the program ends.
(b) It is an error to dereference a pointer to allocated memory after the memory has been released.
(c) Memory should be freed as soon as it is no longer needed.
(d) Only one call to free is necessary to release an entire array allocated with calloc().

[2] Pointers to pointers is a term used to describe
(a) Any two pointers that point to the same variable
(b) Any two pointers that point to variables of the same type
(c) Pointers used as formal parameters in a function header
(d) Pointers whose contents are the address of another pointer

[3] int a, *p = &a;
Which of the following statement will not add 1 to a variable?
(a) a++; (b) a += 1; (c) *p = *p + 1; (d) *p++;

[4] Which one of the following is valid for opening a file for only reading?
(a) fileOpen (filenm, "r"); (b) fileOpen (filenm, "ra");
(c) fopen (filenm, "r"); (d) fopen (filenm, "read");

[5] What are two predefined FILE pointers in C?
(a) stdout and stderr (b) console and error
(c) stdout and stdio (d) stdio and stderr

[6] Which of the following method is not valid to send information in a structure to a function?
(a) Pass each member of the structure as an actual argument
(b) Pass copy of entire structure
(c) Pass structure definition
(d) Pass address of structure

[7] Which of the following is an operation of a Stack data structure?
(a) Top (b) bottom (c) push (d) none of the above

[8] A data structure in which insertion and deletion of an elements occurs at only one end is known as _____.
(a) Queue (b) Stack (c) Tree (d) Graph

[9] A data structure in which insertion and deletion of an elements occurs at both the end is known as _____.
(a) Stack (b) Deque (c) Priority Queue (d) Queue

[10] Which of the following is NOT the type of Singly linked list?
(a) Two-way list (b) Doubly Linked list
(c) Three-way list (d) Circular linked list

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

[1] List out benefits of pointers.
[2] What is scale factor? Explain with example in brief.
[3] List out operations that can be performed on pointers.
[4] Differentiate '.' and '->' operators.
[5] Explain the Append mode with example.
[6] Explain the fclose() function with example.
[7] Give the Example of Primitive Data Structure.
[8] Give the Example of Non-Primitive Data Structure.
[9] Draw the Hierarchical Structure of Data Structure.
[10] What is a Linked List? How is it represented?
[11] What is a Circular Linked list?
[12] Give representation of a Queue data structure.

Q.3 [A] Define pointer variable. How can we declare and initialize pointer variable? How can we access value of variable through pointer type variable? 5

[B] Write a note on dynamic memory allocation. 5

OR

Q.3 [C] Explain the following functions. 5
1. realloc() 2. malloc()

[D] What are pointers? How can they be used with arrays? Explain pointer to an array using appropriate examples. 5

Q.4 [A] What is union? Explain its storage representation. How a member of union is assigned an initial value? Explain in brief with example. 5

[B] Explain array within structure using suitable example. 5

OR

Q.4 [C] Explain pointer to structure array using appropriate example. 5

[D] Explain fprintf and fscanf function with example. 5

Q.5 Write an algorithm to insert an element into a Stack and to delete an element from a Stack. 10

OR

Q.5 Write an algorithm for Change operation and peep operation of a Stack. 10

Q.6 Write an algorithm to insert an element at the beginning of a Singly linked list and at the ending of a Singly linked list. 10

OR

Q.6 Write an algorithm to insert an element into a simple queue and to delete an element from a simple queue. 10

—— X ——

[20/A-13] Seat No. _____ No. of printed pages : 03

SARDAR PATEL UNIVERSITY
B.Sc. (IV SEMESTER) EXAMINATION
Saturday, 22nd April - 2017
2.00 p.m. to 5.00 p.m.
US04CELC01 : Electro Dynamic

Maximum Marks : 70

Q 1. Multiple Choice Questions: (10)

(1) Field of Sheet of charge is given by _____

a) $E = \frac{\rho s}{2\epsilon 0}\widehat{a_N}$

b) $E = \frac{2\epsilon 0}{\rho s}\widehat{a_N}$

c) $E = \frac{\rho s}{\epsilon 0}\widehat{a_N}$

d) $E = \frac{2\epsilon 0}{\rho s}\widehat{a_N}$

(2) Coulomb's law for two charges Q1 and Q2 is defined by_____

a) $F = \frac{kQ1Q2}{R^2}$

b) $F = \frac{\frac{R^2}{Q1Q2}}{k}$

c) $F = \frac{kR^2}{Q1Q2}$

d) None of all

(3) Unit of electric field intensity is _____

a) m/F

b)N/m

c)F/m

d)All

(4) The relation between Displacement density D and E is

a) $\vec{D} = \varepsilon_0 \vec{E}$

b) $\vec{D} = \varepsilon_0 / \vec{E}$

c) $\vec{D} = \vec{E} / \varepsilon_0$

d) None of the above.

(5) The mathematical formula of gauss's law is

a) $\oint_s \vec{D}s.\vec{d}s = Q$

b) $\oint_s \vec{D}s.\vec{d}s = \Psi$

c) $\oint_s \vec{E}.\vec{d}s = Q$

d) None of the above

(6) At infinity the potential is

a) Zero
b) Infinite
c) Finite
d) One

(7) The potential of dipole is proportional to

a) Inverse square of distance
b) Inverse cube of distance
c) Inverse of distance
d) Square of distance

(8) The conductor surface is _____

a) Equipotential surface
b) Non equipotential surface
c) Superelastic surface
d) Conservative surface

(9) Dipole moment is a

a) Scalar Quantity
b) Tensor Quantity
c) Vector Quantity
d) None of the above

(10) The static electric field intensity inside a conductor is _____

a) 0
b) 1

c) Infinite

d) Finite

Q 2: Answer any ten questions briefly. 20

1. State "The experimental law of Coulomb".
2. Define Electric Field Intensity and state its unit.
3. State gauss's laws and give its mathematical form.
4. Define Divergence theorem and give its mathematical form.
5. Define electric flux density.
6. Define potential difference between points A and B. Give its expression.
7. Define dipole moment and give units
8. Define conservative field.
9. Define equipotential surface.
10. Summarize the principles which apply to conductors in electrostatic field.
11. State two differences between Polar and Nonpolar molecules.
12. Explain nature of dielectric molecules.

Q 3. Derive an expression for electric field intensity due to line charge distributed over an infinitive length of a line. 10

OR

Q 3. Derive an expression for electric field intensity due to an infinite sheet of charge distribution. 10

Q 4. Discuss in detail Faraday's experiment for electric flux density and state important conclusions. 10

OR

Q.4. Discuss in detail any two applications of Guass's Law. 10

Q 5. What is dipole? Obtain an expression for potential and electric field intensity due to dipole. 10

OR

Q 5. Obtain an expression for energy expended in moving a point charge in an electric field. 10

Q 6. Derive the boundary conditions for conductors. 10

OR

Q 6. Derive the boundary conditions for perfect dielectric materials. 10

**********Best of Luck **********

[20/A-13] SEAT No._____ No. of Printed Pages : 2

Sardar Patel University

[CBCS]) S. Y. B. Sc. Examination 2017

Electronics and Communication

US04CELC02: Radio and Television System

21 – 4 – 2017, 02:00 p.m. to 5:00 p.m.

Maximum Marks: 70

Note: Figures to right indicates the full marks.

Q-1 Multiple Choice Questions. **(10)**

1. The standard value of intermediate frequency is _____.
   (a) 456 KHz (b) 500 KHz
   (c) 755 KHz (d) 426 KHz
2. Meaning of the word heterodyne is to_____.
   (a) separate the signal (b) mix the signal
   (c) amplify the signal (d) none of these
3. Sensitivity of radio receiver should be _____.
   (a) Low (b) High
   (c) Average (d) None
4. The RF amplifier provides _____.
   (a) better image signal rejection (b) greater gain
   (c) good selectivity (d) All
5. In interlaced scanning, the number of lines per picture must _____.
   (a) odd (b) even
   (c) Both a and b (d) None
6. In a T.V. system aspect ratio is _____.
   (a) 2:3 (b) 4:3
   (c) 3:2 (d) 5:4
7. Number of lines scanned by an electron beam per second in interlaced scanning is ___.
   (a) 31250 (b) 50
   (c) 15625 (d) 625
8. _____ is used to match the 75 Ω feeder impedance to 500 Ω input impedance of the receiver circuit.
   (a) IF Trap (b) RF amplifier
   (c) Diode detector (d) balun
9. IF traps are used to provide _____.
   (a) rejection of unwanted IF signal (b) passage of unwanted RF signal
   (c) gain to the output of local oscillator (d) none of these
10. Vidicon camera tube utilizes the principle of _____.
    (a) photo voltaic (b) photo conductivity
    (c) photo emission (d) none of these

Q-2		**Answer in short. (Any Ten)**	**(20)**
	1.	Write the basic function of A.M. receivers.	
	2.	Give the classification of radio transmitter according to the carrier frequency.	
	3.	Explain intermediate frequency.	
	4.	What are the main advantages of RF amplifier stage?	
	5.	Why frequency mixer is required?	
	6.	What are the two limitations of simple AGC in radio receiver?	
	7.	Mention the characteristics of camera tube.	
	8.	Why vestigial sideband modulation is used for television transmission?	
	9.	What is meant by Aspect ratio?	
	10.	Draw the circuit diagram of I.F. Trap.	
	11.	What is the use of the Balun?	
	12.	What is the use of Local Oscillator circuit in broadcast television receiver?	
Q-3	**(a)**	Draw neat block diagram of super heterodyne receiver and explain the function of each stage.	**(07)**
	(b)	Write the basic principle of super heterodyne receiver.	**(03)**
		OR	
Q-3	**(a)**	Give the classification of radio receiver.	**(05)**
	(b)	Write a short note on Straight receiver.	**(05)**
Q-4	**(a)**	With necessary diagram explain RF amplifier circuit in detail.	**(07)**
	(b)	Explain salient features of radio receiver.	**(03)**
		OR	
Q-4	**(a)**	Explain IF amplifier circuit in detail with necessary diagram.	**(07)**
	(b)	What is the need of Intermediate frequency?	**(03)**
Q-5	**(a)**	Write a short note on Composite Video Signal.	**(06)**
	(b)	What do you mean by vertical and horizontal resolution?	**(04)**
		OR	
Q-5	**(a)**	Explain working principle of Image Orthicon camera tube.	**(06)**
	(b)	What are the functions of Video processing circuits at output of camera tube?	**(04)**
Q-6	**(a)**	Draw the block diagram of B/W television receiver and explain it.	**(10)**
		OR	
Q-6	**(a)**	Explain RF tuner circuit in detail	**(06)**
	(b)	Give the functional requirement of RF tuner.	**(04)**

X=X=X

SEAT No._____ No. of Printed Pages : 02

[84/A42]

SARDAR PATEL UNIVERSITY

BSc. 4th Semester

Tuesday, 11th April 2017

US04CELE01- Electronics Devices Applications

2:00 pm to 5:00 pm

Total Marks : 70

Q.1 Multiple Choice Questions. [10]

1. At _____ voltage the channel in FET is completely closed.
   (a) pinch off (b) current ON (c) switch ON
2. The JFET is a _____ controlled device.
   (a) Power (b) Voltage (c) Current
3. Decibel is a unit of _____ change.
   (a) Power (b) Voltage (c) Current
4. In the symbol of enhancement mode MOSFET the line representing the channel is broken to indicate that channel does not exist until the _____ potential is applied.
   (a) drain (b) source (c) gate
5. In enhancement depletion MOSFET drain current is _____when Vgs = 0.
   (a) Present (b) Absent (c) Non continues
6. _____ type of biasing is used in common source amplifier circuit.
   (a) Self bias (b) Potential divider (c) Fixed bias
7. In common source circuit the input and output signals are _____ phase with each other.
   (a) 90° out of (b) 180° out of (c) 270° out of
8. The photo darlington is capable of producing _____output current than, a photo transistor.
   (a) lower (b) higher (c) smaller
9. The dynodes are electrodes which are treated to produce _____ emission.
   (a) Primary (b) Secondary (c) Neutron
10. LEDs made from _____ emit red light.
    (a) GaAsP (b) GaAs (c) GaP

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

1. Why does the amplifier gain falls at low frequency ?

[P.T.O]

2. Give the constructional detail of N channel JFET.
3. Explain what do you understand by stray capacitance.
4. Why the potential divider circuit is better than self bias circuit ?
5. Draw the symbols of depletion enhancement mode MOSFET.
6. Draw the potential divider circuit using N channel JFET.
7. Draw the common source ac equivalent circuit.
8. Why common drain circuit is called source follower ?
9. Draw the common drain ac equivalent circuit.
10. What is dynamic scattering ?
11. What is an LED ?
12. What does photoconductive cell consist of ?

Q.3 Discuss in detail the frequency response of an amplifier giving necessary figures. [10]

OR

Q.3 Discuss in detail the construction and principle of operation of the N channel JFET. [10]

Q.4 Discuss in detail depletion enhancement mode MOSFET. [10]

OR

Q.4 Discuss in detail the enhancement mode MOSFET. [10]

Q.5 Draw the circuit of common source amplifier and explain its working. [10]

OR

Q.5 Draw the circuit of common gate amplifier and explain its working. [10]

Q.6 Write a note a photomultiplier tube. [10]

OR

Q.6 Discuss in detail the liquid crystal display. [10]

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SEAT No._____ SARDAR PATEL UNIVERSITY No. of Printed Pages : 02

[917

BSc. 4th Semester

Thursday, 13th April 2017

US04CELE02- Instrumentation & Digital Electronics

2:00 pm to 5:00 pm

Total Marks : 70

Q.1 Multiple Choice Questions. [10]

1. The Fan in is_____.
   (a) No. of outputs that can be connected to the gate
   (b) No. of inputs that can be connected to the gate
   (c) No. of outputs and inputs that can be connected to the gate
2. The TTL logic family work as _____ gate.
   (a) AND (b) NAND (c) OR
3. _____ and _____ gates are used to construct comparator.
   (a) AND & OR (b) NAND & XOR (c) XNOR & AND
4. In D flip flop the value of D is transferred to the output only when clock is _____.
   (a) High and Low (b) Low (c) High
5. The PRESET and CLEAR are _____ inputs.
   (a) synchronous (b) asynchronous (c) enable
6. Toggle means _____.
   (a) Set (b) Reset (c) Complement of previous state
7. In RS flip-flop, when S= 1 and R= 0 the flip flop will _____.
   (a) Set (b) Reset (c) Forbidden
8. The another name of counter is _____.
   (a) Frequency divider (b) Pulse (c) Square wave
9. The conversion from binary to decimal is called _____.
   (a)Encoding (b) Decoding (c) Multiplexer
10. Decade counter has _____ states.
    (a) 10 states (b) 9 states (c) 4 states

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

1. List the logic specifications.
2. Draw the logic circuits of half and full adder.
3. Draw the logic symbol and truth table of XNOR gate.
4. What is RC differentiation circuit ?

[P.T.O]

5. List the applications of Schmitt trigger circuit.
6. Draw the logic symbol of positive edge trigger and negative edge trigger D flip flop including preset and clear.
7. State the difference between serial and parallel counter.
8. What is the disadvantage of parallel counter ?
9. Draw the logic diagram of Mod- 5 combination counter.
10. How many states are omitted in BCD 2421 counter? Name them.
11. List the states of 3 stage shift counter.
12. Draw the decoding gates and decoding waveforms for Mod- 5 serial counter.

Q.3 Discuss in detail the TTL logic family. [10]

OR

Q.3 Discuss in detail the applications of XOR and XNOR gates. [10]

Q.4 Discuss in detail the working of JK and JK master slave flip-flops. [10]

OR

Q.4 Explain the working of Schmitt Trigger circuit in detail giving necessary figures. [10]

Q.5 Discuss in detail the mod – 8 parallel counter with necessary diagrams. [10]

OR

Q.5 Discuss in detail the mod –7 asynchronous counter with necessary diagrams. [10]

Q.6 Explain 3 flip-flop Up and 3 flip-flop Down counter. [10]

OR

Q.6 Discuss in detail the 2421 BCD counter. [10]

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SEAT No._____

No. of Printed Pages: 2

[567A31]

SARDAR PATEL UNIVERSITY
FOURTH SEMESTER B.Sc. EXAMINATION
2017
SATURDAY 8th APRIL
02:00 pm to 05:00 pm
USO4CENV 01
(COMPONENTS OF ECOLOGY)

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. Littoral swamp forest form a characteristic vegetation known as _____

(a) Mangrooves (b) Gymnosperms (c) Angiosperms (d) Pteridophytes

2. Succulent xerophytes in which leaves become fleshy are known as _____

(a) Malocophyllus xerophytes (b) Halophytes

(c) Hydrophytes (d) Mesophytes

3. _____ is an intermediate group between aquatic and land plants

(a) Marshy plants (b) Palm trees (c) Flowering plants (d) Mosses

4. Break down and decomposition of organic molecules proceeds primarily by _____

(a) Dehydrogenation (b) Hydrogenation

(c) Homogenation (d) Heterogenation

5. In living organism, CO_2 is main source of _____

(a) Carbon (b) Hydrogen (c) Nitrogen (d) Chromium

6. _____ is made up of matrix formed by a fungus within the cells of which algae is embedded.

(a) Hermit Crab (b) Lichen (c) Moth (d) All

7. _____ is not an example of commensalism

(a) Linas (b) Epiphytes (c) Lichens (d) Epizoans

8. Which of the following are areas of high biodiversity?

(a) National Park (b) Sanctuary (c) Seed bank (d) Hot spot

9. _____ are multipurpose protected areas with boundaries circumscribed by legislation

(a) Biosphere reserves (b) Arboreta (c) Cryopreservation (d) Sacred plant

10. _____ is concerned with all the aspects of plant distribution

(a) Biogeography (b) Phytogeography (c) Zoogeography (d) Entomology

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

1. What are pneumatophores?
2. Write about succulents
3. Draw a labelled diagram of free floating hydrophyte
4. Discuss in brief sulphur cycle
5. Draw carbon cycle
6. Explain phosphorus cycle on land
7. Write note on biological clock
8. What are positive interactions?
9. Explain competition as a negative interaction
10. Define the term Phytogeography and Zoogeography
11. What are endemic species?
12. Write about biodiversity

Q.3. **(a)** Describe the morphological adaptations of Hydrophytes **[06]**

(b) Write note on mesophytes **[04]**

OR

Q.3. **(a)** Describe the adaptations of Xerophytes **[06]**

(b) Explain the anatomical features of Halophytes **[04]**

Q.4. Give a detailed note on nitrogen cycle **[10]**

OR

Q.4. **(a)** Discuss various processes involved in oxygen cycle **[06]**

(b) Give a diagrammatic presentation of mineral cycle **[04]**

Q.5. **(a)** Explain Mutualism with suitable examples **[06]**
(b) Discuss Leibig's law of minimum **[04]**

OR

Q.5. **(a)** Write note on Commensalism **[06]**
(b) Write note on parasitism **[04]**

Q.6. Write a detailed note on strategies for conservation of biodiversity and conservation methods **[10]**

OR

Q.6. Give a brief account of Phytogeographic regions of world **[10]**

ALL THE BEST

SEAT No._____ No. of Printed Pages : 02

[79/A-33]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc.4th SEMESTER EXAMINATION
10th April 2017,Monday
02.00 PM to 05.00 PM
Environmental Pollution,Wildlife & Biodiversity (US04CENV 02)

Total Marks-70

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

1. _____is the natural contaminant of air pollutants
a) Dust b) smoke c) pollen d) fumes
2. The main source of Sulphur dioxide is_____
a) Fertilizer b) Fuel burning c) Poultry feeding d) Mud road

3. NO_2 inhalation results in _____disease
a) Lung cancer b) White lung c) Blank lung d)Silo -filler

4._____ is not an example of domestic water pollutant
a)garbage b) detergents c) food d)pesticide
5._____ source is a well-defined source in which pollutants are emitted to water bodies
a)structural b) non-point c)point d) operational
6._____ is not a physical property of water
a) pH b) COD c) Turbidity d) Colour
7._____ plant diversities are mainly found in North East Zone of India
a)Orchid b) Rhododendron c)Bamboo d)All of above
8. According to estimation, there are more than _____ species of insects in India
a) 17,000 b) 26,000 c) 29,000 d) 18,000
9. Major wildlife zones of India are in _____ number
a) seven b) five c) four d) three

10. _____ lay down procedures for setting standards of emission or discharge of environmental pollutants
a)Water act b) Air act c) Environment rules d) Atomic energy

Q.2 **Answer any ten** 20

1.Define photo chemical smog
2.Write a short note on primary and secondary air pollutants
3.Write a brief note on two sources of SOx
4.What is water pollution?
5.Write in brief about biological parameters of water pollution
6. Give a note on effect of water pollution on vegetation
7. Write in brief about conservation of biodiversity
8. Discuss in brief Western Ghats with its floral species
9. What is ecosystem diversity?
10.Define occupancy
11. Write a short note on human settlement

12. Write a brief note on environmental education

Q. 3 a). Explain the effects of SO_X pollutants on human health and materials [06]
b). Write down the effects of Carbon monoxide on human health [04]

OR

Q.3 a). Explain the effects of Particulate matter on human health [05]
b). Discuss the effects of photochemical smog [05]

Q.4 a)Discuss natural and anthropogenic sources of surface water pollution [05]
b) How radioactive and thermal pollutantsworks as type of water pollution? [05]

OR

Q.4a)Give a note on industrial pollutant as a type of water pollution [05]
b)Write a note on effects of water pollution on human health [05]

Q.5a)Write a note on levels of biodiversity with parameters [05]
b) Give a detail account on vegetation of Nicobar Island [05]

OR

Q.5a) How Gangetic plain is beneficial as a wildlife zone of India? [05]
b) Write a note on loss of biodiversity [05]
Q.6 a)Write a detail note on objectives of environmental education [05]
b) Explain five major patterns of settlement [05]

OR

Q.6 a)Write a note on importance of biodiversity [05]
b) Explain in detail methods used in land restoration and revegetation [05]

— X —

SEAT No._____

No. of Printed Pages:02

[57]

SARDAR PATEL UNIVERSITY
S.Y.B.Sc EXAMINATION, IVth Semester
Saturday, 8th April 2017, 02.00p.m to 05.00p.m
Genetics: US04CGEN01 [Molecular Genetics & Biostatistics]

NOTE- Figures in the right indicate full marks. **Maximum Marks-70**

Q:1	**Multiple Choice Questions (10 marks- One Mark for Each MCQ)**	[10]
(1)	Bacterial growth is not taking place in _____phase a) Log phase B) Lag phase c) Both A and B d) None of above	
(2)	Bacterial cell wall is much thicker in _____ bacteria a) Gram + ve b) Gram –ve c) Both A and B d) None of above	
(3)	DNA replication takes place _____. a)during interphase b) prior to mitosis c) prior to meiosis d) all of the above	
(4)	The enzyme catalyzing the binding of Alanine to its tRNA is called: a) Alanine-tRNA polymerase b) Alanine-tRNAtransferase c)tRNA-Alanyl polymerase d)Alanyl-tRNAsynthetase	
(5)	The closed promoter complex consists of all of the following except: a) Promoter region of the DNA. b) RNA polymerase. c) Transcription factors.d) Helicase	
(6)	Total of gene frequency is a) 1 b)100% c) both a and b d) none of above	
(7)	Inheritance of skin colour in human is showing _____inheritance a)Qualitative b) Mendelian c) Quantitative d) All of above	
(8)	Scatter diagram is used to depict _____ beween X and Y. a)average b) correlation c) dispersion d) regression	
(9)	Chi square test is used for testing of independence of _____ a) means b) standard deviation c) proportion d) attributes.	
(10)	Degree of freedom for chi square test is _____. a)(r-1)(c-1) b)(r-1)(c+1) c)(r+1)(c-1) d)(r+1)(c+1)	
Q.2	**Short Question (any 10 question x2 marks each)**	[20]
1	Discuss different groups of micro organisms	
2	Discuss difference between selective and differential media for bacterial growth.	
3	Discuss the contribution of lweenhock.	
4	What is function of topoisomerase?	
5	Discuss about reverse transcriptase enzyme.	

6	What is promoter? Discuss its function.	
7	Differentiate between Qualitative and Quantitative traits	
8	Enlist factors affecting gene and genotype frequency and give equation for Δq after migration	
9	Give characteristics of Qualitative traits.	
10	Define regression.	
11	Define chi-square distribution.	
12	Define correlation.	
Q.3.a	Write a detail note on discovery of gene transfer in bacteria (U tube experiment)	[5]
Q.3.b	Discuss bacterial growth curve	[5]
	OR	
Q.3.a	Enlist different methods of sterilization.	[5]
Q.3.b	Discuss any two methods of isolation of bacteria	[5]
Q.4.a	Describe the termination of prokaryotic transcription.	[5]
Q.4.b	Discuss about DNA Polymerase in detail.	[5]
	OR	
Q.4.a	Describe the experiment which prove the semi-conservative mode of replication	[5]
Q.4.b	Describe the initiation of prokaryotic translation.	[5]
Q.5.a	State and explain Hardy–Weinberg law	[10]
	OR	
Q.5.a	Give an account of selection as factors responsible for changing allele and genotype frequencies	[5]
Q.5.b	Discuss quantitative inheritance with suitable example	[5]
Q.6.a	Write difference between correlation and regression.	[5]
Q.6.b	Find Pearson's correlation coefficient.	[5]

X	48	49	50	51	52	53	54	55	56
Y	98	100	88	102	95	125	120	110	125

	OR	
Q.6.a	Explain scatter diagram method and its types of studying correlation between two variables.	[5]
Q.6.b	From the following data, obtain the two regression equations.	[5]

Sales	91	97	108	121	67	124	51	73	111	57
Purchases	71	75	69	97	70	91	39	61	80	47

– X –

(2)

SEAT No._____

No. of Printed Pages: 2

(80)

SARDAR PATEL UNIVERSITY

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

Monday, 10th April 2017

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

US04CGEN02: Principles of Genetics-II

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. **Normally crossing over promotes_____.**
(a) Linkage (b) Parental types (c) Recombinations (d) All of these

ii. **Chromosomes map obtained by recombination data is also known as_____.**
(a) Genetic map (b) Physical map (c) both (a) and (b) (d) None of these

iii. **Drosophila male shows _____ for wing length and body colour.**
(a) Complete linkage (b) Incomplete linkage (c) Both (a) and (b) (d) None of these

iv. **Cytoplasmic inheritance is governed by _____.**
(a) Plasma genes (b) Cytogenes
(c) Extranuclear genes (d) All of these

v. **First case of cytoplasmic inheritance was reported by_____.**
(a) Correns (b) Sturtevant (c) Caspari (d) Renner

vi. **The coiling phenotype in the offspring is controlled by the _____.**
(a) Genotype of the mother (b) Phenotype of the mother
(c) Both (a) and (b) (d) Recombination of genes

vii. **_____ codon acts as initiator codon.**
(a) AUG (b) UGA (c) UAA (d) UAG

viii. **The *lac* operon in *E. coli* comprises_____.**
(a) Promoter and structural genes only (b) Promoter and operator genes only
(c) Structural , Promoter and operator genes only (d) All of these

ix. **Within a gene, a unit of mutation is called _____.**
(a) Hot spot (b) Cistron (c) Muton (d) Recon

x. **A loss of one single chromosome creates a condition called _____.**
(a) Trisomy (b) Nullisomy (c) Monosomy (d) Haploid

Q.2 **Answer any <u>TEN</u> from the following:** **[20]**

i. Write a short note on Morgan view on Linkage.
ii. Differentiate between complete and incomplete linkage.
iii. Define crossing over.
iv. What do you mean by cytoplasmic inheritance?
v. Write a short note on evolution of mitochondria and chloroplast.

vi. Write about iojap inheritance.
vii. What is lozenge locus?
viii. What do you mean by tryptophan operon?
ix. Write a short note on Wobble hypothesis.
x. Differentiate between aneuploidy and euploidy.
xi. Write a short note on chemical mutagens.
xii. What do you mean by mutagens? Write about mutagens types.

Q.3 **(a)** What do you mean by linkage? With suitable examples discuss incomplete linkage. **[06]**

(b) Write a note on chromosome maps. **[04]**

OR

Q.3 **(a)** Write a detail note on Sterns experiment to explain crossing over. **[06]**

(b) Briefly discuss about the significance of crossing over. **[04]**

Q.4 **(a)** Discuss the role of chloroplast and mitochondria in the cytoplasmic inheritance. **[06]**

(b) Write a short note on the following: **[04]**

(i) Kappa particle (ii) Male sterility

OR

Q.4 **(a)** What do you mean by maternal inheritance? Give a detail account on shell coiling in *Limnaea*. **[06]**

(b) Write a note on plastid inheritance in *Mirabilis jalapa*. **[04]**

Q.5 **(a)** Write a detail note on regulation of gene expression that is operon concept with examples. **[10]**

OR

Q.5 **(a)** Write a note on- **[04]**

(i) Genetic code **[03]**
(ii) Position effect

(b) Discuss in brief about recombination test. **[03]**

Q.6 **(a)** Discuss in detail about change in chromosome number and structure with suitable examples. **[10]**

OR

Q.6 **(a)** What do you mean by gene mutation? Write a brief note on its types and causes. **[06]**

(b) Discuss the various practical applications of mutation. **[04]**

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No. of Printed Pages : 2

SEAT No._____

[58PA32]

SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry

(Semester – 4TH) EXAMINATION

8th April 2017, Saturday

Course No. : US04CICH01

(Engineering Materials)

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

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

1. The structure of material which can be examined by naked eye is
   a)Macrostructure b) Crystal structure c) Nuclear structure d) None of these
2. Antimony and Arsenic possess characteristics of
   a)Metals b) Non-metals c)Metal & nonmetals d) None of these
3. Alumina is an example of _____ refractory.
   a) Acidic b)Neutral c) Basic d)None of the
4. Common glass is called
   a) Soda glass c)Hard glass
   b)Flint glass d)Pyrex
5. Clay mostly contains
   a) alumina c)Both a) and b)
   b) Silica d)None of these
6. Purest form of iron is:
   a) Steel b) Wrought iron c) Pig iron d) Cast iron
7. Mond's process is used in the extraction of
   a) Cobalt b) Zinc c) Nickel d) aluminum
8. During galvanic corrosion, the more noble metal acts as
   a) anode b) cathode c) anode as well as cathode d) corroding metal
9. A paint contains
   a) Pigment only b) drying oil only c) pigment + drier only d) All
10. Rusting of iron:
    a) increases in wet air c) prevented on coating with zinc
    b)Retarded in the presence of dissolved salts d) All are true

Q.2 Attempt any Ten. [20]

i. Which electrical and chemical properties are considered while selcting engineering materials.
ii. Explain the term 'Material Science'
iii. Differentiate electronic structure and nuclear structure.
iv. Mention advantages of 'Glazing'.
v. Define refractoriness and softening temperature.
vi. What is the function of sand in lime/cement mortars?
vii. Discuss the term slag and flux.
viii. Define corrosion.
ix How copper can be removed from nickel?
x What is a pigment? List any two function of pigment.
xi Why brass utensils are usually tinned?
xii Why wire mesh corrodes faster at the joints?

(PTO)

Q.3a)	How materials are classified according to their structure discuss in detail.	**[10]**
	OR	
Q.3a)	Write classification of Engineering Materials in detail.	**[10]**
Q.4a)	List different raw materials used in manufacturing of glass.	**[5]**
b)	Discuss manufacturing of cement.	**[5]**
	OR	
Q.4a)	Discuss about any five properties of refractory.	**[5]**
b)	Discuss manufacturing of white wares.	**[5]**
Q.5a)	Write a short note on: Bronze.	**[5]**
b)	Discuss about different purpose of Alloying.	**[5]**
	OR	
Q.5a)	Write a note on: Nickel and its alloys.	**[5]**
b)	Discuss composition, properties and uses of cast iron.	**[5]**
Q.6a)	Write a note on: Waterline corrosion.	**[5]**
b)	Explain cathodic protection and galvanizing.	**[5]**
	OR	
Q.6a)	Explain manufacturing of oil paint.	**[5]**
b)	Discuss chemical corrosion in detail.	**[5]**

—X—

SEAT No._____

[65/A-43]

SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry

(Semester – 4TH) EXAMINATION

11th April 2017, Tuesday

Course No. : US04CICH02

(Chemical Plant Utilities)

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

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

1. Hardness in water is caused by
   a)sodium chloride c) sodium carbonate
   b)calcium carbonate d)potassium nitrate
2. Coagulants help in the setting of:
   a)Suspended impurities only c)Fine suspended matter only
   b)Colloidal particles only d)Dissolved Ca and Mg salt
3. Bomb calorimeter is used to determine
   a)HCV at constant pressure c) LCV at constant pressure
   b) HCV at constant volume d) LCV at constant volume
4. Which gas is used to extinguish fire?
   a) CO_2 b) N_2 c) H_2 d) O_2
5. Which of the following gas is used in making tungusten filaments for electric lamps?
   a) mixture of N_2 and H_2 b) N_2 c) H_2 d) O_2
6. The pressure at the outlet of a compressor is called
   a)Suction pressure b) Discharge pressure c) Vaccum d) None of these
7. The C.O.P. is always _____than one
   a)greater than b)less than c)equal d)none of these
8. Which of the following is the example of external combustion engine?
   a) steam power plant b)petrol c)diesel d) none of these
9. Which of the following is not a fire tube boiler ?
   a)Simple vertical b) locomotive c) Lancashire d) Wilcox
10. The efficiency of diesel engine is.....
    a)70%-75% b)Up to 45% c)50%-60% d)None of these

Q.2 Attempt any Ten. **[20]**

i. Discuss Clerk's Method.

ii. List the common impurities present in water.

iii. Why water should be softened before using in boiler?

iv. Explain Higher Calorific value and Lower Calorific value.

v. How moisture and ash content is determined in Proximate analysis.

vi. List uses of Nitrogen.

vii. Define C.O.P. and Heat of Refrigeration.

viii. Write desirable characteristics of Ideal Refrigerant.

ix Write classification of refrigerents.

x Write the function of Safety valve and water level indicator.

xi Write any two differences between external combustion engine and internal combustion engine.

xii Write classification of boiler according to the method of water circulation.

Q.3a)	Discuss different factors which are responsible for corrosion.	**[5]**
b)	With the help of diagram explain " Hot Lime Soda Process".	**[5]**
	OR	
Q.3a)	Write a note on: Deionizers for water softening.	**[5]**
b)	Discuss about disadvantages of scale formation.	**[5]**
Q.4a)	Discuss characteristics of a good fuel.	**[5]**
b)	Write a note on: Bomb Calorimeter.	**[5]**
	OR	
Q.4a)	Write industrial applications of Hydrogen and Carbon Dioxide.	**[5]**
b)	Write comparison of solid,liquid and gaseous fuels.	**[5]**
Q.5a)	With the help of diagram explain working of single stage single acting reciprocating compressor.	**[5]**
b)	Discuss Multistage compression.	**[5]**
	OR	
Q.5a)	Explain Air refrigeration cycle.	**[5]**
b)	Derive an equation for work done by single stage single acting reciprocating compressor during adiabatic compression.	**[5]**
Q.6a)	What is internal combustion engine? Write classification of Internal Combustion engine.	**[5]**
b)	Write a note on: Simple vertical boiler.	**[5]**
	OR	
Q.6a)	Write the comparison between water tube boiler and fire tube boiler.	**[5]**
b)	Derive an equation for efficiency of Ottoengine.	**[5]**

— X —

No. of Printed Pages : 2

SEAT No._____

[59]

Sardar Patel University

B.Sc. SEMESTER IV
INDUSTRIAL CHEMISTRY (VOCATIONAL)
US04CICV01
Plant Utilities
Date: 8th April 2017

Time: 02:00 pm to 05:00 pm **Total Marks: 70**

Q1. Answer the following multiple choice questions. **[10]**

1. Permanent hardness of water cannot be removed by _____.
   (a) Adding soda (b) Distillation
   (c) Boiling (d) Adding lime-soda

2. The exhausted permit (zeolite) is regenerated by percolating through it a solution of ___.
   (a) Calcium chloride (b) Zinc chloride
   (c)Magnesium chloride (d) Sodium chloride

3. Water is hard, when it contains ____.
   (a) Acid solution (b) Precipitates in suspension
   (c)Dissolved sodium salt (d) Both (b) and (c)

4. Which of the following gas is used in making tungsten filaments for electric lamps?
   (a) N_2 (b) O_2
   (c) Mixture of N_2 and H_2 (d) CO_2

5. The maximum temperature reached, when coal is completely burnt in the theoretical amount of air, called ____.
   (a) Fusion temperature (b) Calorific intensity
   (c) Ignition temperature (d) None of these

6. The heat removing capacity of one tonne refrigerator is equal to ____.
   (a) 21 kJ/min (b) 210kJ/min
   (c) 420 kJ/min (d) 620 kJ/min

7. Which of the following refrigerants has the lowest freezing point?
   (a) R-11 (b) R-12
   (c) R-22 (d) Ammonia

8. The pressure at the inlet of a refrigerant compressor is called _____.
   (a) Suction pressure (b) Discharge pressure
   (c) Critical pressure (d) Back pressure

9. Which of the following is single tube boiler?
   (a) Cornish (b) Locomotive
   (c) Lancashire (d) Babcock

10. The efficiency of diesel engine is___.
    (a) up to 45 % (b) 50 to 60 %
    (c) 70 to 75 % (d) 75 to 85?

Q – 2 Answer the following short questions (any ten) **[20]**

I. Write about phosphate treatment given for feed water conditioning.
II. What is Zeolite?
III. Draw the labelled diagram for oil removal from water.
IV. Define critical temperature.
V. Write the industrial applications of nitrogen.
VI. What is meant by ignition temperature?
VII. Define volumetric efficiency.
VIII. Explain about stroke volume.
IX. Enlist the classification of compressors.
X. Differentiate between otto engine and diesel engine.
XI. Enlist the functions of boiler.
XII. Define internal combustion engine.

Q – 3 (a) Write note on effect of water on rocks and minerals **[05]**
(b) With the help of labelled diagram explain deionization process. **[05]**

OR

Q – 3 (a) Define carry over and explain priming and foaming in detail **[05]**
(b) With the help of labelled diagram explain hot lime soda process. **[05]**

Q – 4 Explain advantages of solid, liquid and gaseous fuels over each other. **[10]**

OR

Q – 4 With the explanatory note on characeterstic of good fuels. **[10]**

Q – 5 With the help of labelled diagram explain mechanism of simple vapour compression refrigeration system . **[10]**

OR

Q – 5 With the help diagrams explain air refrigerator working on reversed brayton. **[10]**

Q – 6 (a) With the help of diagram explain construction and working of simple vertical boiler. **[05]**
(b) Write note on conditions of steam **[05]**

OR

Q – 6 Write explanatory note on steam tables. **[10]**

– X –

SEAT No._____

[86/A-463]

N.o. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

S.Y.B.Sc. Industrial Chemistry (VOC.) SEMESTER – IV

EXAMINATION -2017

Industrial Instrumentation and process control

SUB CODE: US04CICV02

DATE: 11TH April 2017 TIME: 2:00 pm to 5:00 pm

DAY: Tuesday TOTAL MARKS: 70

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

(1) ------ is used to measure the flow rate of fluids
- (A) McLeod Gauge (C) Rotameter
- (B) Radiation pyrometer (D) All of these

(2) The -----strip consists of two different metals which expand at different rates as they are heated
- (A) Pressure gauge (C) bimetallic
- (B) orifice (D) None of these

(3) A radiation pyrometer infers the -------- of an object by detecting its thernmally emitted radiation
- (A) temperature (C) pressure
- (B) Flowrate (D) all of these.

(4) The pressure range of bronze spring is _____
- (A) 600 psi (C) 10000 psi
- (B) 1000 psi (D) 800 psi

(5) ------is a scientific instrument used to measure very low pressures, down to 10^{-6} Torr
- (A) McLeod gauge (C) radiation pyrometer
- (B) thermocouple (D) venturimeter

(6) The converging section corn angle in a _____ is in the range of 15-25^0
- (A) Venturimeter (C) Rotameter
- (B) Pitot tube (D) Pressure gauge

(7) The fluid velocity is calculated as √2gh in ------
- (A) Pitot tube (C) orificemeter
- (B) Venturimetre (D) All of these

(8) A value of more than 4000 for N_{Re} implies _____range
- (A) Turbulent (C) Transition
- (B) Laminar (D) None of above

(9) The variable chosen to represent the state of the system is _____
- (A) Process control (C) Input element
- (B) Controlled variable (D) controller

(10) A controlled valve is essentially a variable orifice and hence its flow equation is _____
- (A) CV√ΔP (C) PV
- (B) ΔC (D) All of these

Q.2 Answer <u>any TEN</u> of the following **[20]**

(1) Distinguish between direct and indirect measurement.
(2) Classify instruments based on their working.
(3) Define Accuracy and Precision of instruments
(4) Write the classification of pressure measuring devices.
(5) Write the principle of Bourdon pressure gauge.
(6) Explain foot & tape method.
(7) Write principle of Rotameter.
(8) Write advantages and disadvantages of Venturimeter.
(9) Write principle of Pitot tube.

(10) Differentiate between analog and digital indicator.
(11) What is the objective of data recorder?
(12) Differentiate between multipoint indicator and multi pointer indicator.

Q.3 Write classification of measuring instruments and discuss mercury in glass thermometer . [10]

OR

Q.3 Write a detailed note on thermal well. [10]

Q.4 (A) Explain the construction and working of bourdon tube pressure gauge. [05]
(B) Explain the construction and working of Diaphragm pressure gauge. [05]

OR

Q.4 (A) Write a note on sight glass method. [05]
(B) Write a note on ultrasonic level detector. [05]

Q.5 (A) Write the principle and working of Venturimeter. [05]
(B) Write the **principle** and working of Orificemeter. [05]

OR

Q. 5 (A) Explain the construction and working of Rotameter. [05]
(B) Derive the equation for flow measurement using pitot tube. [05]

Q. 6 (A) Explain recorders in detail. [05]
(B) Explain the principle and working of strip chart recorder. [05]

OR

Q. 6 (A) Explain the principle and working of circular chart recorder. [05]
(B) Differentiate between feedback and feed forward control system. [05]

— X —

SEAT No._____ No. of Printed Pages : 2

[60]

Sardar Patel University
S.Y.B.Sc IVth Semester Examination, (under CBCS)
USO4CINS01 (Signal conditioning)
Saturday, 8th April 2017

Time: 02.00 PM – 05.00 PM **Marks: 70**

Q.1 Multiple choice questions. **[10]**

(1) In electronic aided measurement first stage is _____.
(A) Amplifier (B) Recorder
(C) Transducer (D) None of them

(2) Op-amp gain range is _____.
(A) 10 - 10^2 (B) 10^2 -10^4
(C) 10^9- 10^{18} (D) 10^4-10^8

(3) Non-Inverting amplifier the feedback is_____.
(A) Positive (B) Negative
(C) Open loop (D) A & B both

(4) Maxwell's bridge is used to measure unknown_____.
(A) Inductance (B) Capacitance
(C) Resistance (D) Q

(5) Kelvin's bridge is used t measure _____.
(A) Power (B) Resistance
(C) Current (D) Voltage

(6) The light intensity measure in terms of_____.
(A) Lumen (B) Ohm/V
(C) Cm/s (D) None of these

(7) Diode bridge modulator gain is_____ db.
(A) 65 (B) 56
(C) 50 (D) 76

(8) The most popular DAC is_____type.
(A) Switch current source (B) Weighted resister
(C) Switched capacitor (D) R-2R ladder

(9) The simplest ADC is_____ type.
(A) Counter (B) Flash
(C) Dual slope (D) R-2R

(10) The slowest ADC is _____ _____type.
(A) Counter (B) Flash
(C) Dual slope (D) Weighted

C1)

(PTO)

Q.2 Short answer types question. (Any Ten) [20]

(1) What is gain? Draw the equivalent circuit of op-amp
(2) Enlist the characteristic of Op-amp.
(3) Write about voltage to current converter with floating load.
(4) Write a note on light intensity meter.
(5) Draw the circuit of wheatstone's bridge and calculate the unknown resistance where $R_1 = 10K\Omega$ $R_2 = 15\ K\Omega$ and $R_3 = 20\ K\Omega$.
(6) Write the application and limitation of wheatstone's bridge.
(7) Define: (i) Modulator (ii) Chopper
(8) Draw the circuit diagram of solid state modulator.
(9) Compare DC and AC bridge.
(10) What are the output voltages caused by logic 1 in each bit position in an 8 bit ladder for 0 is 0V and that for 1 is + 10V?
(11) Explain bipolar DAC.
(12) Define (i) Step-size (ii) Accuracy

Q.3 (a) Write a detail note on integrator amplifier. [06]
(b) Explain non-inverting amplifier with suitable diagram. [04]

OR

Q.3 (a) Write an note on differential amplifier. [06]
(b) Write a note on inverting amplifier with suitable diagram. [04]

Q.4 (a) Explain transistor choppers. [06]
(b) Write a note on analog weight scale. [04]

OR

Q.4 (a) Briefly explain diode bridge modulator. [06]
(b) Draw the circuit of magnetic modulator and explain in detail. [04]

Q.5 (a) Draw the circuit of Kelvin's bridge and derive the equation for unknown resistance. [06]
(b) Draw the circuit of inductance comparison bridge and derive the equation for finding of unknown inductance. [04]

OR

Q.5 (a) Give a detail note on Hay bridge. [06]
(b) Explain Maxwell's bridge [04]

Q.6 Explain R-2R ladder type DAC with all cases. [10]

OR

Q.6 Brief description on counter type ADC and also explain weighted resistor type DAC. [10]

— X —

SEAT No._____ No. of Printed Pages : 02

[817]

SARDAR PATEL UNIVERSITY

S.Y.B.Sc - IVth Semester Examination, (under CBCS)

USO4CINS02 (Calibration, Recorders, Signal Analyzers and Optical Fibre)

Monday , 10th April 2017

Time: 02.00 PM – 05.00 PM **Marks: 70**

Q.1 Multiple choice questions. **[10]**

(1) The highly accurate voltage and current sources known as _____.

(a) Instrument (b) calibrators

(c) voltmeters (d) potentiometers

(2) The chart speed is expressed in _____.

(a) inches/second (b) m^2/second

(c) cm/second (d) m/sec

(3) The instrument which record changes of only one input parameters are called as _____.

(a) Recorders (b) single point recorders

(c) multi point recorders (d) PMMC

(4) Process measurements to measure the variable quantity as _____.

(a) Voltmeter (b) pressure

(c) ammeters (d) loggers

(5) A transition detector can be used at the input of _____.

(a) timing analyzer (b) analyzer

(c) vector analyzer (d) none of these

(6) The statement of "find data value then trace after/about address output-port" is known as _____.

(a) sequential triggering (b) don't care trigger

(c) vector analyzer (d) none of these

(7) The long as the incident angle is less than the critical angel, the light will be totally _____ without attenuation.

(a) reflected (b) refracted

(c) polarized (d) none of these

(8) The ammeter and voltmeter calibration are combination of _____

(a) Wattmeter (b) Potentiometers

(c) Zener diode (d) P-N junction diode

(9) Simulated Brillouin Scattering (SBS) may be regarded as the modulation of _____ through thermal molecules vibrations within the fiber.

(a) light (b) voltage

(c) current (d) power

(10) High-speed DSOs typically resolve signals to _____bits.

(a) 7 (b) 9

(c) 8 (d) 16

Q.2 **Short answer type questions (Attempt any Ten)** **[12]**

(1) Draw the circuit for calibration of a wattmeter.

(2) Write any two objective of instrument calibration.

(3) Define: Calibrators.

(4) Draw the block diagram of servo recorder mechanism.

(5) Draw the block diagram of the basic X-Y recorder.

(6) Define: logic analyzer.

(7) Write the benefits and limitations of equipment for digital oscilloscope.

(8) Draw the block diagram of triggering of the timing analyzer

(9) Explain with applications and limitations of spectrum analyzer.

(10) Define: Harmonic distortion (THD).

(11) Give the advantages of fibre optics.

(12) Calculate the angle of acceptance of a given optical fiber, if the refractive indices of the core and the cladding are 1.563 and 1.498 respectively.

Q.3 (a) Sketch a circuit to show how a standard voltmeter may be used to calibrate a dc voltmeter. **[6]**

(b) Discuss the procedure of DC Ammeter calibration with figure. **[4]**

OR

Q.3 (a) Sketch a circuit to show how a potentiometer should be used for calibrating dc ammeter. **[6]**

(b) Write a short note on digital multimeter as standard instruments. **[4]**

Q.4 (a) Explain the basic mechanism used the dc potentiometer servo recorders. **[6]**

(b) Draw the diagram of a data logger and explain its operation. **[4]**

OR

Q.4 (a) State the operation of PMMC galvanometer type strip chart recorder. **[6]**

(b) List suitable points for the selection of a recorder. **[4]**

Q.5 (a) Discuss with type of real time spectrum analyzers in detail. **[6]**

(b) Write a note on transitional sampling. **[4]**

OR

Q.5 (a) Explain the operation of logic timing analyzer's sampling method. **[6]**

(b) Write a short note on interfacing target system. **[4]**

Q.6 (a) Explain how light propagates through an optical fiber. **[6]**

(b) Give an account of Step Index Fiber. **[4]**

OR

Q.6 (a) What is numerical aperture? Derive an expression for numerical aperture. **[6]**

(b) Explain the difference between refection and refraction. What is total internal reflection? **[4]**

— X —

SEAT No._____ No. of Printed Pages : 2

C82/A-347

SARDAR PATEL UNIVERSITY

B.Sc. (IT) – IV SEMESTER (CBCS)

US04CINT01 : Computer Organization and Digital Computer Electronics

Date : 10/04/2017 Time : 2:00 PM to 5:00 PM Max Marks : 70

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

[01] The base of Octal Number System is _____.
(A) 7 (B) 8
(C) 9 (D) 10

[02] CPU stands for _____.
(A) Central Processing Unit (B) Control Programming Unit
(C) Control Processing Unit (D) Common Programming Unit

[03] $(562)_8 = (\_\_\_\_)_2$
(A) 10101010 (B) 111100000
(C) 110110010 (D) 101110010

[04] The _____ is responsible for fetching instruction from main memory and determining their type.
(A) Arithmetic Logic Unit (B) Control Unit
(C) Registers (D) Program Counter

[05] The _____is a register, which points to the next instruction to be fetched for execution.
(A) Instruction Register (B) Control Register
(C) Program counter (D) Memory Address Register

[06] Invert Gate has only _____ input and _____ output.
(A) One, One (B) One, Two
(C) Two, One (D) Two, Two

[07] The _____ gate has two or more input signals. All inputs must be same to get a high output.
(A) NAND (B) NOR
(C) XOR (D) XNOR

[08] A combinational circuit that performs the arithmetic addition of two bits is called _____.
(A) Encoder (B) Decoder
(C) Half Adder (D) Full Adder

[09] In K-Map, Pair eliminates _____ variable(s) and their complements.
(A) 1 (B) 2
(C) 3 (D) 4

[10] A Multiplexer has _____.
(A) One Input and One Output (B) One Input and Many Output
(C) Many Input and One Output (D) Many Input and Many Output

PTO

Q:2 Answer the following short questions : Attempt Any Ten [20]

[01] What is Hardware? Give examples.
[02] Perform : $(735)_8 = (\ ?\ )_2$
[03] Perform : $(ACD)_{16} = (\ ?\ )_2$
[04] What is Instruction Register?
[05] What is Array Computers?
[06] What is Instruction-Level Parallelism?
[07] Explain AND Gate.
[08] Explain NOR Gate.
[09] Explain NOT Gate.
[10] What is Multiplexer?
[11] What is Decoder?
[12] What is Minterm?

Q:3 [A] Draw a Block Diagram of Basic Organization of a Computer System. Explain its functional units. [06]

[B] Perform the following conversions : [04]

1. $(4762)_{10} = (\ \_\_\_\_\_\ )_2$ 2. $(5432)_8 = (\ \_\_\_\_\_\ )_2$

OR

Q:3 [C] What is Number System? Explain Hexadecimal Number System in detail. [06]

[D] Perform the following conversions : [04]

1. $(1010)_2 + (1011)_2 = (\ \_\_\_\_\_\ )_2$
2. $(1101)_2 - (0110)_2 = (\ \_\_\_\_\_\ )_2$

Q:4 [A] Explain the internal organization of a typical Von Neumann Machine. [06]

[B] Explain Hamming Code with example. [04]

OR

Q:4 [C] Explain Pipelining in detail. [06]

[D] Explain Instruction Execution Cycle of a CPU. [04]

Q:5 [A] Explain De-Morgan's First and Second Theorem in detail. [10]

OR

Q:5 [B] Explain Half Adder and Full Adder in detail. [10]

Q:6 [A] Explain 8x1 Multiplexer in detail. [06]

[B] Explain RS Flip Flop. [04]

OR

Q:6 [C] Explain Comparator in detail. [06]

[D] Simplify the following K-Map : [04]

$F(A, B, C, D) = \sum (0, 1, 2, 3, 4, 5, 6, 7, 10, 11, 15)$

—X—

No. of Printed Pages : 02

SEAT No._____

C87/A417

SARDAR PATEL UNIVERSITY
V.V.NAGAR
EXTERNAL EXAMINATION(2017)
S. Y. Bsc (INT)-4th Semester

Exam Date :- 11/04/2017 Course :-US04CINT02
Total Marks :- 70 Time:2:00pm – 5.00pm

Subject: - Web Designing and Applications

Q.1 Multiple Choice Questions [10]

1. LAN stands for_____
   a. Local Area Network. b. Line Area Network.
   c. Link Area Network. d. None of the Above.
2. A _____ Is a device use for modulation and demodulation.
   a. Internet b. Computer
   c. Modem d. None of the Above.
3. URL stands for _____
   a. Universal Resource Location. b. Uniform Resource Locator.
   c. Universal Resource Link. d. None of the above.
4. _____tag used to produce formatted output.
   a. <PRE> b. <P>
   c. <SUB> d. <SUP>
5. _____ tag is used to make hyperlink.
   a. <IMG> b. <A>
   c.
 d. None of the Above.
6. The _____ color is the default color of a hyperlink.
   a. purple b. red
   c. blue d. None of the above.
7. _____ attributes sets the amount of space between the two adjacent cell.
   a. CELLSPACING b. CELLPADDING
   c. WIDTH d. None of the above.
8. To show a particular option shown by default, ____attribute is used in <select>
   a. checked b. value
   c. selected d. type
9. Which operator is used to concatenate two strings?
   a. + b.++
   c. += d.None of these.
10. Which keyword is used to declare a variable as an integer?
    a. int b. num
    c. var d. dim

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

1. Write a note on <script> tag
2. Explain about Confirm dialog box..
3. Explain the break statement.
4. Explain the frameset tag with all its attributes.
5. Discuss <TR> tag.
6. Explain <A> tag in short.
7. Explain BIG, SMALL, TT tags.
8. Write a short note on MARQUEE tag.
9. What are special characters? Explain how you create it?
10. What is Internet?
11. Explain Hyper-text.
12. Briefly explain commands in Edit menu.

Q.3	a)	List and explain the components of Web-Browser.	[6]
	b)	Explain FTP in detail.	[4]
		OR	
Q.3	a)	Write the full form of HTTP. Explain in brief. Where is it used?	[6]
	b)	Explain Electronic mail in detail.	[4]
Q.4	a)	Draw and discuss the structure of HTML Document.	[6]
	b)	Explain LINK Tag in detail with Example.	[4]
		OR	
Q.4	a)	How you can create different type of LINK? Explain.	[6]
	b)	How you can create BULLETED list? Explain	[4]
Q.5		Write a note on <form> tag with all the associated attributes and tags.	[10]
		OR	
Q.5		Explain TABLE creation of HTML in detail also explain IMAGE tag in detail.	[10]
Q.6	a)	Explain about Arithmetic operators in with Example.	[6]
	b)	Write a note on IF statement in detail.	[4]
		OR	
Q.6	a)	Write a note on Creating, assigning, initializing Arrays.	[6]
	b)	Write a note on for looping statement.	[4]

All the Best

SEAT No._____ No. of Printed Pages : 2

[61]

SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar - 388120

B.Sc. (IVth Semester) Examination - March/April 2017

Instrumentation (Vocational)

US04CINV01 (Power Electronics)

Saturday, 8th APRIL-2017

02:00 PM - 05:00 PM

Max. Marks: 70

Que 1 **Objective Type Questions.** **[10]**

1 Series Connected SCR Improves _____ Rating.

(A) Voltage (C) Both A) and B)

(B) Current (D) None of These

2 SCR is _____ Layer Device.

(A) Two (C) Four

(B) Three (D) None of These

3 _____: Used as a Relaxation Oscillator.

(A) CSCR (C) UJT

(B) SCS (D) All of These

4 _____: Bilateral Device/s.

(A) SCR (C) DIAC

(B) TRIAC (D) All of These

5 Relaxation Period of UJT Can be Changed by with the help of _____.

(A) Capacitor (C) Both A) and B)

(B) Inductor (D) None of These

6 Maximum Time Delay for AC Breaker Circuit is _____ Cycle/s.

(A) 1.25 (C) 1.50

(B) 1.33 (D) None of These

7 Megger is Used For Measurement of _____.

(A) Low Inductance (C) High Inductance

(B) Low Resistance (D) None of These

8 Operating Voltage of a Megger is About _____.

(A) 120 V (C) 500 V

(B) 400 V (D) None of These

9 Thyristor Mainly Used As/For _____.

(A) Amplifier (C) Power Control

(B) Rectifier (D) None of These

10 _____: CSCR.

(A) Complimentary SCR (C) Common SCR

(B) Continuous SCR (D) None of These

Que 2	**Short Answer Type Question (Attempt Any Ten).**	**[20]**
1	Enlist Factors which Contribute to Internal Losses of Thyristor.	
2	Define: String Efficiency.	
3	Draw Characteristics of Series and Parallel Connected SCR.	
4	Differentiate: SCR and TRIAC.	
5	Briefly Explain: Snubber Circuit.	
6	Explain What DIAC is.	
7	Enlist Advantages of Phase Control AC Circuit Over DC Circuit With Respect to Thyristor.	
8	Explain Briefly Time Delay Circuit.	
9	What is Cycloconverter?	
10	List out Possible Faults In Electric Washing Machine.	
11	List out Parts of Non-Automatic Iron.	
12	Differentiate: Automatic and Non-Automatic Iron.	
Que 3 (A)	With Necessary Diagram, Explain Principle of Operation of an SCR.	**[05]**
(B)	Write a Note on TURN-ON Mechanism of an SCR.	**[05]**
	OR	
Que 3(A)	Discuss Series Connected SCR Operation With Necessary Figure.	**[05]**
(B)	Write a Note on TURN-OFF Mechanism of an SCR.	**[05]**
Que 4(A)	Give Constructional Detail of TRIAC. Explain its Triggering Mode.	**[05]**
(B)	Explain Phase Control Using TRIAC.	**[05]**
	OR	
Que 4(A)	Give Constructional Detail of UJT. Explain its Characteristics.	**[05]**
(B)	Explain UJT as a Relaxation Oscillator.	**[05]**
Que 5(A)	Explain Static Breaker Circuit.	**[05]**
(B)	Enlist Applications of Thyristor. What do You Mean by Zero Voltage Switch?	**[05]**
	OR	
Que 5(A)	Write a Note on Gate Turn On (GTO) Device.	**[05]**
(B)	Explain "Over Voltage Protection" With the Help of Thyristor.	**[05]**
Que 6	Write a Detailed Note on Megger.	**[10]**
	OR	
Que 6(A)	Explain Electric Toaster.	**[05]**
(B)	Write a Note On Hair Drier.	**[05]**

[62/A-33] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY - V.V.NAGAR

B.Sc.(SEM. – 4th) EXAMINATION

INSTRUMENTATION (V)

18th APRIL - 2017

SUBJECT - US04CINV02 – OSCILLATORS AND OPTICAL DEVICES

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

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

1. In phase shift oscillator feedback RC circuit gives total _____ degree of phase shift.
   (A) 60 (B) 270
   (C) 180 (D) 90
2. A crystal oscillator works on the principle of _____.
   (A) Planck's (B) Piezoelectric
   (C) Induced emf (D) Mutual induction
3. Pin no. 7 of 555 timer IC is _____.
   (A) Trigger (B) Discharge
   (C) Supply (D) Threshold
4. _____ laser use as cutting application in industries because of its high output power.
   (A) CO_2 (B) Ruby
   (C) He-Ne (D) None of above
5. Normally in LED _____ emission and in LASER _____ emission occurs.
   (A) Spontaneous, Stimulated (B) Stimulated, Spontaneous
   (C) Spontaneous, Spontaneous (D) None of above
6. In homojunction type of structure optical output power is _____.
   (A) Zero (B) High
   (C) Low (D) None of above
7. _____ is one of the loss in fiber optic cable.
   (A) Electrical (B) Radiation
   (C) Magnetic (D) None of above
8. _____ is type of optical detector.
   (A) Inductor (B) Resistor
   (C) Capacitor (D) None of above
9. The wavelength at which the _____ energy becomes equal to the band gap energy is called cut-off wavelength.
   (A) Electron (B) Hole
   (C) Proton (D) Photon
10. _____ absorption is caused by valence electron in the silica material from which fibers are manufacture.
    (A) Ion resonance (B) UV
    (C) IR (D) None of above

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

1. State both Barkhausen criteria.
2. What is Piezoelectric effect ? Draw its equivalent circuit.
3. Define Snell's law.
4. What is Numerical aperture and Acceptance angle ?
5. Only draw and label the Edge Emitting LED.
6. Enlist basic requirements of LED.
7. What do you mean by Dispersion ?

8. State applications of fiber.
9. What do you mean by Refraction and Reflection ?
10. What is Spontaneous and Stimulated emission ?
11. List different types of oscillators with its frequency of oscillation.
12. Write short note on Ruby Laser.

Q.3 Draw the pin diagram and equivalent circuit of 555 Timer IC and explain function of each pin. **[10]**

OR

Q.3(A) Draw the diagram of Wein Bridge Oscillator and explain its working **[03]**

Q.3(B) What is oscillator ? Explain any one L-C Oscillator in detail with neat diagram. **[07]**

Q.4 Discuss different applications of LASER in detail. **[10]**

OR

Q.4(A) List different types of Lasers. Discuss He-Ne Laser in detail. **[07]**

Q.4(B) State difference between LED and LASER. **[03]**

Q.5(A) Compare Metal Cable with Fiber Optic Cable. **[05]**

Q.5(B) Discuss fiber optic construction of Direct melt method with necessary diagram. **[05]**

OR

Q.5 What is Photo detector ? Discuss PIN Photo detector in detail with necessary diagrams. **[10]**

Q.6(A) Write a note on multimode step-index and multimode graded index fiber. **[05]**

Q.6(B) Discuss different losses in fiber. **[05]**

OR

Q.6 Draw the block diagram of Fiber Optic Communication system and explain it in detail. **[10]**

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[A-5] Seat No: _____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

T. Y. B.Sc. (VI Sem) Examination - 2017[CBCS] CNC-2010 Batch)

THURSDAY, 23 March, 2017

2:00PM - 5:00 PM

US04CMIC01(MICROBIOLOGY)

FUNDAMENTAL MICROBIOLOGY

Maximum Marks: 70

Q.1. Each question below gives a multiple choice of answers. Choose the most appropriate one. **[10]**

1 The normal flora of the human body is composed mainly of:

(a) fungi (b) bacteria

(c) protozoa (d) Algae

2 The capability of microorganism to cause disease is called_____

(a) Virulence (b) Infection

(c) Pathogenecity (d) All of these

3 Cholera toxin is classified as which type of toxin?

(a) Neurotoxin (b) Enterotoxin

(c) Cytotoxin (d) Leukocidin

4 The spray of small and large droplet that are expelled during sneezing or coughing is called_____

(a) Infectious dust (b) Droplet nuclei

(c) A fomite (d) Aerosol

5 Microorganisms used for alcohol production is_____.

(a) *S. cerevisiae* (b) *P. chrysogenum*

(c) *B.subtilis* (d)All of these

6 Which of the antimicrobial agent is used in cold sterilization

(a) X-rays (b) Alcohol

(c) N_2 gas (d) All of these

7 _____ is a chemical agent usually applied to the surface of the body that prevents microorganisms from multiplying.

(a) Germicide (b) Antiseptic

(c) Disinfectant (d) Sanitizer

8 An ideal chemical agent would have :

(a) Lack of toxicity (b) Antimicrobial activity

(c) Stability (d) All of these

Q. 2 Short Questions (Attempt any Six) **[12]**

1 What are the advantages of knowing the normal flora of human body.
2 Differentiate between exotoxin and enterotoxin
3 Define Virulence and Toxoid.
4 Give two examples of diseases whose causative agent are transmitted by dust or aerosol from environmental source.
5 Name the major categories of industrial microbiological products.
6 What are HEPA filters.
7 What are the various methods of using high temperature to kill microorganism

8 Name four major group of chemicals used to control microorganisms and give one example each.

Q. 3	[A]	Define germ free animal and differentiate between germ free and normal animal	[03]
	[B]	Describe normal flora of skin	[05]
		OR	
Q. 3	[A]	What role does microbial adherence play in establishment of normal flora and give an example	[05]
	[B]	Describe normal flora of Mouth	[03]
Q. 4		Discuss in detail various virulence factors	[08]
		OR	
Q. 4		Discuss species, racial and individual resistance	[08]
Q. 5	[A]	Write a note on Aerosol	[04]
	[B]	Write a note on microorganisms in air	[04]
		OR	
Q. 5		Discuss the methods of enumeration of microorganisms in detail.	[08]
Q. 6	[A]	Discuss the role of microorganisms in industry	[04]
	[B]	Write a note on Alcohol fermentation	[04]
		OR	
Q. 6	[A]	Draw a neat labeled diagram of a Fermentor and write about the parts involved in aeration and agitation	[05]
	[B]	What are the major classes of processes where microorganisms are used. Explain in brief.	[03]
Q.7.		Discuss the method of high temperature for the effective removal of microorganisms	[08]
		OR	
Q.7.	[A]	Describe desiccation in brief	[03]
	[B]	Write a note on membrane and HEPA filters	[05]
Q.8.	[A]	Write a note on Phenol coefficient method	[05]
	[B]	Explain mode of action of iodine and its compounds	[03]
		OR	
Q.8.	[A]	Discuss the characteristics of an ideal antimicrobial chemical agent	[04]
	[B]	Explain mode of action and practical application of heavy metals	[04]

X=X=X

SEAT No._____ No. of Printed Pages 2

[627A29]

SARDAR PATEL UNIVERSITY
B.Sc.(4th Semester) EXAMINATION 2017
Saturday, April 8th, 2017
2:00 p.m. TO 5:00 p.m.
SUBJECT: MICROBIOLOGY US04CMIC01
(General Microbiology)

TOTAL MARKS: 70

Note: (1) All the questions are compulsory.
(2) Figures on the right indicate marks.

Q-1 Select the correct answer for each question from the option given below **[10]**

1. Which of the following capsulated bacteria is responsible for dental caries?
   (A)*Lactobacilli* (B) *E.coli*
   (C) *Corynebacterium diphtheriae* (D) *Streptococcus mutan*
2. Diphtheria toxin is classified as which type of toxin?
   (A)Neurotoxin (B) Enterotoxin (C) Cytotoxin (D)Leukocidin
3. Which sampler automatically separates air particles in to six aerodynamic size?
   (a) Lemon (b) Andersen (c) Hollaender & Dalle Valle (d) Kluyver & Visser
4. Which of the following is used in fermentar for thorough mixing of medium and inoculums?
   (a) Impeller (b) Shaft (c) Sparger (d) Head space
5. Which of the following instrument works on the principle of saturated steam under pressure?
   (A)Steam Arnold (B) Autoclave (C) Hot Air Oven (D)Boiling water bath
6. The lowest temperature at which microbial population is killed in 10 minutes is known as_____.
   (A)Thermal Death Time (B) Thermal Death Point
   (C)Generation Time (D) Decimal Reduction Time
7. An agent that reduces the microbial population to safe levels as judged by public health requirements is known as_____.
   (A)Sterilizer (B) Disinfectant (C) Sanitizer (D) Antiseptic
8. Which of the following antimicrobial agent has killing as well as cleansing effect?
   (A)Phenol (B) Copper (C) Crystal violet (D) Ethanol
9. Which of the following radioactive isotope is used for the emission of γ-radiation?
   (A) ^{14}C (B) ^{63}Ni (C) ^{15}N (D) ^{60}Co
10. Which of the following antimicrobial agent is used to sterilize space air craft components?
    (A)Methanol (B) Ethanol (C) Propanol (D) Ethylene oxide

Q-2 **Give Short answers to following questions (Any ten)** [20]

[1] Write about normal flora of intestine.
[2] Give at least four differences between endotoxin and exotoxin.
[3] How the virulence of a pathogen is measured?
[4] Air is not a natural environment for growth and reproduction of microorganisms. Justify

(P.T.O.)

[5] Write about thermal precipitation method to study air microflora.
[6] What is the significance of microorganisms in air? Give two examples of air born diseases with their respective causative agents.
[7] Define (1) Thermal Death Time (2) Decimal reduction time
[8] How does osmotic pressure play an important role in controlling microorganisms?
[9] How microorganisms are affected by subzero temperature?
[10] Define (1) Disinfection (2) Antiseptic
[11] What is Bordeaux mixture? What is its significance?
[12] Give examples of selective inhibition of microorganisms by dyes. What is the use of such dyes in bacteriological media?

Q-3 Define gnotobiotic life? Discuss in detail about process of rearing germ free animals with their uses. [10]

OR

Q-3 (A) Write a note on-Active and Passive penetration. [05]
(B) What do you mean by natural resistance? Discuss about Species resistance. [05]

Q-4 (A) Enumerate various characteristics of industrially important microorganisms. [04]
Q-4 (B) Enlist various methods to enumerate air microflora and discuss about impingement in liquid and impaction on solid method in detail. [06]

OR

Q-4 (A) Explain basic design of fermentar with neat and labeled diagram. [05]
Q-4 (B) Write a note on- Control of air borne microorganisms. [05]

Q-5 Enlist various physical processes to control the growth of microorganisms and discuss in detail about filtration. [10]

OR

Q-5 Why moist heat is better than dry heat. Explain the role of temperature as an antimicrobial agent. [10]

Q-6 (A) Write a note on- Role of Quaternary Ammonium Compounds as an antimicrobial agent. [05]
(B) Discuss FDA method for the evaluation of antimicrobial agents. [05]

OR

Q-6 Discuss various characteristics of an ideal antimicrobial agent. [10]

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SEAT No._____ No. of Printed Pages : 02

[583/A-31]

SARDAR PATEL UNIVERSITY
B.SC. EXAMINATION
MICROBIOLOGY SEMESTER – 4,
SUBJECT CODE: US04CMIC02
SUBJECT TITLE: APPLIED MICROBIOLOGY

Date: 10/04/2017 Day: Monday

Time: 2:00 p.m. to 5:00 p.m. Total marks: 70

N.B: Figures on the right indicate marks.

Q.1 **Attempt Multiple ChoiceQuestions.(01-Mark each)** 10

1 In MBRT, the dye methylene blue is colored when it is in ---------- state.
(a) Oxidized (b) Neutral
(c) Reduced (d) None of these

2 --------- is the disease causing inflation of the udder in cattle.
(a) Brucellosis (b) Mastitis
(c) Salmonellosis (d) None of the above.

3 In ultra-pasteurization, milk is heated at ---------temperature for 1 to 2 seconds.
(a) 145^0F (b) 300^0F
(c) 300^0C (d) 145^0C

4 The temperature of vat pasteurization was increased by 2° F to ensure the complete destruction of ----------.
(a) *Salmonella typhi* (b) *Coxiella burnetii*
(c) *Mycobacterium tuberculosis* (d) *Staphylococus aureus*

5 ----------is the major contaminant present on the skin of freshly dressed poultry.
(a) *Enterococci* (b) *Pseudomonas*
(c) *Enterobacter* (d) *Clostridium*

6 ---------- is a viral disease transmitted through water.
(a) Poliomyelitis (b) Typhoid
(c) Tuberculosis (d) Brucellosis

7 ----------gives Vogesporsaker and Citrate utilization test positive.
(a) *E. coli* (b) *Enterobacter aerogenes*
(c) *Proteus vulgaris* (d) All of the above.

8 The liquid effluent becomes coated with microbial flora known as ----------.
(a) zoogleal film (b) both a & c
(c) cinefilm (d) none of these

9 An association in which one organism lives in or on the body of another organism is known as_____
(a) Competition (b) Predation
(c) Antagonism (d) parasitism

10 Symbiotic nitrogen fixation is done by the genera---------
(a) *Rhizobium* (b) *Azotobacter*
(c) *Arthrobacter* (d) none of these

Q.2		**Attempt the following Short Questions. (any Ten)**	20
	1	What is phosphatase test?	
	2	What are the limitations of reduction test?	
	3	Enlist diseases of human origin that have been transmitted by milk.	
	4	What is putrefaction?	
	5	Describe very briefly dehydration of food for preservation.	
	6	What are the advantages of sterilization for food preservation?	
	7	Draw the neat labeled diagram of Septic tank.	
	8	Explain; Coliforms	
	9	Define ,"potable water"	
	10	Explain algal population in soil.	
	11	What is ammonification? Explain the process.	
	12	Explain in brief competition interaction.	
		Attempt the following long questions	
Q.3	a	Write a note on cheese	06
	b	Describe types of microorganisms found in milk.	04
		OR	
Q.3	a	Explain in detail MBRT test. Classify milk on the basis of MBRT.	06
	b	Write a note on butter.	04
Q.4	a	Describe the role of chemicals in food preservation with suitable examples.	06
	b	Howdoes low temperature helps for food preservation?	04
		OR	
Q.4	a	Describe microbial examination of foods	06
	B	Discuss microbial flora of fresh foods like meats and eggs .	04
Q.5	a	Describe IMViC test to check the presence of coliforms in water.	06
	b	Write in short about groups of natural waters.	04
		OR	
Q.5	a	How does filtration method work for water purification	06
	B	Explain oxidation ponds.	04
Q.6		Write an exhaustive note on microbial interactions in soil.	10
		OR	
Q.6		Explain Sulfur cycle in detail.	10

—X—

SEAT No._____ No of printed pages : 3

[21/A12]

SARDAR PATEL UNIVERSITY
B.Sc.(SEMESTER - IV) EXAMINATION - 2017
Friday , 21st April , 2017
MATHEMATICS : US04CMTH01
(LINEAR ALGEBRA)

Time : 2:00 p.m. to 5:00 p.m. Maximum Marks : 70

Que.1 Fill in the blanks. 10

(1) If $S = \{(x_1, x_2, x_3) \in V_3 / x_1 x_2 = 0\}$ then S is .....V_3 .

(a) subspace of (b) equal to (c) not subset of (d) not subspace of

(2) ..... $\notin [(1,2),(2,4)]$ in V_2 .

(a) $(0,0)$ (b) $(5,10)$ (c) $(3,6)$ (d) $(3,7)$

(3) $[(0,5,2)(0,3,0)] =$ .....

(a) xy-plane (b) yz-plane (c) zx-plane (d) V_3

(4) $\{(2,0,0)$, $(0,3,0)$, ...$\}$ is LI set .

(a) $(0,0,3)$ (b) $(0,6,0)$ (c) $(2,3,0)$ (d) $(4,6,0)$

(5) $\{x^2-1$, $x+1$, ...$\}$ is LD set .

(a) $3x-3$ (b) $2x-1$ (c) $x-1$ (d) x^2-x-2

(6) Any set containing zero vector is ..... set.

(a) LI (b) LD (c) empty (d) neither LI nor LD

(7) Dimension of $\mathbb{C}$ over $\mathbb{R}$ is .....

(a) 1 (b) 2 (c) 3 (d) 0

(8) $T : V_3 \to V_3$ defined by $T(x_1, x_2, x_3) =$ ..... is not linear map .

(a) $(0, x_1, x_3)$ (b) $(0, x_1, x_3 x_2)$ (c) (x_2, x_1, x_3) (d) $(x_1 - x_2, x_3, x_2 - x_3)$

(9) If $T : V_1 \to V_2$ defined by $T(x) = (x+1, 0)$ then $T(x+y) =$ .....
(a) $(x+y+2, 0)$ (b) $(x+y+1, 0)$ (c) $(x+y+1, x+y)$ (d) $(x+y, 0)$

(10) If a linear map $T : V_2 \to V_2$ defined by $T(x, y) = (-x, y)$, $B_1 \& B_2$ are standard basis for V_2 then $(T : B_1, B_2) =$ .....

(a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

Que.2 Attempt the following (Any ten) 20

(1) In any vector space V , prove that $\alpha u = \bar{0}$ iff either $\alpha = 0$ or $u = \bar{0}$.

(2) Is $\{(x_1, x_2, x_3) \in V_3 / \ x_1 = \sqrt{2} x_2$ and $x_3 = 3x_2\}$ subspaces of V_3 ? Verify it.

(3) Prove that $[v_1, v_2] = [v_1 - v_2, v_1 + v_2]$.

(4) Is $\{(1,3,2),(1,-7,-8),(2,1,-1)\}$ LD in V_3 ? Verify it.

(5) Prove that $\{v_1, v_2\}$ is LD iff v_1 and v_2 are colinear .

(6) Determine a value of k that makes the vectors $\{(1,2,k),(0,1,k-1),(3,4,3)\}$ are LD.

(7) In n - dimensional vector space V , prove that any set of n - LI vectors is a basis for V .

(8) Prove that $T : V_2 \to V_2$ defined by $T(x,y) = (x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$ is linear map .

(9) Find basis and dimension for following subspace $W = \{(3,-6,3)\ ,\ (-2,4,-2)\}$ of V_3 .

(10) Let $T : U \to V$ be a linear map .Then prove that
$T(\alpha_1 u_1 + \alpha_2 u_2 + ... + \alpha_n u_n) = \alpha_1 T(u_1) + \alpha_2 T(u_2) + ... + \alpha_n T(u_n)$,
for all scalar $\alpha_1, \alpha_2, ..., \alpha_n$, for all $u_1, u_2, ..., u_n \in U$.

(11) Determine a linear map T if $T : V_2 \to V_4$ is defined by $T(1,1) = (1,1,1,1)$,
$T(1,-1) = (-1,-1,-1,-1)$.

(12) Let a linear map $T : V_3 \to V_3$ be defined by $T(x_1,x_2,x_3) = (2x_1 + x_2, x_2 - x_3, x_3 + x_1)$. Find $(T : B_1, B_2)$,where $B_1 = \{(1,2,3),(1,0,0),(1,1,0)\}$; $B_2 = \{e_1, e_2, e_3\}$.

Que.3 (a) Let R^+ be the set of all positive real numbers .Define the operations as bellow : 5
$u + v = uv$, $\alpha u = u^\alpha$ $\forall\ u, v \in R^+$; $\alpha \in \mathbb{R}$
Prove that R^+ is a real vector space .

(b) Let $S = \{(1,2,1),(1,1,-1),(4,5,-2)\}$ .Determine which of the following vectors are in [S] . 5
(i) (1,-3,5) (ii) (2,-1,-8) (iii) (-8,-10,4)

OR

Que.3 (a) Prove that the set of all 2×2 real matrices forms a real vector space under matrix addition and multiplication of matrix by a scalar . 5

(b) Prove that a nonempty subset S of a vector space V is a subspace of V iff the following conditions are satisfied 5
(i) $u + v \in S$, $\forall\ u, v \in S$
(ii) $\alpha u \in S$, $\forall\ u \in S$; $\forall$ scalar α.
Hence prove that S is a subspace of V iff $\alpha u + \beta v \in S$, $\forall\ u, v \in S$; $\forall$ scalar α, β.

Que.4 (a) In a vector space V ,suppose $\{v_1, v_2, ..., v_n\}$ is an ordered set of vectors with $v_1 \neq 0$. then prove that the set is LD iff one of the vectors $v_1, v_2, ..., v_n$, say v_k, belongs to the span of $v_1, v_2, ..., v_{k-1}$. 5

(b) Determine whether the set $S = \{(1,1,2),(-3,1,0),(1,-1,1),(1,2,-3)\}$ is LD or not. If set is LD then locate one of the vectors that belongs to the span of previous ones .Also find a LI subset A of S such that [A]=[S]. 5

OR

Que.4 (a) Prove that the vectors $(1+i, 2i)$ & $(1, 1+i)$ are LD in V_2^C but LI in V_2 . 3

(b) In any vector space V , prove that every subset of LI set is LI . 3

(c) Determine whether the set $S = \{(1,1,0),(0,1,1),(1,0,-1),(1,1,1)\}$ is LD or not. If set is LD then locate one of the vectors that belongs to the span of previous ones .Also find a LI subset A of S such that [A]=[S]. 4

Que.5 (a) If U and W are subspaces of a finite dimensional vector space V then prove that
$dim(U + W) = dim(U) + dim(W) - dim(U \cap W)$. 5

(b) Let the set $\{v_1, v_2, ..., v_k\}$ be a linearly independent subset of an n - dimensional vector space V . then prove that we can find vectors $\{v_{k+1}, v_{k+2}, ... , v_n\}$ such that the set $\{v_1, v_2, ... , v_k, v_{k+1}, \ ... \ , v_n\}$ is a basis for V . 5

OR

Que.5 (a) In a vector space V ,If $B = \{v_1, v_2, ..., v_n\}$ span V then prove that the following two conditions are equivalent 5

(i) B is LI .

(ii) If $v \in V$, then the expression $v = \alpha_1 v_1 + \alpha_2 v_2 + ... + \alpha_n v_n$ is unique .

(b) Is $S = \{1 + x + 2x^2, 3 - x + x^2, x + 2, -7 + 5x + x^2\}$ froms a basis for vector space P_2 ? If not , Determine the dimension of subspace [S] of P_2 .

Que.6 (a) Let $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 1 & 0 \end{bmatrix}$. Determine a linear map $T : V_3 \to V_2$ such that $A = (T : B_1, B_2)$,where 5

$B_1 = \{(1,1,1)\ ,\ (1,2,3)\ ,\ (1,0,0)\}$; $B_2 = \{(1,1)\ ,\ (1,-1)\}$.

(b) Let a linear map $T : P_2 \to P_3$ be defined by $T(P)(x) = xP(x)$. 5

Find $(T : B_1, B_2)$, where $B_1 = \{\ 1\ ,\ 1 + x\ ,\ 1 - x + x^2\ \}$; $B_2 = \{\ 1\ ,\ 1 + x\ ,\ x^2\ ,\ 2x - x^3\ \}$

OR

Que.6 (a) Let $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ -1 & 3 \end{bmatrix}$. Determine a linear map $T : V_2 \to V_3$ such that $A = (T : B_1, B_2)$,where 5

$B_1 = \{(1,1)\ ,\ (-1,1)\}$; $B_2 = \{(1,1,1)\ ,\ (1,-1,1)\ ,\ (0,0,1)\}$.

(b) Let a linear map $T : V_3 \to V_2$ be defined by $T(x,y,z) = (x+y, y+z)$. Find $(T : B_1, B_2)$, where 5

$B_1 = \{\left(1\ ,\ 1\ ,\ \frac{2}{3}\right)\ ,\ (-1,2,-1)\ ,\ \left(2\ ,\ 3\ ,\ \frac{1}{2}\right)\}$; $B_2 = \{(1,3)\ ,\ \left(\frac{1}{2}\ ,\ 1\right)\}$

(A-18) Seat No.:_____ No of printed pages : 3

SARDAR PATEL UNIVERSITY
B.Sc.(SEMESTER-IV) (JUNE 2010 BATCH) EXAMINATION -2017 (NC)
Wednesday , 15th March ,2017
MATHEMATICS : US04CMTH01
(LINEAR ALGEBRA)

Time : 2:00 p.m. to 5:00 p.m. **Maximum Marks:70**

Que.1 Fill in the blanks. 10

(1) ..... is a subspace of vector space V .
(a) { 1 } (b) 1 (c) 0 (d) {0}

(2) If S is nonempty subset of vector space V_3 then (0,0,0) ..... [S].
(a) = (b) $\neq$ (c) $\in$ (d) $\notin$

(3) $[(1,0,0)(0,1,0)]$ = ...
(a) xy-plane (b) yz-plane (c) zx-plane (d) V_3

(4) Every nonzero singleton set is ..... set.
(a) LI (b) LD (c) empty (d) neither LI nor LD

(5) $\{(1,0,0)$, $(0,2,0)$, ...$\}$ is LD set .
(a) $(0,0,1)$ (b) $(0,6,0)$ (c) $(0,0,4)$ (d) $(0,0,6)$

(6) The vectors (a,b) and (c,d) of V_2 are LD iff .....
(a) ad = bc (b) ab = cd (c) ac = bd (d) a = c

(7) dim P_3 = ...
(a) 1 (b) 2 (c) 3 (d) 4

(8) $T : V_3 \to V_3$ defined by $T(x_1,x_2,x_3)$ = ... is not linear map .
(a) $(0,x_1,x_3)$ (b) $(0,x_1,x_3+1)$ (c) (x_2,x_1,x_3) (d) (x_1,x_3,x_2)

(9) $T : V_n \to V_m$ then the matrix $(T : B_1, B_2)$ is of order .....
(a) $n \times n$ (b) $m \times m$ (c) $m \times n$ (d) $n \times m$

(10) If a linear map $T : V_2 \to V_2$ defined by $T(x,y) = (x,-y)$, B_1 and B_2 are standard basis for V_2then $(T : B_1, B_2)$ = ...
(a) $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0\\ 0 & 0\end{bmatrix}$; (c) $\begin{bmatrix}-1 & 0\\ 0 & 1\end{bmatrix}$ (d) $\begin{bmatrix}1 & 0\\ 0 & -1\end{bmatrix}$

Que.2 Answer the following (Any six) . 12

(1) For any vector space V, prove that $0u = \bar{0}$, $\forall\ u \in V$.

(2) Is $\{(x_1,x_2,x_3) \in V_3 / \ x_2x_3 = 1\}$ subspace of V_3 ? Verify .

(3) If S is a nonempty subset of a vector space V then prove that [[S]] = [S] .

(4) If u,v,w are LI vectors in a vector space V then prove that $u+v, v+w, w+u$ are also LI .

(5) Prove that the vectors $\{\sin x, \cos x, \sin(x+1)\}$ are LD .

(6) Show that the set $\{(1,2),(3,4)\}$ is a basis of V_2 . (P.T.O.)

(7) Check whether the mapping $T : V_3 \to V_1$ defined by $T(x_1, x_2, x_3) = x_2$ is linear or not .

(8) Let a linear map $T : V_3 \to V_2$ be defined by $T(e_1) = 2f_1 - f_2$, $T(e_2) = f_1 + 2f_2$, $T(e_3) = 0$, where $\{e_1, e_2, e_3\}$ and $\{f_1, f_2\}$ are standard bases for V_3 and V_2 respectively.Then find linear map T .

Que.3 (a) Let R^+ be the set of all positive real numbers .Define the operations as bellow : 5
$u + v = uv, \forall\ u, v \in R^+$, $\alpha u = u^\alpha, \forall\ u \in R^+, \alpha \in \mathbb{R}$.
Prove that R^+ is a real vector space .

(b) Check whether the set $\{(x_1, x_2, x_3) \in V_3 / \ x_3 = \sqrt{3}x_2\}$ is subspace of V_3 ? 3

OR

Que.3 (a) Prove that the set of all 2×2 real matrices forms a real vector space under matrix addition and multiplication of matrix by a scalar . 5

(b) A nonempty subset S of a vector space V is a subspace of V iff $\alpha u + \beta v \in S$, for all $u, v \in S$ and for all scalar α, β. 3

Que.4 (a) Let S be a nonempty subset of a vector space V and $u, v \in V$. If $u \in [S \cup \{v\}]$, but $u \notin [S]$, then prove that $v \in [S \cup \{u\}]$. 5

(b) Check whether the subset $\{(3, 0, 0), (-2, 0, 0), (0, 0, 1)\}$ of V_3 is LI or LD ? 3

OR

Que.4 (a) Let $S = \{(1, 2, 1), (1, 1, -1), (4, 5, -2)\}$ .Determine which of the following vectors are in [S] . 5
(i) (1,1,1) (ii) (2,2,-2)

(b) Check whether the subset $\{x^2 - 1, x + 1, x - 1\}$ of P is LI or LD ? 3

Que.5 (a) Determine whether the set $S = \{(1, 1, 0), (0, 1, 1), (1, 0, -1), (1, 1, 1)\}$ is LD ? If set is LD then locate one of the vectors that belongs to the span of previous ones . Also find a LI subset A of S such that [A]=[S]. 5

(b) Prove that the set $\{v_1, v_2, v_3\}$ is LD iff v_1 , v_2 and v_3 are co-planer . 3

OR

Que.5 (a) Determine whether the set $S = \{(1, 1, 2), (-3, 1, 0), (1, -1, 1), (1, 2, -3)\}$ is LD ? If set is LD then locate one of the vectors that belongs to the span of previous ones . Also find a LI subset A of S such that [A]=[S]. 5

(b) In any vector space V , prove that Every subset of LI set is also LI . 3

Que.6 (a) If U and W are subspaces of a finite dimensional vector space V then prove that $dim(U + W) = dim(U) + dim(W) - dim(U \cap W)$. 5

(b) Is the subset $S = \{x - 1, x^2 + x - 1, x^2 - x + 1\}$ from a basis for vector space P_2 ? If not , Determine the dimension of subspace [S] . 3

OR

Que.6 (a) In a vector space V ,If $B = \{v_1, v_2, \ldots, v_n\}$ span V then prove that the following two conditions are equivalent
(i) B is LI .
(ii) If $v \in V$, then the expression $v = \alpha_1 v_1 + \alpha_2 v_2 + \ldots + \alpha_n v_n$ is unique . 5

(b) Is the subset $S = \{(0, 0, 1), (1, 0, 1), (1, -1, 1), (3, 0, 1)\}$ from a basis for V_3 ? If not , then find a basis for [S] . 3

Que.7 (a) Let U and V be a vector space and $T : U \to V$ be any map then prove that T is linear iff $T(\alpha u_1 + \beta u_2) = \alpha T(u_1) + \beta T(u_2)$, $\forall$ scalar α, β ; $\forall$ $u_1, u_2 \in U$. 5

(b) Check whether a mapping $T : V_3 \to V_3$ defined by $T(x_1, x_2, x_3) = (x_1 + x_3, 0, x_2)$ is linear or not . 3

OR

Que.7 (a) Let $T : U \to V$ be a linear map .Then prove the following 5
(i) $T(0_U) = 0_v$
(ii) $T(\alpha_1 u_1 + \alpha_2 u_2 + ... + \alpha_n u_n) = \alpha_1 T(u_1) + \alpha_2 T(u_2) + ... + \alpha_n T(u_n)$,
$\forall$ scalars $\alpha_1, \alpha_2, ..., \alpha_n$, $\forall$ $u_1, u_2, ..., u_n \in U$

(b) Check whether a mapping $T : V_3 \to V_3$ defined by $T(x, y, z) = (x^2 + xy, xy, yz)$ is linear or not . 3

Que.8 (a) Let a linear map $T : V_2 \to V_3$ be defined by $T(x_1, x_2) = (x_1 + x_2, 2x_1 - x_2, 7x_2)$. Find $(T : B_1, B_2)$, where $B_1 = \{e_1, e_2\}$; $B_2 = \{f_1, f_2, f_3\}$. 3

(b) Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$. Determine a linear map $T : V_3 \to V_3$ such that $A = (T : B_1, B_2)$, where $B_1 = \{(1, 1, 1), (1, 0, 0), (0, 1, 0)\}$; $B_2 = \{(1, 2, 3), (1, -1, 1), (2, 1, 1)\}$. 5

OR

Que.8 (a) Let a linear map $T : V_3 \to V_2$ be defined by $T(x, y, z) = (x + y, y + z)$. Find $(T : B_1, B_2)$, where $B_1 = \{(1, 1, 2/3), (-1, 2, -1), (2, 3, 1/2)\}$; $B_2 = \{(1, 3), (1/2, 1)\}$. 5

(b) Let $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ -1 & 3 \end{bmatrix}$. Determine a linear map $T : V_2 \to V_3$ such that $A = (T : B_1, B_2)$,where B_1 and B_2 are standard bases for V_2 and V_3 respectively . 3

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SEAT No._____ No. of Printed Pages : 02

[92/A-51]

SARDAR PATEL UNIVERSITY

B.Sc. (*SEMESTER – IV*) EXAMINATION-2017

Thursday, April 13, 2017

2.00 p.m. to 5.00 p.m.

US04CMTH02(Differential Equations)

Maximum Marks: 70

Q.1 Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

(1) One solution of $\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$ is.....
(a) $x^2 + y^2 = c$ (b) $y^2 - z^2 = c$ (c) $x^2 + z^2 = c$ (d) $xyz = c$

(2) Integral curves of $2xdx = dy = 2zdz$ is given by....
(a) $x^2 + y = c_1,\ y - z^2 = c_2$ (b) $x^2 + y = c_1,\ y + z^2 = c_2$
(c) $x^2 - y = c_1,\ y - z^2 = c_2$ (d) $x^2 + y = c_1,\ y^2 + z = c_2$

(3) If $\overline{X}$ is a vector and $\overline{X} \cdot curl\overline{X} = 0$, then for an arbitrary function μ of x, y, z
(a) $(\mu\overline{X}) \cdot curl(\mu\overline{X}) = 0$ (b) $(\mu\overline{X}) \cdot curl(\mu\overline{X}) = 1$ (c) $(\mu\overline{X}) \cdot curl(\mu\overline{X}) = -1$ (d) None of these

(4) The general solution of $p - 2q = 4$ is....., where F is an arbitrary function.
(a) $F(y + 2z,\ x - 2y) = 0$ (b) $F(y + 2z,\ x + 2y) = 0$
(c) $F(2x + y,\ 4x - z) = 0$ (d) $F(2y - z,\ 4x - z) = 0$

(5) Eliminating the arbitrary constants a and b from $z = (x + a)(y + b)$, we get
(a) $p + q = 1$ (b) $p + q = z$ (c) $pq = z$ (d) $pq = 1$

(6) Partial differential equation for $z = f(x - y)$ is.....
(a) $p - q = z$ (b) $p - q = 0$ (c) $p + q = 0$ (d) $p^2 + q = 0$

(7) Degree of the partial differential equation $\left(\frac{\partial^2 z}{\partial x^2}\right)^{\frac{2}{3}} - x^3\left(\frac{\partial z}{\partial y}\right)^{\frac{1}{3}} = 0$ is
(a) 2/3 (b) 4/3 (c) 2 (d) 4

(8) Which of the following is a linear partial differential equation?
(a) $p + q = pq$ (b) $pq = 1$ (c) $p - x^2q = 2z$ (d) $2p^2 = q$

(9) In Charpit's method, equation involving only p and q, the Charpit's equation is of the form
(a) $\frac{dp}{x} = \frac{dq}{y}$ (b) $\frac{dp}{0} = \frac{dq}{0}$ (c) $\frac{dp}{f_x} = \frac{dq}{f_y}$ (d) $\frac{dx}{0} = \frac{dy}{0}$

(10) A particular integral of the equation $(D^2 + 4DD' + 3D'^2)z = e^{x+3y}$ is....
(a) $\frac{1}{27}e^{x+3y}$ (b) $\frac{1}{13}e^{x+3y}$ (c) $\frac{1}{24}e^{x+3y}$ (d) $\frac{1}{40}e^{x+3y}$

Q.2 Attempt any Ten: [20]

(1) Find the integral curves of the equations $\frac{dx}{y^2} = \frac{dy}{x^2} = \frac{dz}{x^2y^2z^2}$.

(2) Define Orthogonal trajectories of a system of curves on a surface.

(3) Solve: $\frac{dx}{1+x} = \frac{dy}{1+y} = \frac{dz}{z}$.

(4) Is $(x^2 + yz)dx + (x + z)dy + xydz = 0$ integrable? Justify!

(5) Obtain partial differential equation of $z = ax^3 + by^3$ by eliminating arbitrary constants a and b.

(6) Eliminate the arbitrary function f from $z = x + y + f(xy)$.

(7) Find the general solution of the equation $xp + yq = 4z$.

(8) Show that the equations $f(x, y, p, q) = 0$ and $g(x, y, p, q) = 0$ are compatible if $\frac{\partial(f,g)}{\partial(x,p)} + \frac{\partial(f,g)}{\partial(y,q)} = 0$.

(9) Find the differential equation of the suface which is orthogonal to the system of surfaces $z = xy(x^2 + y^2)$.

(10) Solve: $(pq^2)(z - xp - yq) = 1$.

(11) Show that the equation $xp - yq = x$ and the equation $x^2p + q = xz$ are compatible.

(12) Solve: $\dfrac{\partial^2 z}{\partial x^2} - a^2 \dfrac{\partial^2 z}{\partial y^2} = 0.$

Q.3

(a) Solve $\frac{dx}{y^3x-2x^4} = \frac{dy}{2y^4-x^3y} = \frac{dz}{2z(x^3-y^3)}$. [05]

(b) Find the equation of system of curves on the cylinder $2y = x^2$ orthogonal to its intersection with the hyperboloids of the one parameter system $xy = z + c$. [05]

OR

Q.3

(c) Solve $\frac{dx}{x+z} = \frac{dy}{y} = \frac{dz}{z+y^2}$. [05]

(d) Find the orthogonal trajectories on the conicoid $(x + y)z = 1$ of the conics in which it is cut by the system of planes $x - y + z = k$, where k is parameter. [05]

Q.4

(a) Prove that a necessary and sufficient condition that the Pfaffian differential equation $\bar{X} \cdot d\bar{r} = 0$ should be integrable is that $\bar{X} \cdot \operatorname{curl} \bar{X} = 0$. [06]

(b) Solve: $y^2p - xyq = x(z - 2y)$. [04]

OR

Q.4

(c) Determine whether the pfaffian differential equation $(x^2z - y^3)dx + 3xy^2dy + x^3dz = 0$ is integrable or not. Find its premitive if it is integrable. [05]

(d) Solve: $px(z - 2y^2) = (z - qy)(z - y^2 - 2x^3)$. [05]

Q.5

(a) Find the surface which is orthogonal to one parameter system $z = cxy(x^2+y^2)$ which passes through the hyperbola $x^2 - y^2 = a^2,\ z = 0$. [05]

(b) Find the integral surface for the linear partial differential equation $x(y^2+z)p-y(x^2+z)q = (x^2-y^2)z$ which passes through the straight line $x + y = 0,\ z = 1$. [05]

OR

Q.5

(c) Find the integral surface for the linear partial differential equation $(x-y)y^2p+(y-x)x^2q = (x^2+y^2)z$ passes through the curve $xz = a^3,\ y = 0$. [05]

(d) Show that the complete integral $z^2 + \mu = 2(1 + \lambda^{-1})(x + \lambda y)$ of the p.d.e. $z = \frac{1}{p} + \frac{1}{q}$ is the envelope of one parameter subsystem obtained by taking $b = \frac{-a}{\lambda} - \frac{\mu}{1+\lambda}$ in the complete integral $z = \sqrt{2x + a} + \sqrt{2y + b}$. [05]

Q.6

(a) Show that the equations $xp - yq = x$ and $x^2p + q = xz$ are compatible and solve them. [05]

(b) Find complete integral of $z = p^2 - q^2$. [05]

OR

Q.6

(c) Find complete integral of $pqxy = z^2$. [06]

(d) Find the particular integral of the equation $(D^2 - D')z = 2y - x^2$. [04]

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SEAT No._____

[84/A-30]

SARDAR PATEL UNIVERSITY
S.Y. B.Sc, 4th Semester
Monday, 10th April 2017
Session: Evening, Time: 02:00 to 05:00 PM
Subject Code: (PHYSICS) US04CPHY01
Subject Title: Electromagnetic theory and spectroscopy.

Total Marks: 70

Que: 1 **Write correct answer for each of the following MCQs.** [10]

1 The electric field is strong where the field lines are _____ together.
   a) apart b) closed
   c) positive d) negative

2 The electric field **E** is a negative gradient of _____.
   a) F **b) V**
   c) K **d) ϕ**

3 Generally directions of electric field and magnetic fields are _____.
   a) uniform b) parallel
   c) perpendicular d) None

4 The electric field _____ away from a positive charge.
   a) curls b) divergence
   c) gradient d) none

5 The magnetic monopole term is always _____.
   a) Infinite b) Positive
   c) Zero d) none

6 The line spectra is produced when the emitting element is in the _____State.
   a) molecular b) Atomic
   c) Both d) none

7 Which of the following quantum number determined the shape of the orbit?
   a) Orbital b) Principal
   c) Orbital-magnetic d) none

8 Band spectra are also Known as _____ spectra.
   a) line b) atomic
   c) molecular d) absorption

9 The Bragg's law is _____.
   a) $n\lambda=2d\sin\theta$ b) $n\sin\lambda=2d\theta$
   c) $\sin\theta= 2d\, n\lambda$ d) none

10 X ray was invented by _____.
   a) Daune Hunt b) Moseley's
   c) Auger d) Rontgen

1

Que 2	**Write answers of any ten questions in brief.**		**[20]**
	1	Define: Gradient, Divergence and Curl.	
	2	Deduce : $\mathbf{E}=-\nabla V$	
	3	How much work will have to do in moving a charge from point a to point b?	
	4	Explain Lorent'z force law.	
	5	Prove that work done by magnetic force is zero.	
	6	Write applications of Ampere's law.	
	7	Explain space quantisation.	
	8	Which type of coupling scheme is called j-j coupling?	
	9	What is luminescent and incandescent?	
	10	Compare X rays with ordinary light.	
	11	Write any four properties of X rays.	
	12	Write about : "auger electrons"	
Que 3	**[A]**	Give the statement of Gauss's law and deduce Gauss's law in differential and integral form.	**[06]**
	[B]	Describe divergence of **E**.	**[04]**
		OR	
Que 3	**[C]**	Derive the expression for the energy of a point charge distribution.	**[06]**
	[D]	Define electric potential and comment on it. And deduce electric potential of a localised charge distribution.	**[04]**
Que 4	**[A]**	Explain line, surface and volume current density. Also obtain continuity equation.	**[06]**
	[B]	Discuss divergence and curl of **B** by using Biot-Sawart law.	**[04]**
		OR	
Que 4	**[C]**	Calculate magnetic field of a pure dipole by using multipole expansion of the vector potential.	**[06]**
	[D]	Compare magneto static and electrostatic.	**[04]**
Que 5	**[A]**	Explain types of spectra.	**[07]**
	[B]	What is wave number?	**[03]**
		OR	
Que 5	**[C]**	Give classical interpretation of normal Zeeman effect.	**[05]**
	[D]	Explain resolution of spectral lines in an applied electric field by Stark effect.	**[05]**
Que 6	**[A]**	Explain continuous X ray spectrum and deduce Daune Hunt law. Also explain characteristic emission spectrum of X ray with diagram	**[10]**
		OR	
Que 6	**[B]**	State and explain Moseley's law with applications. Also explain in detail the Fluorescence yield.	**[10]**

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(A-42) Seat No.:_____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

Fourth Semester B.Sc. EXAMINATION (NC)

(Under CBCS) June 2010 Batch

Thursday, 16th March-2017

Time: 2:00 to 5:00 pm

PHYSICS – US04CPHY01

Optics, Spectroscopy, Electrostatics & Magnetism

N.B: Figures on the right indicate maximum marks. **Total Marks: 70**

Q.1 **Answer the following MCQ by choosing correct option.** **(10)**

1 The phenomenon in which vibrations of electric field vector of light are confined to one direction is known as _____.

(a) Polarization (b) Reflection
(c) Diffraction (d) refraction

2 _____is a positive crystal.

(a) Calcite (b) lead
(C) Sodium (d) Quartz

3 The phase difference between the components of elliptically polarized light is _____.

(a) 0 (b) Π
(C) Π/2 (d) Π/4

4 The half wave plate introduces the path difference of _____ between extra ordinary and ordinary ray.

(a) λ/4 (b) 3λ/4
(C) λ (d) λ/2

5 In electromagnetic spectrum, the region of ultra-violet is lying between __& ___ regions respectively.

(a) X-rays, Visible (b) IR, Microwave
(C) Visible, Infrared (d) Microwave, Radiowave

6 Molecular spectra are also known as _____.

(a) Atomic (b) line
(C) Band (d) X-rays

7 The splitting of energy level of an atom when it is placed in electric field is known as _____.

(a) Zeeman effect (b) Stark effect
(c) Raman effect (d) None of these

8 Electric lines of force about a negative point charge are _____.

(a) Radial, inwards (b) Circular, clockwise
(C) Circular, anticlockwise (d) Radial, outwards

9 The divergence of magnetic field B is _____.

(a) -1 (b) infinity
(C) Zero (d) 1

10 The material which gets repelled when the magnetic field is applied, is known as _____ material.

(a) Ferromagnetic (b) Diamagnetic
(c) Paramagnetic (d) None of these

(P.T.O.)

(1)

Q.2		**Give short answers to the following questions. (Attempt any Six)**	(12)
	1	Distinguish between polarized and unpolarized light.	
	2	What are wave plates?	
	3	Classify various types of spectra.	
	4	Write any two properties of X-rays.	
	5	Define: Electric potential.	
	6	What is a Non-rigid rotator?	
	7	State Coulomb's law and give the expression for Coulomb's force.	
	8	Write expressions for the magnetic force exerted on charge Q in magnetic field and total force on charge Q in presence of both electric and magnetic fields.	
Q.3	(a)	What is double refraction? State the properties if e-ray and o-ray.	[04]
	(b)	Explain the polarization by reflection through the transparent medium.	[04]
		OR	
Q.3	(a)	Describe the construction and working of Nicol prism.	[04]
	(b)	State the Brewster's law and show that when light is incident at polarizing angle, reflected and refracted lights are perpendicular to each other.	[04]
Q.4	(a)	Explain the theory of superposition of waves which are linearly polarized at right angles.	[05]
	(b)	Explain the detection of elliptically polarized light.	[03]
		OR	
Q.4	(a)	Discuss the experimental arrangement for production and detection of circularly polarized light.	[05]
	(b)	Write a note on half wave plates?	[03]
Q.5	(a)	What is Zeeman effect? Explain anomalous Zeeman effect.	[05]
	(b)	Write a note on L-S coupling scheme.	[03]
		OR	
Q.5	(a)	With necessary diagram explain the Coolidge tube method for production of X-rays.	[05]
	(b)	State the applications of X-rays.	[03]
Q.6	(a)	What are rotational spectra? Explain isotope effect in it.	[04]
	(b)	Explain isotope effect in rotational spectra.	[04]
		OR	
Q.6	(a)	What is Raman effect? Explain its salient features.	[04]
	(b)	Derive an expression for rotational energy of a rigid rotator.	[04]
Q.7	(a)	State and explain Gauss's law in differential form.	[05]
	(b)	Using Gauss's law in differential form, obtain Poisson's equation and Laplace equation.	[03]
		OR	
Q.7	(a)	Define electric potential and obtain the relation $\vec{E} = -\vec{\nabla}V$.	[05]
	(b)	Prove that potential obeys the superposition principle.	[03]
Q.8	(a)	Discuss divergence and curl of magnetic field using Biot-Savart law.	[05]
	(b)	Write a note on ferromagnetic materials.	[03]
		OR	
Q.8	(a)	Obtain an expression for torque on a rectangular current loop in a uniform field $\vec{B}$.	[05]
	(b)	Give the difference between diamagnetic and paramagnetic materials.	[03]

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(A-95) Seat No.: _____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

B.Sc. EXAMINATION (IV-Semester) (NC)

Saturday, 18th March 2017

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

Subject: PHYSICS

Course: US04CPHY02

Classical, Quantum and Nuclear Physics

Total Marks:70

N.B: (i) All the symbol have their usual meanings
(ii) Figures at the right side of questions indicate full marks

Q-1 Multiple Choice Questions (Attempt All) **(10)**

(1) The gravitational force between two masses is _____
(a) repulsive (b) attractive
(c) infinity (d) zero

(2) The potential due to dipole falls off as _____
(a) $1/r^3$ (b) $1/r$
(c) r^2 (d) $1/r^2$

(3) At the turning point in an arbitrary potential field the radial velocity is ___
(a) 0 (b) ∞
(c) 1 (d) 0.5

(4) The angular momentum is _____ in a central force field
(a) conserved (b) not conserved
(c) zero (d) infinity

(5) The Non-normalized wave function must have _____ norm
(a) finite (b) infinite
(c) complex (d) zero

(6) _____ theorem convert volume integral in to surface integral
(a) Green's theorem (b) Stoke's theorem
(c) Gauss' theorem (d) Eherenfest's theorem

(7) The limit of a region-I for a square well potential is _____
(a) $-\infty < x < 0$ (b) $a < x < \infty$
(c) $-a < x < a$ (d) $-\infty < x < -a$

(8) The nuclei of nitrogen atoms emit _____ when bombarded with α- particles from radium C
(a) electron (b) positron
(c) neutron (d) proton

(9) _____ is not a charged particle
(a) electron (b) proton
(c) neutron (d) positron

(10) Artificial radioactive was discovered by _____ and _____
(a) Rutherford and Chadwick (b) Curie and Joliot
(c) Aston and Dempster (d) Bohr and Pauli

Q-2 Short Questions (Attempt any Six) **(12)**

(1) State the Newton's law of gravitation
(2) Define electric dipole
(3) Define elliptical orbit
(4) What you mean by $|\Psi|^2$

(5) Define stationary states of the wave function
(6) Define square well potential
(7) What is Q-value?
(8) What is positron?

Q-3 Derive the expressions for gravitational and electrostatic fields and potentials (8)

OR

Q-3 Derive the Gauss' law for electrostatic fields. Also find the expression of Laplace equation using Gauss' law. (8)

Q-4 (a) Derive the equation of motion of equivalent one body (5)
(b) Derive the polar equation of elliptical orbit (3)

OR

Q-4 (a) Discuss the motion of a particle in a central force field (5)
(b) State and prove the Kepler's third law of planetary motion (3)

Q-5 (a) Derive the one dimensional Schrodinger equation for a free particle (5)
(b) Discuss the concept of matter wave and show the experimental agreement (3)

OR

Q-5 (a) Discuss the Non-normalized wave function and box normalization (5)
(b) Discuss the Heisenberg's uncertainty principle (3)

Q-6 (a) Discuss the expectation values of the variable and prove the Ehrenfest's theorem (5)
(b) Describe the stationary states and energy spectra of the quantum mechanical system (3)

OR

Q-6 (a) Derive the time independent Schrodinger equation and explain their physical significance (5)
(b) Draw the diagram of energy eigen function for a particle in a square well potential (3)

Q-7 (a) Describe the Q-value of nuclear reaction and applying the conservation laws derive the expression of threshold energy (5)
(b) Describe transmutation by deuterons (3)

OR

Q-7 (a) Discuss the alpha-neutron reaction with necessary expressions (5)
(b) Describe transmutation by neutrons (3)

Q-8 (a) Discuss the method of measurement of velocity and energy of α-particle with schematic diagram of the deflection chamber (5)
(b) Write note on transuranium elements (3)

OR

Q-8 (a) Discuss the method of measurement of range, ionization and stopping power with proper diagram of an apparatus (5)
(b) Discuss about the discovery of artificial radioactivity (3)

— X —

SEAT No._____ SARDAR PATEL UNIVERSITY No. of Printed Pages : 3

B.Sc. EXAMINATION (SEMESTER: IV)

[63/A-32]

2017

April, 18th, 2017.

Tuesday

Subject: Probability Distributions

Subject code: USO4CSTA02

Time: 02.00 p.m. to 05.00 p.m. **Marks: 70**

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

(1) For a binomial distribution with n = 7 and p = 0.50, we get ------

(a) P(X = 5) < P(X = 2) (b) P(X = 5) > P(X = 2)

(c) P(X = 5) = P(X = 2) (d) P(X = 5) ≠ P(X = 2)

(2) The recurrence relation for the probability of geometric distribution with parameter p is f(x + 1) = --------.

(a) q.f(x) (b) p . f(x) (c) f(x) + p (d) none

(3) If $M_X(t) = e^{25t(1+2t)}$ is the m.g.f. of a continuous random variable X then mean and standard deviation of X is --------- and --------..

(a) 25 and 10 (b) 25 and 100 (c) 25 and 50 (d) none

(4) If $M_X(t) = (1-5t)^{-1}$, $t \neq 0$, is the m.g.f. of a random variable X then X follows -------- distribution

(a) normal (b) exponential (c) continuous uniform (d) none

(5) If $f(x) = kx^2$, $0 < x < 1$. and zero , otherwise ; is the p.d.f. of X then k = ----------.

(a) 2 (b) 3 (c) 4 (d) 5

(6) If $X \sim b(n,p)$ distribution then as $n \to \infty$ $\frac{X-np}{\sqrt{npq}}$ follows approximately---------- distribution.

(a) binomial (b) Poisson (c) standard normal (d) none

(7) If X_1 and X_2 are two independent exponential variate with mean θ each, then $Y = X_1 + X_2 \sim$ --------- distribution.

(a) G(2,θ) (b) G(2,2θ) (c) G(1,θ) (d) none

(8) If X_1 and X_2 are two independent N(2,5) and N(3,4) distributions respectively then the distribution of $Y = X_1 + X_2$ follows ---------- distribution.

(a) N(5,8) (b) N(5,10) (c) N(5,9) (d) none

(9) If $X_i \sim NID(\mu, \sigma^2)$ distribution for i = 1,2,..... 25 then $\bar{X} \sim$ ---------- distribution

(a) $N(\mu, 25\sigma^2)$ (b) $N(25\mu, 25\sigma^2)$ (c) $N(\mu, \frac{\sigma^2}{25})$ (d) none

(10) If $S^2 = \frac{1}{n}\sum_1^n (X_i - \bar{X})^2$ is the sample variance of a random sample from $N(\mu, \sigma^2)$ then $\frac{(n-1)S^2}{\sigma^2} \sim$ --------- distribution.

(a) $\chi^2_{(n)}$ (b) $\chi^2_{(n-1)}$ (c) $\chi^2_{(1)}$ (d) none

2 **Short Questions (Attempt any TEN)** **[20]**

(1) Define Hyper geometric distribution. State its mean and variance.

(2) Define Poisson distribution. State its mean, variance and its p.g.f.

Show that the recurrence relation is given by $f(x+1) = \frac{\lambda}{x+1} f(x)$.

(3) If $P(t) = (\frac{2}{3} + \frac{1}{3}t)^9$ is the p.g.f. of a random variable X then identify the distribution of X and state its mean, variance p.m.f. and m.g.f.

(4) If $X \sim N(50, 36)$ distribution then find (i) $P(32 \leq X \leq 62)$ and $P(|X - 50| < 6)$.

(5) If $f(x) = kx(1 - x)$, $0 < x < 1$ and zero otherwise, is the p.d.f of X then find k and identify the distribution and $P(X < 0.50)$.

(6) If $f(x) = k e^{-3x}$, $0 < x < \infty$ and zero otherwise then find k and c.d.f. of X. Name the distribution of X.

(7) If X follows continuous uniform distribution with mean 3 and variance 3, find $P(X > 0)$ and $P(X < 1)$.

(8) If X and Y are independent random variables and X and Y follows Poisson distribution respectively P(5) and P(3). Find the distribution of $Z = X + Y$. Write the p.m.f. of X and find $P(X < 4)$ and $P(X > 5)$.

(9) If $X \sim b(64, 1/2)$ then find $P(X = 36)$ and $P(28 < X < 44)$. State the result you used.

(10) Define F – distribution. Write the p.d.f. of $F_{(2,2)}$ distribution.

(11) Define Chi square distribution. State it's mean , variance and m.g.f.

(12) If $X \sim N(0, 1)$ distribution then state the distribution of X^2 and hence find $P(X^2 > 3.841)$ and $P(X^2 < 6.635)$.

3 (a) Define Negative binomial distribution. State its mean and variance. If a random variable X follows a negative binomial distribution with mean = 12 and variance = 36 then find the p.m.f. of X and also the $P(X = 0)$ and $P(X \geq 1)$. **[5]**

(b) Define discrete uniform distribution. Find its mean and variance. **[5]**

OR

3 (a) Define a Poisson Distribution. State its mean, variance and m.g.f. **[5]**

A car hire firm has two cars, which he hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which (i) neither car is used, and (ii) the proportion of days on which some demand is refused.

(b) If $P(t) = (\frac{2}{5} + \frac{3}{5} e^t)^{10}$ is the m.g.f. of a random variable X then identify the distribution of X and find it's mean, variance . Also find $P(X = 0)$ and $P(X \geq 2)$. **[5]**

4 (a) Define normal distribution. Obtain its m.g.f. and hence or otherwise find its mean and variance. **[5]**

(b) If $f(x) = 30x^2(1 - x)^2$, $0 < x < 1$; **[5]**
$= 0$, elsewhere
then identify the distribution of X. Find it's mean, harmonic mean and variance

OR

4 (a) If $f(x) = \frac{1}{2a}$, $-a < x < a$ **[5]**
$= 0$, otherwise . Find the m.g.f. of X. Also prove that all the odd order moments are zero. Find an expression for even order moments

(b) Define an exponential distribution and, then for every constant $a > 0$, prove that $P[X \leq x + a / X \geq a] = P[X \leq x]$ for all x. **[5]**

5 (a) If $X_1, X_2, \ldots X_n$ are independent random variables with m.g.f.s. $Mx_1(t)$, $Mx_2(t)$,..... $Mx_n(t)$ then prove that the m.g.f. of $Y = \sum_1^n X_i$ is given by $My(t) = \prod_1^n Mx_i(t)$. **[5]**

(b) $X \sim b(11, 0.35)$ and $Y \sim b(5, 0.35)$. If X and Y are independent, Find the distribution **[5]**

of $Z = X + Y$ Find (i) $P(X+Y = 6)$, (ii) $P(3 < X+Y \leq 8)$.

OR

5 **(a)** If X_1, X_2 are independent random variables with N(0,25) and N(0,144) then find the distribution of $Y = X_1 - X_2$. Also state its p.d.f. mean and variance of Y. Also find $P(Y< 21)$ and $P(|Y|> 21)$. **[5]**

(b) X follows Poisson distribution with parameter 100 then find $P(X =120)$ and $P(120 \leq X \leq 130)$. State the result you use. **[5]**

6 **(a)** Define Student's t distribution. X is distributed like Students t with 15 d.f. Find (i) $P(0.536 < x < 1.341)$, (ii) $P(|x| > 1.07)$, (iii) $P(X^2 > 4.54)$, (iv) c such $P(|x| < c) = 0.60$ **[5]**

(b) If $X_1, X_2, \ldots\ldots X_n$ denote a random sample of size n from a population having mean μ and variance σ^2. If $\bar{X} = \frac{1}{n}\sum_1^n X_i$ and $S^2 = \frac{1}{n}\sum_1^n (X_i - \bar{X})^2$ and $S'^2 = \frac{1}{n-1}\sum_1^n (X_i - \bar{X})^2$. Obtain $E(S^2)$ and $E(S'^2)$ **[5]**

OR

6 **(a)** Define F distribution on (r_1, r_2) degrees of freedom. If $X \sim F_{(2,r)}$ distribution, $r \geq 2$ then prove that $P(X \geq k) = (1 + \frac{2k}{r})^{-\frac{r}{2}}$ **[5]**

(b) A random sample of size n = 36 is to be taken from N(15,144) distribution. Find $P(13 \leq \bar{X} \leq 17)$ and $P(\bar{X} \leq 19)$. Also state $E(\bar{X})$, $E(\bar{X} + 5)$, and $V(\bar{X})$, $V(\bar{X} - 2)$, State the result you use clearly. **[5]**

**********@@@@@@@@@@@@@@@@@@@@@@@@**********

SEAT No._____ No. of Printed Pages: 02

[93/A-52]

SARDAR PATEL UNIVERSITY

S. Y. B. Sc. (FOURTH SEMESTER) EXAMINATION

2017

THURSDAY, 13th APRIL

Time: 02.00 p.m. to 05.00 p.m.

US04CZOO01 (ZOOLOGY)

(INVERTEBRATE, VERTEBRATE AND ANIMAL BEHAVIOUR)

Note: 1. Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.

2. Figures to the right indicate the full marks of sub question

3. Draw neat and labelled diagrams wherever necessary

Maximum Marks: 70

Q. 1. Multiple choice questions **(10)**

1. In *Hirudinaria* there is no special organ for _____.
   a. Reproduction b. Excretion c. Digestion d. Respiration
2. Spongin type of mouthparts is found in _____.
   a. Butterfly b. Cockroach c. Honeybee d. Housefly
3. Eyes of prawn are made up of a large number of independent visual units called _____.
   a. Retina b. Ommatidia c. Cornea d. Rhabdomes
4. The inner lip of mouth of *Pila* is also called _____ lip.
   a. Suture b. Collumellar c. Unilocular d. Varices
5. Each abdominal segment of prawn carries a pair of jointed appendages called _____.
   a. Uropod b. Maxillae c. Mandible d. Pleopod
6. Poison glands of snake are modified from _____.
   a. Mandibular gland b. Parotid gland c. Labral gland d. Sublingual gland
7. The common name of *Calotes* is _____
   a. Wall lizard b. Garden lizard c. Monitor lizard d. House lizard
8. Barrel shaped larva is _____ larva of Echinodermata.
   a. Bipinnaria b. Ophipluteus c. Doliolaria d. None of these
9. When pheromone helps to receiver it is called_____.
   a. Kairomone b. Gemone c. Hormone d. Allomone
10. Induced orientation of plants in response to external stimuli is called _____.
    a. Motivation b. Reflexes c. Tropism d. Navigation

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

1. Describe suckers of Leech.
2. Name the layers of body wall of Leech
3. Enlist the insect products useful for humans with name of insect
4. Draw a neat and labelled diagram of shell of *Pila*
5. Write about sexual dimorphism of Prawn
6. Describe Radula of *Pila*
7. Write about Bipinnaria larva of class Asteroidea
8. State location and function of cloaca in *Calotes*
9. What is antivenin?
10. Give difference between hormone and pheromone
11. Define kinesis. Enlist different types of kinesis.
12. Explain Habituation with example.

Q. 3. Describe the digestive system of Leech in detail with physiology of digestion **(10)**

OR

Q. 3. **a.** Write a short note on: Types of mouthparts in insects **(06)**

b. Write briefly about household insects and their control **(04)**

Q. 4. **a.** Describe the nervous system of Prawn with diagram. **(06)**

b. Write a short note on any two sense organs of *Pila* **(04)**

OR

Q. 4. **a.** Write in detail about Pila respiratory system **(06)**

b. Describe cephalic appendages of Prawn **(04)**

Q. 5. **a.** Give a brief account on poisonous apparatus in snakes with biting mechanism **(06)**

b. Write a short note on locomotion in snakes **(04)**

OR

Q. 5. Describe the external features of *Calotes versicolor* with diagram **(10)**

Q. 6. **a.** Write the mode of action of Pheromone **(06)**

b. Write a note on Insight learning with suitable example **(04)**

OR

Q. 6. **a.** Describe conditional reflex demonstrated by Pavlov's experiment **(06)**

b. Write a short note on types of Pheromone **(04)**

SEAT No._____ No. of Printed Pages : 2

[74/A-32]

Sardar Patel University

B. Sc. Semester IV Examination 2017

Physiology, Economic Zoology, Toxicology and Wild Life

US04CZOO02

15th April, 2017, Saturday

2:00 pm to 5:00 pm

Total Marks: 70

QI Multiple Choice Questions. **[10]**

1. Implantation of embryo occurs at _____stage.
   a. Trophoblast b. Cytotrophoblast
   c. Blastocyst d. None
2. Ovaries secrete _____hormone/s.
   a. Progesterone b. Estrogen
   c. Inhibin d. All of these
3. Pre ovulatory phase lasts from _____days in 28 day cycle.
   a. 1 to 5 b. 6 to 13
   c. 14 to 16 d. 15 to 28
4. _____ is a secondary lymphatic organ.
   a. Spleen b. Thymus
   c. Both d. None
5. Both T and B cells of the immune system are produced in _____.
   a. Thymus b. Bone marrow
   c. Lymph nodes d. Spleen
6. Antibodies are produced by _____.
   a. T cells b. B cells
   c. Dendritic cells d. Macrophage
7. _____ is a heavy metal.
   a. Lead b. Calcium
   c. Magnesium d. Manganese
8. _____ species is used for sericulture industry.
   a. *Bombyx mori* b. *Tachardia lacca*
   c. *Apis indica* d. None of these
9. Wild Ass sanctuary is located in _____ district of Gujarat.
   a. Anand b. Panchmahal
   c. Kutch d. Junagadh
10. Project Tiger was launched in India in _____.
    a. 1975 b. 1990
    c. 1973 d. 1978

ID T /

Q - II Answer the following in short. (Attempt any Ten) **[20]**

1. Give the location and functions of testis.
2. Sketch and label human sperm.
3. What is menopause?
4. What is inflammation? Name the stages.
5. Differentiate between immunogenicity and reactivity.
6. Write the chemical nature of antigens.
7. Give the chemical composition of honey.
8. Give the economic importance of silk.
9. Enlist various groups of pesticides.
10. Give the names and location of any two wild life sanctuaries of Gujarat.
11. Differentiate between wild life sanctuaries and national parks.
12. What is Red Data Book?

QIII a. Write a note on uterus. **[05]**

b. Describe the process of spermatogenesis. **[05]**

OR

QIII Describe the phases of female reproductive cycle. **[10]**

QIV Write notes on: a) Spleen **[05]**

b) Lymph nodes **[05]**

OR

QIV a. Describe the pathways of antigen processing. **[05]**

b. Discuss the process of cell mediated immunity in detail. **[05]**

QV a. Write a note on: Methods of bee keeping. **[06]**

b. Give composition and properties of Lac. **[04]**

OR

QV a. Give an account on hazards caused due to automobile emissions. **[05]**

b. Write a note on pesticides. **[05]**

QVI Describe the methods of wild life conservation in detail. **[10]**

OR

QVI Give an account on vanishing of wild life in India. **[10]**

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SEAT No._____ No. of Printed Pages: 3

[45/A-25]

SARDAR PATEL UNIVERSITY

B.Sc. (SEM-4) EXAMINATION-2017

US04EBCH01-FUNDAMENTALS OF BIOCHEMISTRY AND INSTRUMENTATION

19-04-2017 TIME-2-00PM TO 4-00PM

WEDNESDAY TOTAL MARKS-70

QUE-1MULTIPLE CHOICE QUESTIONS: (10)

(a)Citric acid cycle belongs to which type of process?

(i)Catabolic (ii) Anabolic (iii) Osmotic (iv)Amphibolic

(b)Which one of the following enters into mitochondrial matrix:

(i)Acyl coA (ii)Acetyl coA (iii)Malonyl coA (iv)None of these

(c)Which one of the following obey chargaff's rule?

(i)RNA (ii) Protein (iii) Lipid (iv) DNA

(d) Which one of the following is most stable form of DNA?

(i)A DNA (ii)B DNA (iii)Z DNA (iv)All of these

(e)Which of the following element is absent DNA?

(i) C (ii) H (iii) N (iv) S

(f)E.C-3.X.Y.Z is an example for the class of enzyme namely:

(i)Hydrolases (ii) Transferases (iii) Isomerases (iv) Ligases

(g)The non protein part of the conjugated enzyme known as:

(i) Coenzyme (ii)apoenzyme(iii)Holoenzyme(iv)None of these

(h)Which factor is affecting enzyme catalyzed reaction?

(i)Temperature (ii) PH (iii) Inhibitors (iv)All of these

(i)Tungsten filament lamp in colorimeteric analysis is an example of :

(i)Radiant energy source (ii) Detector (iii)filter (iv) None of these

(j)Which one of the followings is part of electrophoresis?

(i)Buffer (ii) Gel (iii) Power pack (iv)All of these

QUE-2 SHORT QUESTIONS (ANSWER ANY TEN) **(20)**

(a)What is metabolism?

(b)What is energy coupling reaction?

(c) What is feedback mechanism?

(d)Write nucleotides of DNA.

(e)Give examples of ω-3 and ω-6 fatty acids.

(f)Draw structure of any nitrogen base?

(g)Define-activation energy

(h)Write in brief on isoenzymes.

(i)Define-zymogens

(j)List factors affecting electrophoretic mobility.

(k)What is electromagnetic spectrum?

(l)State Lambert's law.

QUE-3 Discuss:

(a)Central role of ATP in metabolism. (05)

(b) Role of acetyl co-A as the central molecule in metabolism. (05)

OR

QUE-3Discuss:

(a)Living organisms are never at equilibrium with their surroundings. (05)

(b)Organisms transform energy and matter from their surroundings. (05)

QUE-4 Write notes on-(a)Types of RNA (05)

(b)Simple lipid (05)

OR

Que-4 Explain following -(a)Harshey and Chase experiment (05)

(b)Avery-Macleod-McCarty experiment (05)

QUE-5Write notes on-(a) Mechanism of enzyme action (05)

(b)IUB system of enzyme classification (05)

OR

QUE-5 Derive Michaelis-Menten equation (10)

QUE-6 Write principle, instrumentation and applications of colorimeter. (10)

OR

QUE-6 what is detector? List the names and write in detail about PMT. (10)

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SEAT No._____

No. of Printed Pages : 02

[81/A44] **SARDAR PATEL UNIVERSITY ANAND**

Examination April, 2017

B. Sc-IV Semester (Fourth Semester)

US04EBIO 01- CELL AND MOLECULAR BIOLOGY

Thursday, 13th APRIL, 2017

Time: 2:00p.m. to 4:00 p.m.

Total Marks: 70

Q.1 **Fill in the blanks by choosing appropriate option.** **(10)**

(a) DNA synthesis occur during
(a)Interphase (b)Prophase (c)Metaphase (d) Anaphase

(b) Post mitotic gap period is …….. phase
(a)G1 (b)S (c) G2 (d)None of them

(c) Polytene chromosomes were discovered by
(a)Balbiani (b)W. Waldeyer (c)Blackburn (d)Greider

(d) The chromosomal end is known as……..
(a)Centomere (b)chromomere (c)Kinetochore (d) Telomere

(e) The speed of a centrifuge rotor is expressed as
(a) RPM (b) rcf (c) rpm (d) None of them

(f) Incomplete sediment is obtained in ----------centrifugation.
(i) Isopycnic centrifugation. (ii) Rate-zonal centrifugation. (iii)Differential centrifugation. (iv) None of them.

(g) ……is the stationary phase in Gas Liquid chromatography
(a)Gas (b) Liquid (c) Solid (d) All of them.

(h) First microscope was designated by ----------
(a)Knoll & Ruska (b)Watson & Crick (c)Jensen & Hans (d) Jacob & Monod.

(i) Source of electrons in Transmission Electron Microscopy is …… shaped tungsten filaments
(i)I (ii) v(iii) u (d) i

(j) ----------method is more versatile faster and have more reproducibility
(i) TLC (ii) HPLC (iii) GLC (iv) Paper.

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

(a) Define cell cycle
(b) Give an account of Amitosis.
(c) State the different between mitosis and meiosis
(d) Write a function of chromosomes.
(e) Sketch and label typical chromosomes.
(f) Enlist morphological types of chromosomes according to the position of the centrome.
(g) Enlist types of column chromatography.
(h) Give application of Gas Liquid chromatography.
(i) Define centrifuge force.
(j) Explain the principle of compound microscope.
(k) Write the application of SEM.
(l) What is magnification?

[P.T.O]

Q.3	(a)	Describe Prophase 1 of Meiosis.	(05)
	(b)	Write note on stages of mitosis	(05)
		OR	
Q.3	(a)	Write note on cell cycle.	(05)
	(b)	State the significance of cell division	(05)
Q.4	(a)	Write notes on (a) Polytene chromosome (b) Heterochromatin	(10)
		OR	
Q.4	(a)	Euchromatin	(05)
	(b)	What is sex chromosome? Describe its structure and types.	(05)
Q.5	(a)	Write a note on HPLC system.	(06)
	(b)	Write application and uses of Paper chromatography.	(04)
		OR	
Q.5	(a)	Differentiate between Rate zonal and Isopycnic centrifugation.	(05)
	(b)	Write difference between Differential Centrifugation and Density gradient centrifugation	(05)
Q.6	(a)	Give an account on TEM(Transmission Electron Microscopy)	(10)
		OR	
Q.6	(a)	Describe the principle and different parts of compound microscope and draw its pathway	(10)

— X —

[55/A-29]

SEAT No._____

No. of pages: 2

SARDAR PATEL UNIVERSITY
S.Y. B. Sc, 4th Semester
Monday, 17th April 2017
Session: Evening, Time: 02:00 to 04:00 PM
Subject Code: (BOTANY) US04EBOT01
Course Title: Plant Histology, Taxonomy, Physiology and Genetics
Max Marks: 70

Que: 1 Write correct answer for each of the following MCQs. [10]

1. Arenchyma is found in ----

   (a) Xerophyte (B) Sciophytes (c) Hydrophytes (d) Lithophytes

2. Parenchymatous cells which store ergastic substances------

   (a) Idioblast (B) Phragmoplast (c) conidioplast (d) None of these

3. Collenchyma is found in the stem and petiole of-----

   (a) Hydrophytes (B) Herbaceous climbers (c) xerophytes (d) Lianas

4. Many vegetable and pulses yielding plants belong to family----

   (a) Leguminosae (B) Myrtaceae (c) Meliaceae (d) None of these

5. Parietal placentation is found in--------family

   (a) Malvaceae (B) Brassicaceae (c) Asteraceae (d) None of these

6. Loss of water in the form of liquid through hydathodes is called-----

   (a) Transpiration (B) Respiration (c) Photosynthesis (d) Guttation

7. Assimilatory powers ($NADPH_2$ and ATP) are synthesized in-------

   (a) Light reaction (B) Dark reaction (c) Respiration (d) Guttation

8. Minerals are absorbed by the plants in the----------form

   (a) Ionic (B) Molecular (c) Solid (d) None of these

9. T.H. Morgan worked on------

   (a) Cucumber (B) Pea (c) Drosophila (d) None of these

10. The ratio of Monohybrid test cross is-----

   (a) 1 : 1 (B) 1 : 1 : 1 : 1 (c) 3 : 1 (d) None of these

Que2. Write answers of any ten questions in brief. [20]

1. Name the various types of sclereids.
2. List the types of thickenings in tracheary elements.
3. Write function of xylem.
4. Write the corolla of Fabaceae.
5. Define Aestivation.
6. Write the botanical name of any two plants belonging to Mimosaceae.
7. Define Long day plant.
8. What is dark reaction?
9. List the causes for dormancy.
10. What is linkage?
11. Why Mendel selected Pea plant? Give only two reasons.
12. What is back cross?

Que 3. [A] Write the types and function of collenchyma. [05]

[B] Describe the types of meristem based on their position. [05]

OR

[A] Explain structure of xylem. [07]

[B] Write a note on sieve tube elements. [03]

Que 4. Describe floral characters and economic importance of Lamiaceae family. [10]

OR

Que 4. Explain general characters and economic importance of Brassicaceae family. [10]

Que 5. [A] Explain role and deficiency symptoms of Zinc and Potassium. [06]

[B] Describe photo system II. [04]

OR

Que 5. [A] Describe methods of breaking of seed dormancy. [05]

[B] Explain mechanism of opening and closing of stomata. [05]

Que 6. [A] Explain dihybrid cross of mendel's experiment. [05]

[B] Describe law of segregation. [05]

OR

Que 6. [A] Explain dominant epistasis with suitable example. [06]

[B] Write a note on complete linkage. [04]

—X—

[58/A23] SEAT No._____ No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY

S.Y.B.Sc. EXAMINATION

15, April –2017

INDUSTRIAL CHEMISTRY

US04ECHE05

(Industrial Pollution, Its Control & Industrial Safety)

DATE : 15/04/2017 **TIME : 2.00 to 4.00**

Total Marks : 70

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

1 Use of leaded gasoline in internal combustion engine cause
(a) No pollution (b) More pollution
(c) Less pollution (d) More smoke emission.

2 _____ affects respiration and O_2 carrying capacity of blood when polluted air is inhaled.
(a) CO (b) CO_2 (c) NO (d) SO_2

3 Secondary pollution appear in air is due to
(a) Emission from source (b) Reaction among primary pollutant
(c)Emission of radiation. (d) All of these

4 Trickling filter involve _____process to reduce BOD of waste water
(a) Aerobic (b) Anaerobic
(c) Chemical (d) All of these

5 Dewatering of sludge is carried out in
(a) Sedimentation (b) Rotary filter
(c) Centrifuge (d) Wet scrubber

6 The process employed for removal of suspended solid is
(a)Settling (b) Filtration
(c) Centrifugation (d) None of these

7 Residues of combustion of solid fuel incinerator waste is as known as
(a) Clays (b) Rubbish
(c) Ashes (d) None of these.

8 Nonputrscible solid waste is known as
(a) Garbage (b) Rubbish
(c) Both of these (d)None of these

9 Skin inflammation causes by hazardous chemicals and it is known as
(a) Dermatitis (b) Irritation
(c) Paralysis (d) None of these

10 Fire due to petrol is extinguished using
(a)Water (b) Nitrogen
(c) Dry powder (d)CO_2 gas

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

1 List various industrial sources of air pollution.
2 How acid rain is formed?
3 Explain primary and secondary pollutants
4 List organic matter present in polluted water.
5 List various water pollutants.
6 List the steps followed in sewage treatment.
7 Write the steps followed in solid waste management.
8 What is meant by land filling?
9 List some industrial solid waste.
10 Explain TLV.
11 List the personal protective devices
12 What is MSDS? Write its importance.

QUE-3 Attempt the following

[A] Write a note on electrostatic precipitator. [05]

[B] List the adverse effect of polluted air due to presence of CO_x [05]

OR

QUE-3 Attempt the following

[A] Write a note on wet scrubber. [05]

[B] List the adverse effect of polluted air due to presence of NO_x [05]

QUE-4 Attempt the following

[A] List the adverse effect of waste water due to presence of Biological pollutants. [05]

[B] Explain BOD test. [05]

OR

QUE-4 Attempt the following

[A] List the adverse effect of waste water due to presence of Inorganic pollutants. [05]

[B] Explain any one step involved in sewage treatment plant. [05]

QUE-5 Write classification of solid waste and discuss solid waste collection method. [10]

OR

QUE-5 List the potential methods of disposal of solid waste and discuss them in detail. [10]

QUE-6 Attempt the following

[A] Discuss the indices of flammability. [05]

[B] Discuss the approach of ventilation and lilting for safety. [05]

OR

QUE-6 Attempt the following

[A] Write a note on fire hazard. [05]

[B] Write about importance of color codes in detail. [05]

SEAT No._____ No. of Printed Pages : 02

[82/A-47]

Sardar Patel University

B. Sc. (Semester – IV) Examination

INDUSTRIAL CHEMISTRY & INDUSTRIAL CHEMISTRY VOCATIONAL

COURSE NO: US04ECHE06 (Instrumental Method Of Chemical Analysis)

Date: 13th April 2017, Thursday Time: 02:00pm to 04:00pm

Notes: Figures to the right indicate full marks. Total marks: 70

==========

Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. According to ohm's law, strength current (I) flowing through of current is proportional to _____
   A. Voltage
   B. Resistance
   C. Potential different
   D. None of these
2. Which of the following electrode gives no salt error?
   A. Quin hydrone electrode
   B. Hydrogen electrode
   C. Glass electrode
   D. Antimony electrode
3. Which of the following electrode is not affected by dissolve oxygen?
   A. Glass electrode
   B. Hydrogen electrode
   C. Liq-liq electrode
   D. Quinhydrone electrode.
4. The development of paper is done by allowing the solvent to travel up the paper is known as _____ chromatography.
   A. Ascending – descending
   B. Descending
   C. Ascending
   D. Two dimensional
5. High polarity solvent is _____
   A. Acetone
   B. Water
   C. Benzene
   D. N- butane
6. _____ is not used as stationary phase in chromatography.
   A. Alumina
   B. Silica
   C. Glass
   D. Methanol
7. In gas chromatography the mobile phase used is gas but stationary phase....
   A. Solid & Liquid
   B. Liquid & Gas
   C. Solid, Liquid, Gas
   D. None of them.
8. The record of the emergence of various compound against retention time is called...
   A. Histogram
   B. Chromatogram
   C. Fistogram
   D. None
9. The wave length in ultra-violate range is ...
   A. 2000-4000 A^{o}
   B. 4000-8000 A^{o}
   C. 8000-12000 A^{o}
   D. None of above
10. The total energy of molecule is given by ...
    A. $E_{vib} + E_{rot} + E_{ele}$
    B. $E_{vib} - E_{rot} - E_{ele}$
    C. $E_{rot} - E_{vib} + E_{ele}$
    D. None of them.

Q.2 Answer the following short questions. (ANY TEN) (20)

1. Give advantages of conductometric titration.
2. Define term specific resistance and specific conductance.
3. Write disadvantage of hydrogen electrode.
4. Enlist factors effecting column efficiency.
5. Write limitations of TLC.
6. Enlist superiority of TLC over paper chromatography.
7. Write the advantages of gas chromatography.
8. Discuss on the carrier gas used in GC.
9. Write the principal of HPLC technique.
10. List out the advantages of double beam instrument.
11. The characteristic band of $n \rightarrow \pi^*$ in the pyridine generally disappears in acidic solution, Explain.
12. Why, saturated hydrocarbons can serve as the best solvent for UV measurements.

Q.3

A. Discuss the method of conductance measurement with Wheatstone bridge and also determine cell constant. (06)
B. Write a note on "Quinhydreone electrode". (04)

OR

Q.3 Discuss the following: (10)

A. Glass electrode.
B. Hydrogen electrode.

Q.4 Giving principle, write detail note on "Paper Chromatography". (10)

OR

Q.4 Discuss experimental procedure for "Column Chromatography". (10)

Q.5 Write a notes on following:

A. Gas Chromatography and its applications. (06)
B. Flame Ionization Detector (FID). (04)

OR

Q.5

A. Write a note on "Electron Capture Detector" (ECD). (04)
B. Giving schematic diagram of HPLC, discuss its applications. (06)

Q.6

A. Discuss the Lambert's-Beer's law and also discuss on factors responsible for the deviation from the laws. (06)
B. Write a short note on sources used for UV-Visible spectrophotometer. (04)

OR

Q.6 Write notes on following: (10)

A. Double beam UV spectrophotometer.
B. Visual comparators.

[56/A-28]

SEAT No._____ No. of printed pages : 02

SARDAR PATEL UNIVERSITY

B.Sc. IVth Semester, External Examination (CBCS)

US04ECSC01 : Basics of Linux Operating Systems

17th April, Monday - 2017

Time : 02:00 P.M. to 04:00 P.M. **Total Marks : 70**

Q.1 Select an appropriate answer. **10**

1. The initial Linux file system was _____.
   (a) MINIX (b) EXT (c) EXT2 (d) sysv
2. The heart of Linux is _____.
   (a) program (b) kernel
   (c) file system (d) None of the above
3. All configuration files are located in _____ directory.
   (a) /bin (b) /etc (c) /home (d) /usr.
4. A new process is created by _____ process model.
   (a) exec( ) (b) fork( ) (c) nproc( ) (d) none of these
5. _____ is the job of allocating CPU time to different task.
   (a) Scheduling (b) Process (c) Management (d) All of above
6. In Linux _____ memory is responsible for maintaining the address space.
   (a) physical (b) virtual (c) logical (d) all of above
7. _____ command is used to list the content of the specified directory.
   (a) ls (b) pwd (c) cd (d) rm
8. _____ gives read, write, execute permission to users, group and others.
   (a) 755 (b) 740 (c) 777 (d) none of these
9. To display text or value of variable _____ command is used.
   (a) if (b) display (c) echo (d) exit
10. _____ statement is used to terminated the loop.
    (a) break (b) continue (c) locate (d) all of above

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

1. What is Process? List down its various states.
2. What is Operating System? Give example of some OS.
3. Explain the use of /bin and /etc directories in Linux.
4. Which flags are used with clone() system call? Write function of each.
5. What are the major part of process context?
6. Which are three different zones of physical memory? Write function of it.

7. Which wild card characters are used in linux?
8. Write all commands related to saving a file in vi editor.
9. Which file redirection commands used in linux?
10. Which command is used to print or access value of UDV?
11. Explain the use of Quotes in Linux.
12. What are the advantages to write shell script?

Q.3 [a] Write note on features of linux. **5**

[b] Explain File System. Write notes on EXT2 file system. **5**

OR

Q.3 [a] Explain Design Principles of Linux. **5**

[b] Explain EXT2 superblock, group descriptor, inode. **5**

Q.4 [a] Explain fork(), exec() process model. What is process identity? Explain in brief. **5**

[b] Explain kernel synchronization in detail. **5**

OR

Q.4 [a] Explain process and threading with example. **5**

[b] What is virtual memory? Explain in detail. **5**

Q.5 [a] Explain chmode command with example. **5**

[b] Explain sort and date command with example. **5**

OR

Q.5 [a] Write notes on types of File Access Permission. **5**

[b] Describe ls and pwd command. **5**

Q.6 Explain following with example. **10**
(i) for loop (ii) case statement

OR

Q.6 Explain following with example. **10**
(i) if & nested if statement (ii) while loop

----- X ----- X -----

[57]

No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY
External Examination (CBCS)
B. Sc. - IVth Semester (Computer Science)
US04ECSC02 : RDBMS for Small Scale Organization
17th April, Monday - 2017

SEAT No._____

Time : 2:00 pm to 4:00 pm

Total Marks :70

Q-1 Select an appropriate option. 10

1. One of the RDBMS Package is _____.
   (a) Excel (b) PowerPoint (c) Access (d) Word

2. RDBMS stands for _____.
   (a) Relational Database Management System
   (b) Relation Data Module System
   (c) Right Data Base Management System
   (d) None of the above

3. _____ is a value that can be used to identify a unique record in a table.
   (a) Primary key (b) Unique key (c) Foreign key (d) None of these

4. SQL stands for _____.
   (a) Simple Query Language (b) Structured Query Language
   (c) Small Query Language (d) None of above

5. Which of the following is NOT a data type?
   (a) Picture/graphic (b) Data/time (c) Text (d) Number

6. A relational database is a group of _____.
   (a) Common fields (b) Field values (c) Records (d) Tables

7. A _____ query is the most common category and is used for extracting specific information from one or more tables in a database.
   (a) Select (b) Special Purpose (c) Action (d) SQL Specific

8. To Move on first field of the first record press _____.
   (a) Home (b) CTRL+END (c) Pgup (d) CTRL+ Home

9. _____ deal with data and the processes of data management, such as data entry, validation and retrieval.
   (a) Table (b) Form (c) Report (d) Module

10. A _____ is a list of one or more actions that work together to carry out a particular task in response to an event.
    (a) Macro (b) Modules (c) Report (d) Chart

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

1. What is Relational Database?
2. Explain steps to starting access and opening a database.
3. How many methods are available to create table in access?
4. Explain editing and deleting records from tables.
5. Explain Sorting records in detail.
6. What is Relationship?
7. Define Query.
8. How one can create a Select query?
9. How one can add / remove fields in a query?
10. Why mailing labels are used?
11. What is Chart?
12. What is Module?

Q-3
(a) Explain one of the RDBMS package in detail. 5
(b) Explain data types in Access. 5

OR

Q-3
(a) Explain Advantages of relational database. 5
(b) Explain steps to create a table by entering data in a datasheet. 5

Q-4
(a) What is Primary Key? Explain in detail. 5
(b) Explain in detail types of relationships. 5

OR

Q-4
(a) Explain steps to define relationship between tables. 5
(b) Explain in detail Referential integrity. 5

Q-5
(a) How many methods to create query in access? 5
(b) Explain types of queries. 5

OR

Q-5
(a) What is Form? Explain in detail. 5
(b) Explain Report in detail. 5

Q-6 Write short note on followings: 10
(i) Import data from text file into access database.
(ii) Export data to text file from access database.

OR

Q-6 Write short note on followings: 10
(i) Database Security (ii) Database Utilities

—— x —x ——

SEAT No._____ No. of Printed Pages: 02

[46/A-26]

SARDAR PATEL UNIVERSITY
External Examination (CBCS)
B. Sc. - IVth Semester (Computer Science)
US04ECSC03 : Information Technology in Business
19th April, Wednesday - 2017

Time : 2:00 pm to 4:00 pm Total Marks :70

Q-1 Select an appropriate option. 10

1. _____ are people who develop and operate information systems.
(a) Suppliers (b) End users (c) Managers (d) IS specialists

2. IT provides reengineering and cross functional integration of business processes using _____ technologies.
(a) Internet (b) Financial (c) Computer (d) All of the above

3. Communications media, communications processors, network access and control software are the examples of _____.
(a) Information products (b) Networks resources
(c) Software resources (d) Data resources

4. _____ design information system based on the information requirements of end users.
(a) Programmer (b) System analyst
(c) Data entry operator (d) None of the above

5. _____normally works on structured to semi structured environments and utilize the model base and database for optimum utilization of resources.
(a) TPS (b) DSS (c) MIS (d) EIS

6. _____ strategy of IT create virtual organizations of business partners.
(a) Differentiate (b) Innovate (c) Promote growth (d) Develop alliances

7. In _____ marketing customers are not just passive participants but are actively engaged in interactive process.
(a) Interactive (b) Targeted
(c) Sales force auto main (d) None of the above

8. CIM stands for _____.
(a) Computer Integrated Manufacturing
(b) Computer Information Marketing
(c) Computer Information Manufacturing
(d) Computer Integrated Management

9. Supply Chain Life Cycle steps are _____.
(a) Commit, schedule, make, deliver (b) Commit, plan, make, selling
(c) Plan, commit, schedule, selling (d) None of the above.

10. _____E-commerce strategy involves both electronic business marketplaces and direct market links between businesses.
(a) B2C (b) B2B (c) C2C (d) None of the above.

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

1. What is Information System?
2. What is System?
3. Discuss importance of Information System.
4. Who are end users for Information System?
5. Discuss the meaning of IS specialist.
6. Define: (i) System software (ii) Application software
7. What is the main purpose of the Accounting System?
8. Discuss in brief Accounts Receivable and Payable.
9. What do you mean by Capital Budgeting?
10. What is the use of ERP?
11. What is the Scope of E-commerce?
12. Discuss C2C E-commerce.

Q-3

(a) Discuss IS framework for business professional. 5
(b) Explain in brief category of Information System. 5

OR

Q-3

(a) Explain data pyramid for computer based systems. 5
(b) Explain Information System activities. 5

Q-4 Write a short note on Information System Resources. 10

OR

Q-4 Explain managerial challenges of IT. 10

Q-5

(a) Explain the component of Targeted Marketing System. 6
(b) Discuss Sales Force Automation in brief. 4

OR

Q-5

(a) Explain Human Resources Management System in detail. 6
(b) Write short note on : Manufacturing Information System. 4

Q-6

(a) Discuss benefits and challenges of ERP. 5
(b) Explain major application cluster in CRM. 5

OR

Q-6

(a) Discuss Benefits and challenges of CRM. 5
(b) Explain Supply Chain Management in detail. 5

———x—x———

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

[A-9]

SARDAR PATEL UNIVERSITY
B. Sc. (IV Sem.) Examination (2010 Batch)
Wednesday, March 22, 2017
2:00 pm - 4:00 pm
US04EELE01 - Fundamentals of Computer Hardware
Total Marks : 70

Note : Figures to the right indicate marks.

Q.1 Choose the correct answer (10)

(1) Programs made available in ROM on the hardware are known as .....
(a) Firmware (c) Assembler
(b) System Software (d) None of the above

(2) Microsoft introduce active desktop feature with the ..... O S
(a) Windows 98 (c) Windows 95
(b) M.S.DOS (d) None of the above

(3) ..... is one of the benefits of using network.
(a) Peripheral Sharing (c) Protection from virus
(b) File Security (d) None of the above

(4) Assembler is ..... correspondence.
(a) one-to-one (c) one-to-many
(b) many-to-one (d) None of the above

(5) FORTRAN is ..... language.
(a) High Level (c) Low Level
(b) Assembly (d) None of the above

(6) DOS is a ..... bit operating system.
(a) 8 (c) 32
(b) 10 (d) None of the above

(7) If a server stores data files for users to access it is commonly called .....
(a) File Server (c) Application Server
(b) Data Server (d) None of the above

(8) In a Star Network all devices are connected to .....
(a) Hubs (c) Router
(b) Ethernet (d) None of the above

(9) DSL is abbreviation of .....
(a) Digital Subscriber Line (c) Digital Server Line
(b) Digital Service Line (d) None of the above

(10) Modem speed is measured in .....
(a) Kbps (c) Mbps
(b) Gbps (d) None of the above

Q.2 Answer any ten questions in brief. (20)

(1) How many types of software are there ? Define each.
(2) Explain today and yesterday O.S.
(3) List different use of Network.
(4) What is Software ?
(5) What is firmware ?
(6) Explain Windows NT Workstation.
(7) List features of Windows XP that has been upgraded.

P.T.O.

(8) Name common types of Network.
(9) What is network?
(10) Explain ATM.
(11) Explain in brief ISDN Services.
(12) List various hybrid networks.

Q.3 Write a note on machine language. (10)

OR

Q.3 Write a note on assembly language. (10)

Q.4 Write a note on DOS. (10)

OR

Q.4 Explain Windows 9X. (10)

Q 5 Explain in detail LAN. (10)

OR

Q.5 List different types of network topologies, explain any two with suitable diagram. (10)

Q.6 Explain Modem in detail. (10)

OR

Q.6 List different methods for connecting to internet and explain any two in brief. (10)

---- X ----

[54][A-30]

SEAT No._____ No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY

BSc. 4th Semester

Monday, 17th April 2017

US04EELE01- Fundamentals of Computer Hardware

2:00 pm to 4:00 pm

Total Marks : 70

Q.1 Multiple choice questions. [10]

1. A_____ program converted into machine language program by an assembler.
   (a) source (b) object (c) compiler
2. Compiler is _____ correspondence.
   (a) One to Many (b) Many to One (c) One to One
3. Program made available in the ROM on the hardware are known as _____.
   (a) System software (b) Assembler (c) Firm ware
4. GUI is an abbreviation of _____.
   (a) gray unit interface (b) graphical unit interface
   (c) graphical user interface
5. DOS is a _____ bit OS :
   (a) 8 (b) 16 (c) 32
6. _____ is an OS present in smart phone from Nokia and Sony Ericsson.
   (a) Symbian (b) Windows CE NET (c) Palm OS
7. A_____ is an agreed upon format for transmitting data between two devices.
   (a) protology (b) protoplasm (c) protocol
8. _____ is one of the benefit of using a network.
   (a) File security (b) protection from viruses (c) peripheral sharing
9. If you want to connect to a remote network or the internet using a modem you need to connect the modem to a_____.
   (a) digital telephone line (b) analog telephone line (c) ATM line
10. High speed Internet connections are sometimes called_____ connections.
    (a) Highband (b) wideband (c) Broadband

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

1. What is an Interpreter ? How does it differs from a Compiler ?
2. What type of error can be detected by the compiler ?
3. What is Software ? Explain the relation between Hardware and Software.

[P.T.O]

4. How is Windows NT workstation different from Windows 95 ?
5. Name two versions of DOS that were popular during the 1980 and explain why DOS is still in use.
6. What is operating system ? Write the different types of operating system.
7. Explain the difference between LAN and WAN.
8. Explain Intranets and Extranets.
9. What are Packets and how do they work ?
10. How does dial up internet connection work ?
11. What is the difference between the 802.11b standard and 802.11g standard ?
12. Name the different DSL services.

Q.3 Discuss in detail the High level language and state its advantages and disadvantages. [10]

OR

Q.3 Discuss in detail the machine language. [10]

Q.4 Write a short note on any two of the following operating system.
(a) DOS (b) Windows NT workstation (c) Windows 9X
(d) Windows XP [10]

OR

Q.4 Explain Embedded operating system and also explain embedded OS for consumer product such as PDA. [10]

Q.5 What are the uses of network ? Explain them. [10]

OR

Q.5 List the different types of network topologies. Explain them with suitable diagrams. [10]

Q.6 Explain in detail the wireless network. [10]

OR

Q.6 Discuss in detail the Modem ? [10]

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SEAT No._____ No. of Printed Pages : 2

[50/A-26]

Sardar Patel University

S.Y.B.Sc Semester IV [CBCS]

US04EELE02: Instrumentation

18th April 2017, Tuesday

02:00 PM To 04:00 PM

Total Mark: 70

Q1 Multiple Choice Question [10]

1 If the primary power of an ideal transformer having a 2:1 voltage ratio is 100 W, the secondary power is ____.
a) 100W b) 50W c) 75W d) 200W

2 The value of form factor is ____.
a) 1.21 b)1.01 c) 1.11 d) 11.1

3 Which of the following is not a self-generating type of transducer?
a) thermocouple b) LVDT
c) photo voltaic cell d) Bourdon tube of a pressure gauge

4 LVDT windings are wound on ____.
a) steel sheet b) aluminum c) ferrite d) copper

5 Capacitive transducer are normally employed for measurements.
a) static b) dynamic c) transient d) both static and dynamic

6 In an ideal transformer,
a) winding have no resistance b) core has no losses
c) core has infinity permeability d) all of the above.

7 The rms value of the induced emf in the whole of primary winding is
a) $4.44fN_2B_mA$ b) $4.44fN_{12}B_mA$
c) $4.44fNB_mA$ d) $4.44fN_1B_mA$

8 LVDT works on the principle of_____.
a) variable resistance b) variable self-induction
c) variable capacitance d) variable mutual induction.

9 The abbreviation SSR stands for
a) simple solid relay b) solid standard relay
c) solid system relay d) solid state relay

10 Resolution of a transducer depends on ____.
a) material of wire b) length of wire
c) diameter of wire d) excitation voltage

Q2 Answer the following questions in short. (Any Ten) [20]

1 What is voltage transformation ratio?
2 What is transducer?
3 A 25KVA, 1ϕ transformer has 250 turns on the primary and 40 turns on the secondary winding. The primary is connected to 1500 volt, 50 Hz mains. Determine: 1) secondary emf 2) maximum flux in the core
4 What are SSR? Write its characteristics.
5 Write uses of LVDT.
6 Write Specification of transducer.
7 Write down the relay operation with circuit diagram.
8 Write down the applications of transducer.
9 What is the working principle of transformer?

P.T.O.

10 Draw equivalent circuit of transformer.
11 List out the advantages of LVDT?
12 Explain proximity switch.

Q3	A	Explain in detail the construction and working of transformer with proper diagram.	[07]
	B	Derive the emf equation of a transformer.	[03]

OR

Q3	A	Explain the function of RELAY.	[05]
	B	Write an application of SSRs. Describe control AC SSR and DC SSR with diagram.	[05]
Q4		Explain the construction and working of LVDT with labeled diagram.	[10]

OR

Q4	A	Explain capacitive type transducer with diagram.	[05]
	B	Explain magnetic leakage in primary & secondary winding transformer.	[05]
Q5		Explain dynamic characteristic of transducer.	[10]

OR

Q5		Write application of transducer. Explain operation of Piezo-electric transducer.	[10]
Q6		Explain displacement sensors.	[10]

OR

Q6		Write a short note on potentiometric resistance transducer.	[10]

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[25/A-19] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
B.Sc. Examination; Semester –IV
THURSDAY 20 TH April, 2017
US04EFSC01: PRINCIPLES OF FORENSIC SCIENCE

TIME- 2:00PM – 4:00 PM **TOTAL MARKS- 70**

Q-1 Multiple Choice Questions: **(10)**

1) Poison is most readily absorbed in _____ form.
(a) Gaseous (b) Solid Lump
(c) Liquid (d) Colloidal

2) Food with high _____ content delays absorption of poison.
(a) Liquid (b) Organic
(c) Fatty (d) Inorganic

3) Bowl test is a type of test to confirm _____.
(a) Paralysis (b) Death
(c) Epilepsy (d) Fever

4) Fracture is a type of a _____ Injury.
(a) Mechanical (b) Chemical
(c) Drug (d) Electrical

5) Loss of continuity of tissue in depth is known as _____.
(a) Abrasion (b) Incision
(c) Blunt (d) Laceration

6) In spectroscopic examination, blood is affirmed by observation under _____.
(a) Potentiometer (b) Spectrophotometer
(c) Galvanometer. (d) Microscope

7) Blood from arterial source is _____ red.
(a) Bright (b) Dark
(c) Black pitch (d) Shiny

8) Oxides of Nitrogen have _____ odour.
(a) Petrol (b) Egg
(c) Suffocating. (d) Pungent

9) Double Malt Whiskey is classified as a _____ spirit.
(a) Pure (b) Denatured
(c) Fermented non Distilled (d) Distilled

10) Up to _____ mg % alcohol in 100ml of blood that stage is drunken stage.
(a) 200 (b) 300
(c) 400 (d) 500

Q-2 Short Questions: (Attempt Any Ten) **(20)**

1. Give examples of Poisons obtained from plants.
2. What are the possible modes of administration of poison in body?
3. Explain the presumptive heat test for death of a mammal
4. What is the difference between heat stroke and heat rash?
5. Explain gutter fracture.
6. What do you mean by pus?
7. Give the functions of Saliva.
8. State the Principle of Fermentation method for production of Alcohol.
9. How does alcohol affect mood?
10. Define Smoke Explosion.
11. What is Arson?
12. State three important factors for fire.

Q-3(A) Explain mechanism of poison in humans. (5)

(B) Explain Homicidal poisoning. (5)

OR

Q-3(A) Explain collection of toxicological evidence of a living subject. (5)

(B) Write a short note on Antidote. (5)

Q-4(A) State the modes of Death and explain any one. (5)

(B) Give the medicolegal aspect of laceration. (5)

OR

Q-4(A) Write a short note on Injuries due to Cold. (5)

(B) Explain Regional or Traffic injuries. (5)

Q-5. State RIA for Blood and Explain Endothelial Cell Test for Vomit. (10)

OR

Q-5. Write a short note on Saliva and Describe in detail about Tear. (10)

Q-6(A) Write a short note on Fischer Tropsch method. (5)

(B) State the characteristics of Genuine Wine. (5)

OR

Q-6(A) State the phases of fire and explain any two. (5)

(B) Give the various colors of flame and its temperatures. (5)

SEAT No._____ No. of Printed Pages : 02

[83/A-463]

SARDAR PATEL UNIVERSITY

B.Sc. Semester-IV CHEMISTRY

US04EICH02 Instrumental Methods of Analysis

Date: 13/4/2017, Thursday

Time: 2.00 to 4.00 pm **Total Marks: 70**

Q-1 Multiple Choice Questions **10**

1 What is the range of pH of antimony-antimony oxide electrode is used?
(A)3-9 (B) 4-12 (C)4-9 (D)1-12

2 What is Quinhydrone?
(A)Equimolar compound of quinone and hydroquinone.
(B)Equimolar quisole and hydroquisol
(C) Both a & b
(D)None of these

3 The relation between equivalence conductance, specific conductance and concentration is given by _____.
(A)$\lambda = K \times 1000/C$ (B)$\lambda = K\ C/1000$
(C)$K\lambda = C/1000$ (D)$C\lambda(1000) = K$

4 R_F value depends upon _____.
(A)Solvent used (B) Temperature (C) Nature of mixture (D) All of above

5 Stationary phase _____ and mobile phase _____ used in paper chromatography.
(A) Solid, liquid (B) Liquid, gas (C) Liquid, liquid (D) Gas-gas

6 Highest polarity solvent is _____
(A) Toluene (B) Water (C) Benzene (D) N- butane

7 The factor which is the main reason for HPLC came into use is...
(A) Speed (High) (B) Speed (Low) (C) Both A & B (D) None of these

8 A support where porous particle are coated onto an inert solid core such as a glass bead of about 40 μm in diameter is called...
(A) Sellicular (B) Mellicular (C) Pellicular (D) None of these

9 The types of Electrons in organic molecules are...
(A) σ- electron (B) π- electron (C) η- electron (D) All of the above

10 _____ transition has highest energy level.
(A) $\pi \rightarrow \pi^*$ (B) $n \rightarrow \sigma^*$ (C) $\sigma \rightarrow \sigma^*$ (D) none of these

Q-2 Answer the following in short. (ANY TEN) **20**

1 What is conductance?
2 Name four indicator electrodes used for the determination of pH.
3 Define: Molar Conductance an Equivalent Conductance.
4 What is Migration Parameter?
5 Name the adsorbents used in Paper and Thin Layer Chromatography.
6 Discuss factors affecting efficiency of column.
7 What is carrier gas?
8 Discuss the principle of gas chromatography.
9 Draw the diagram of HPLC instrument and label it.
10 State the regions of visible and uv radiations.
11 Discuss on source used for visible radiations in spectrophotometer.
12 " The characteristic band $n \rightarrow \pi^*$ of pyridine disappears in acidic solution." Explain.

Q-3		
(A)	Write short note on:Hydrogen Gas Electrode.	05
(B)	Write short note on: Conductivity cells.	05
	OR	
Q-3		
(A)	Disuss on Glass Electrode with the diagram.	05
(B)	Discuss Acid Base titration with potential measurements.	05
Q-4	Give an account on Paper Chromatography.	10
	OR	
Q-4	Give an account on Thin Layer Chromatography.	10
Q-5		
(A)	Write short note on Pumps used in HPLC.	05
(B)	Discuss applications of HPLC.	05
	OR	
Q-5		
(A)	Draw schematic diagram of Gas Chromatography and explain the principle of it.	05
(B)	Discuss on column and its packing in Gas Chromatography.	05
Q-6		
(A)	Write Lambert-Beer's Law and discuss the factors responsible for the deviation from the law.	05
(B)	Write a short note on: Filetrs and monochromators.	05
	OR	
Q-6		
(A)	Write short note on: Double Beam Spectrophotometer.	05
(B)	Discuss on any two methods from Visual Comparators.	05

ALL THE BEST

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SEAT No._____ No. of Printed Pages : 02

[84/A453]

Sardar Patel University

B.Sc- Semester examination-2017

B.Sc IVth Semester **Subject – Molecular biology-II**

Course no. US04EMBI02 **Date - 13.04.2017 (Thursday)**

Time –2:00 to 5:00 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 The sigma factor of RNA polymerase plays a role of
(A) Recognition of promotor sequences
(B) Elongation of growing mRNA
(C) Stabilization of unwound DNA
(D) Unwinding of double helix of DNA

1.b TATA box are found is found in all
(A) Terminator (B) Repressors
(C) Inducer (D) Promotors

1.c. RNA polymerase synthesizes
(A) DNA from DNA (B) RNA from DNA
(C) RNA from RNA (D) DNA from RNA

1.d. mRNA are synthesized by
(A) RNA Polymerase I (B) RNA Polymerase II
(C) RNA Polymerase III (D) RNA Polymerase IV

1.e Poly A tail is present in
(A) mRNA at 5' end (B) mRNA at 3' end
(C) tRNA (D) rRNA

1.f. Translation is the
(A) Synthesis of mRNA from DNA (B) Synthesis of DNA from RNA
(C) Synthesis of protein from mRNA (D) Synthesis of protein from lipids

1.g. HSP 60 and 70 are proteins responsible for
A) Activation of amino acids (B) Protein folding
(C) Elongation of protein synthesis (D) Termination of protein synthesis

1.h. In prokaryotes the first amino acids in polypeptide chain is
(A) Methionine (B) Glycine
(C) Proline (D) Tryptophan

1.i Operon concept was given by
(A) Jacob and Monad (B) Watson and crick
(C) Barbara Mc Clintock (D) Suttan and Boveri

1.j Expression of prokaryotic operons leads to generation of
(A) Monocistronic mRNA (B) Polycistronic mRNA
(C) Monocistronic tRNA (D) Polycistronic r RNA

P.T.O

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

[1] What is transcription?
[2] Write a brief notes on type of transcriptional termination.
[3] Write notes on requirements of transcription process.
[4] Define post transcriptional modification.
[5] Enlist various agents which inhibit the process of transcription.
[6] What do you mean by splicing?
[7] How you will inhibit protein synthesis?
[8] Enlist the factors which effect translation process.
[9] What is role of tRNA in translation?
[10] What do you mean by gene regulation?
[11] Define gene expression.
[12] What is constitutive genes?

Q3.a. Explain the elongation process of transcription with neat diagram. [5]

Q3.b. Write notes on structure and properties of prokaryotic RNA polymerase. [5]

OR

Q.3.a. Explain the initiation process of transcription with neat diagram. [5]

Q.3.b. Write notes on types, structure and function of prokaryotic promoters. [5]

Q.4.a. Explain the process of post transcriptional modification of mRNA. [5]

Q.4.b. Writes notes on various classes of eukaryotic RNA polymerase. [5]

OR

Q.4.a. Give the difference and similarity between prokaryotic and eukaryotic transcription. [5]

Q.4.b. Explain post transcriptional modification of rRNA. [5]

Q.5.a. What do you mean by amino acid activation? Explain. [5]

Q.5.b. Give the importance of post translational modification of proteins. [5]

OR

Q.5.a. Explain elongation process of translation in detail. [5]

Q.5.b. Enlist the various process of post translational modification of proteins. [5]

Q.6. What is Lac operon? Explain Lac operon in detail with suitable diagram. [10]

OR

Q.6. How Lac operon are positively and negatively regulated? Explain in detail. [10]

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SEAT No._____ SARDAR PATEL UNIVERSITY

C14/A-73 S.Y.BSc. EXAMINATION No of Printed Pages : 2

USO4EMIC 01 (SEMESTER IV)

SUB: MICROBIOLOGY (E MIC 01)

Date: 21-04-2017 Fundamental of Microbiology Total Marks: 70

Time: 2-00 to 4-00 Friday

Q-1 Attempt all following multiple choice question. (10)

(1) E.H. Haeckel proposed the kingdom for unicellular micro organisms that were typically Neither plants nor animals is known as:
(a) Protista (b) Fungi (c) Algae (d) Prokaryotes

(2) The mode of nutrition of kingdom animalia is _____
(a) Absorption (b) Photosynthesis (c) Ingestion (d) Osmosis

(3) Into which kingdom did Whittaker place prokaryotic microorganisms?
(a) Protista (b) Plantae (c) Monera (d) Algae

(4) Normal flora of the human body is composed mainly of _____
(a) Fungi (b) Protozoa (c) Bacteria (d) Viruses

(5) Which vitamin is requiring by germ free animals, which normal animals do not require?
(a) vitamin C (b) vitamin D (c) vitamin K (d) vitamin B

(6) The irreversible loss of the ability to reproduce is _____
(a) Death (b) Reproduction (c) Growth (d) None of these

(7) Extreme dehydration of microorganisms in frozen state is called:
(a) Lyophilization (b) Tyndallization (c) Pasteurization (d) Filtration

(8) Inhibition of cell wall synthesis is brought about by
(a) Penicillin (b) Streptomycin(c) both (a) & (b) (d) None of these

(9) A chemical agent that kills bacteria is called:
(a) Bactericide (b) Bacteriostatic (c) Sporicide (d) None of these

(10) Chloramines can be used as _____
(a) Disinfectant (b) Antiseptic (c) Sanitizer (d) All of these

Q-2 Attempt the following (any ten) (20)

(1) Define : (a) Classification (b) Nomenclature
(2) In which two kingdoms did Linnaeus classify all organisms?
(3) Give two names of bacteria; write it in its proper form.
(4) Explain how a healthy human fetus acquires a normal flora.
(5) What benefits might a human host derive from the normal flora?
(6) Enlist factors affecting transmission of diseases.
(7) What is a membrane filter?
(8) What is Incineration? Where is it used for control of microorganisms?
(9) Explain why gamma rays can be used as antimicrobial agents?
(10) Explain mode of action of Heavy Metals as Antimicrobial agents.
(11) Write the name & practical application of a Colloidal Silver compound used as Antimicrobial agent.
(12) Define (a) Sterilization (b) Germicide

Q-3 Enlist various criteria used for classification of bacteria and explain any three in detail. (10)

OR

Q-3 (A) Explain "Whittaker's five kingdom concept" (06)

(B) Explain in brief Bergey's manual of systemic bacteriology. (04)

Q-4 (A) Define infection and explain various types of infection (05)

(B) Write notes on Gnotobiotic life. (05)

OR

Q-4 (A) Write a note on Transmission of Disease. (07)

(B) Explain in brief: "Virulence" (03)

Q-5 Justify the use of moist heat as antimicrobial agents. (10)

OR

Q-5 Write notes on:

(A) U.V. radiations as antimicrobial agent. (05)

(B) Osmotic pressure as antimicrobial agent. (05)

Q-6 Write on characteristics of an ideal antimicrobial agents. (10)

OR

Q-6 Write on Practical application and Mode of action of Phenols and Alcohols. (10)

****Best of Luck ******

SEAT No._____ No of printed pages : 3

[59/A-22]

SARDAR PATEL UNIVERSITY
B.Sc.(SEMESTER - IV) EXAMINATION - 2017
Saturday , 15^{th} April , 2017
MATHEMATICS : US04EMTH01
(Boolean Algebra and Laplace Transforms)

Time : 02:00 p.m. to 04:00 p.m. Maximum Marks : 70

Que.1 Fill in the blanks. 10

(1) $a.(a+b)$ = ...

(a) b (b) a (c) a+b (d) a.b

(2) $a+(a.b)$ = ...

(a) a (b) b (c) $a.b$ (d) $a+b$

(3) Initial approximation of $x^3 - x - 2 = 0$ can be chosen from .....

(a) [0,1] (b) [-1,0] (c) [1,2] (d) [-2,-1]

(4) Aitken's Δ^2 process is used for finding approximation .....

(a)Derivative of a function (b) Integral of a function (c) Root of equation (d) None

(5) In Bisection method, $x^3 - 9x + 1 = 0$; a=2 and b=3 then x_0=.....

(a) 2 (b) 3 (c) 2.5 (d) 1.5

(6) L[$cosat$]=.....

(a) $\frac{s}{s^2+a^2}$ (b) $\frac{a}{s^2+a^2}$ (c) $\frac{a}{s^2-a^2}$ (d) $\frac{s}{s^2-a^2}$

(7) L[$sinhat$]=.....

(a) $\frac{a}{s^2-a^2}$ (b) $\frac{a}{s^2+a^2}$ (c) $\frac{s}{s^2+a^2}$ (d) $\frac{s}{s^2-a^2}$

(8) $L^{-1}[\frac{s}{s^2+a^2}]$=.....

(a) $\cos at$ (b) $\cosh at$ (c) $\frac{1}{a}\cosh at$ (d) $a\cosh at$

(9) If $L^{-1}\{f(s)\} = f(t)$, then $L^{-1}\{f(s-a)\}$=.....

(a) $e^{at}f'(t)$ (b) $e^{at}f(t)$ (c) $f(t)$ (d) None

(10) $L^{-1}[\frac{1}{s^2}]$=.....

(a) 1 (b) t^2 (c) t (d) t^3

Que.2 Answer the following (Any ten) 20

(1) Prove that the element a' associated with element a in a Boolean algebra is unique .

(2) Define Boolean Algebra and state its Properties.

(3) State Principal of duality.

(4) Solve the equation $f(x) = e^x - 3x = 0$, by using Bisection Method.

(5) Define Algebraic and Transcendental Equation with example .

(6) Using Newton Raphson Method find the real root of the equation $\sin x = \frac{x}{2}$.

(7) Prove that $L(e^{at}) = \frac{1}{s-a}$, $s > a$.

(8) Find laplace transform of $t\cos 3t$.

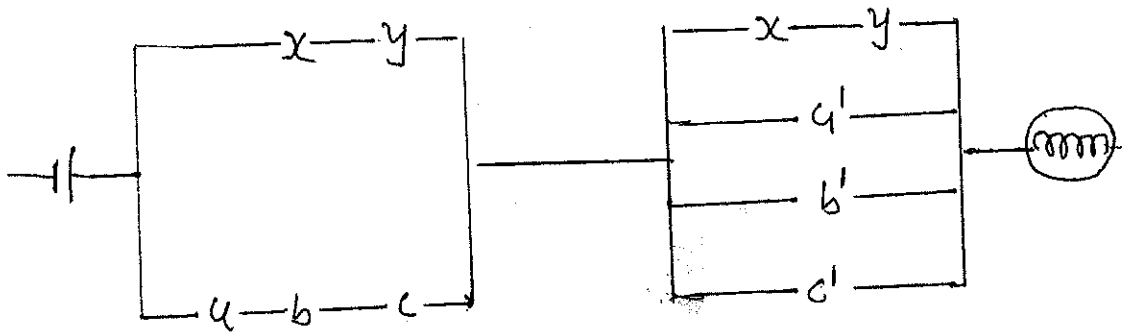
(9) Find laplace transform of $\cos^2 2t$.

(10) Evaluate $L^{-1}\left[\frac{1}{s}\right] = 1$.

(11) Evaluate $L^{-1}[\frac{1}{s^2+a^2}] = \frac{1}{a}\sin at$.

(12) Evaluate $L^{-1}[\frac{s}{s^2-a^2}] = \cosh at$.

Que.3 (a) Find the Boolean function of switching circuit given below and simplify it . Also draw the simplified circuit.

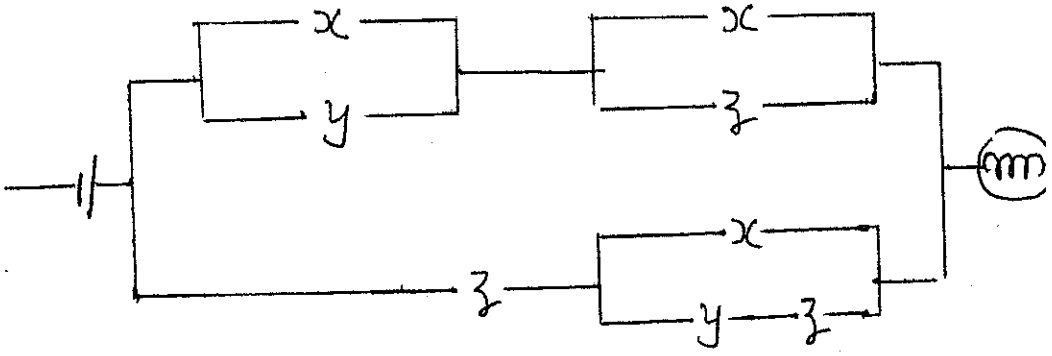


(b) If a and b are elements of boolean algebra B,satisfying the relation $a \leqslant b$ then prove that $a + bc = b(a + c)$, $\forall\, c \in B$.

(c) If $a + x = b + x$ & $a + x' = b + x'$ then prove that $a = b$.

OR

Que.3 (d) Find the Boolean function of switching circuit given below and simplify it . Also draw the simplified circuit.



(e) Prove that in Boolean algebra , every triple of elements a, b, c satisfies the identity $ab + bc + ca = (a + b)(b + c)(c + a)$.

(f) Prove that for every a & $b \in B$, $(a + b)' = a'b'$.

Que.4 (a) Find the real root of the equation $\sin x = 10(x-1)$,correct up to 3 decimal places by using Iteration Method. 5

(b) Find the real root of the equation $f(x) = x^3 - x - 4 = 0$,correct up to 3 decimal places by using False Position Method. 5

OR

Que.4 (c) Using Newton Raphson formulae, establish the iterative formula $x_{n+1} = \frac{1}{2}\left[x_n + \frac{N}{x_n}\right]$ to calculate the square root of N. Using the formulae find the square root of 8 and 5. 5

(d) Find the real root of the equation $2x = \cos x + 3$,correct up to 3 decimal places by using Aitken's Δ^2 Process. 5

Que.5 (a) If $L\{f(t)\} = f(s)$ then prove that $L\{t^n\ f(t)\} = (-1)^n \frac{d^n}{ds^n}[\bar{f}(s)]$, where $n = 0, 1, 2, \ldots$. 4

(b) Find the laplace transform of $\frac{(1-e^t)}{t}$. 3

(c) Evaluate $\int_0^\infty te^{-2t} \sin t\ dt$. 3

OR

Que.5 (d) Prove that $L(t^n) = \frac{n!}{s^{n+1}}$ Where $n = 0, 1, 2, \ldots$ otherwise $\left[\frac{\lfloor n+1}{s^{n+1}}\right]$. 4

(e) Evaluate $L\left\{\int_0^t \frac{e^t \sin t}{t} dt\right\}$. 3

(f) Find Laplace transform of $t^2 \sin at$. 3

Que.6 (a) Prove that $L^{-1}\left[\frac{1}{(s-a)^2+b^2}\right] = \frac{1}{b}\ e^{at} \sin bt$. 4

(b) Find the inverse Laplace transform of $\frac{1}{s(s+a)^3}$. 3

(c) Find the inverse Laplace transform of $\frac{s^2}{(s^2+a^2)(s^2-a^2)}$. 3

OR

Que.6 (d) Apply Convolution Theorem to evaluate $L^{-1}\left(\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right)$. 4

(e) Prove that $L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right] = \frac{1}{2a} t \sin bt$. 3

(f) Find the inverse Laplace transform of $\frac{s+3}{s^2-4s+13}$, by using shifting Theorem . 3

(A-14) Seat No.:_____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

B.Sc. Sem-IV (2010 batch)
21^{th} March, 2017 Tuesday
02.00 p.m. to 04.00 p.m.
Sub: MATHEMATICS (US04EMTH05)
Calculus and Algebra-2

Maximum Marks: 70

Q.1 Write the correct answer from given alternative. [10]

(1) In Boolean algebra ,$1' =$_____
(a) 0 (b) 1 (c) a (d) None

(2) Let $E \subset \mathbb{R}^2$ and $f : E \to \mathbb{R}$ admits the first order partial derivatives at $(a, b) \in E$ and $f_x(a, b) = f_y(a, b) = 0$. Define $A = f_{xx}(a, b)$, $B = f_{x,y}(a, b)$ and $C = f_{yy}(a, b)$. Then $f(a, b)$ is a local maximum of f if .....
(a) $AC - B^2 > 0$ and $A > 0$ (b) $AC - B^2 > 0$ and $A < 0$ (c) $AC - B^2 < 0$ (d) $AC - B^2 = 0$

(3) $\overline{\nabla}^2(fg) =$ _____
(a) $f\overline{\nabla}^2 g - 2\overline{\nabla} f.\overline{\nabla} g - g\overline{\nabla}^2 f$ (b) $f\overline{\nabla}^2 g + 2\overline{\nabla} f.\overline{\nabla} g + g\overline{\nabla}^2 f$
(c) $f\overline{\nabla}^2 g + \overline{\nabla} f.\overline{\nabla} g + g\overline{\nabla}^2 f$ (d) None

(4) If $\bigtriangledown \cdot V = 0$, then V is called.....
(a) solenoidal (b) irrotational (c) harmonic (d) Laplacian

(5) The gradient of a vector field $V = x^3 + y$ is.....
(a) $3x^3 i + yj$ (b) $3x^2 i + j$ (c) $3x^3 i + j$ (d) $3x^2 i + yj$

(6) grad(7f)=.....
(a) grad f (b) 7 grad f (c) grad 7-f (d) 0

(7) The primary law, for $a \in \mathbb{B}$, implies $a + 1 =$ .....
(a) 1 (b) a (c) 0 (d) a'

(8) If $f(x, y) \geq f(a, b)$, for all $(x, y) \in E \subset \mathbb{R}^2$, then f is said to have.....
(a) local extreme point at (a, b)
(b) global minimum point at (a, b)
(c) global maximum point at (a, b)
(d)constant value at (a, b)

(9) $\nabla^2 = \Sigma \dfrac{\partial^2}{\partial x^2}$ is called _____.
(a) Laplacian Operator (b) Gradient of scalar field
(c) Vector differential Operator (d) None

(10) $a = a + a \cdot b$ is called law of.....
(a) Distributive (b) Absorption (c) Associative (d) Commutative

Q.2 Answer any ten in short. [20]

(1) For every boolean algebra B, prove that $(a')' = a$.
(2) Show that $\nabla f(r) = f'(r)\nabla r$
(3) State a sufficient condition for the existence of extreme values of a function.
(4) Show that $\bigtriangledown \cdot (\alpha V) = \alpha(\bigtriangledown \cdot V)$, where α be any scalar.
(5) Show that $\nabla \times (\nabla f) = 0$.
(6) Verify $\bigtriangledown \cdot (V_1 + V_2) = \bigtriangledown \cdot V_1 + \bigtriangledown \cdot V_2$ for $V_1 = x^2 + y$ and $V_2 = e^x$.
(7) For every element a and b in boolean algebra B prove that $a + a = a$.

(8) Define divergent of a vector field,curl of vector field.

(9) Find stationary points of $f(x,y) = x^2 + y^2 + 6x + 12$.

(10) Define Stationary point and global minima.

(11) State principle of duality.

(12) Define Directional derivative and Normal vector.

Q.3(a) Investigate the maxima and minima of the function $f(x,y) = x^3 + y^3 - 63(x+y) + 12xy$. [6]

(b) Show that $y^2 + x^2y + x^4$ has a minimum at $(2,2)$. [4]

OR

Q.3(c) A rectangular box open at the top is to have a volume of $32m^3$. Find the dimension of box so that the total surface area is minimum. [6]

(d) Show that $2x^4 - 3x^2y + y^2$ has neither a maximum nor a minimum at $(0,0)$. [4]

Q.4(a) 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]

(b) Prove $\nabla(f \pm g) = \nabla f \pm \nabla g$ [5]

OR

Q.4(c) Prove $\nabla\frac{1}{r} = -\frac{\bar{r}}{r^3}$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}, r = |\bar{r}|$ [5]

(d) Find unit normal vector at the surface $z^2 = 4(x^2 + y^2)$ at $(1,0,2)$. [5]

Q.5(a) Show that $\nabla \cdot (r^n\bar{r}) = (n+3)r^n$, where $x\bar{i} + y\bar{j} + z\bar{k},\ r = |\bar{r}|$ [6]

(b) For a differentiable scalar field f and differentiable vector field V, prove that $\nabla \times (fV) = f(\nabla \times V) + \nabla f \times V$. [4]

OR

Q.5(c) Find *curl* V for $V = \bar{r}|\bar{r}|^{-3}$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}, r = |\bar{r}|$. [5]

(d) Verify $\nabla \cdot (f \nabla g) = f \nabla^2 g + \nabla f \nabla g$ for $f = x + y + z, g = xyz$. [5]

Q.6(a) State and prove De-Morgan's laws for Boolean algebra. [6]

(b) Draw the network represented by Boolean function $x(xy + x' + xy')$. [4]

OR

Q.6(c) If $a + x = b + x$ and $a + x' = b + x'$, then prove that $a = b$. [6]

(d) Find the Boolean function of switching circuit given below and then its equivalent circuit, also draw the simplified circuit. [4]

— × —

SEAT No._____ No of printed pages : 3

[6c/A-21]

SARDAR PATEL UNIVERSITY
B.Sc.(SEMESTER - IV) EXAMINATION - 2017
Saturday , 15^{th} April , 2017
MATHEMATICS : US04EMTH05
(Calculus and Algebra - 2)

Time : 02:00 p.m. to 04:00 p.m. Maximum Marks : 70

Que.1 Fill in the blanks. 10

(1) If f(x,y)=$x^3+y^3-63x-63y+12xy$ then f_{xx}=.....

(a) 6y (b) 6x (c) $3x^2$ (d) None

(2) If $f(x,y) \leq f(a,b)$, for all $(x,y) \in E \subset R^2$, then f is said to have .....point at (a,b) .

(a) Local extreme (b) Global minimum (c) Global maximum (d) Constant

(3) If $f(x,y) = x^4-2x^2-2y^2+4xy+y^4$ then stationary points are .....

(a) (0,0) (b) $(0,0)$, $(\sqrt{2},-\sqrt{2})$ (c) $(\sqrt{2},\sqrt{2})$ (d) $(0,0)$, $(\sqrt{2},-\sqrt{2})$, $(-\sqrt{2},\sqrt{2})$

(4) A unit normal vector to the surface f(x,y,z)=0 is defined as $\overline{n}$ = ...

(a) $\overline{\nabla} f$ (b) $|\overline{\nabla} f|$ (c) $\dfrac{\overline{\nabla} f}{|\overline{\nabla} f|}$ (d) None

(5) $\overline{\nabla} f$ = ...

(a) $\Sigma \bar{i} \frac{\partial f}{\partial x}$ (b) $\Sigma i \frac{\partial f}{\partial x}$ (c) $\Sigma i\, x$ (d) None

(6) $\nabla^2 = \Sigma \dfrac{\partial^2}{\partial x^2} is$.....

(a)Laplacian Operator (b) Gradient of scalar field (c) Vector differential operator (d) None

(7) $\overline{\nabla} \cdot (f\overline{\nabla} g - g\overline{\nabla} f)$=.....

(a)$f\overline{\nabla}^2 g+g\overline{\nabla}^2 f+2\overline{\nabla} f \cdot \overline{\nabla} g$ (b)$f\overline{\nabla}^2 g+g\overline{\nabla}^2 f-2\overline{\nabla} f \cdot \overline{\nabla} g$ (c) $f\overline{\nabla}^2 g-g\overline{\nabla}^2 f$ (d)$f\overline{\nabla}^2 g-g\overline{\nabla}^2 f+2\overline{\nabla} f \cdot \overline{\nabla} g$

(8) If $\bar{r} = x\bar{i} + y\bar{j}$ then $\dfrac{\partial \bar{r}}{\partial z}$ = ...

(a) $\frac{x}{r}$ (b) $\frac{y}{r}$ (c) $\frac{z}{r}$ (d) 0

(9) $a.(a+b)$ = ...

(a) b (b) a (c) a+b (d) a.b

(10) $a+(a.b)$ = ...

(a) a (b) b (c) $a.b$ (d) $a+b$

Que.2 Answer the following (Any Ten) 20

(1) Define Extreme point , Stationary point , Saddle point .

(2) State a sufficient condition for the existence of extreme values of function of two variables $f(x,y)$.

(3) Find stationary points of $x^2+y^2+6x+12$.

(4) Prove that $\overline{\nabla}\left(\dfrac{f}{g}\right) = \dfrac{g\overline{\nabla} f - f\overline{\nabla} g}{g^2}$

(5) Prove that $\overline{\nabla}(fg) = f\overline{\nabla}g + g\overline{\nabla}f$.

(6) Find gradient of function $f(x,y) = \frac{x}{r}$ where $\bar{r} = x\bar{i} + y\bar{j}$, $r = |\bar{r}|$

(7) Define Curl of a vector field and find Curl of $ax\bar{i} + by\bar{j} + cz\bar{k}$.

(8) Prove that $\overline{\nabla} \cdot (\bar{v_1} - \bar{v_2}) = \overline{\nabla} \cdot \bar{v_1} - \overline{\nabla} \cdot \bar{v_2}$.

(9) Define divergence of a vector field and find divergence of $-3x^2y^4z^3\bar{i} + 3x^2y^3z^2\bar{j} - 2z^3yx\bar{k}$ at $(1,1,-2)$.

(10) Prove that the element a' associated with element a in a Boolean algebra is unique .

(11) Define Boolean Algebra and state its Properties.

(12) State Principal of duality.

Que.3 (a) A rectangular box open at the top is to have a volume of $32m^3$. Find the dimension of box so that the total surface area is minimum . 5

(b) Find the maxima and minima for the function $x^4 - 2x^2 - 2y^2 + 4xy + y^4$, if they exist . 5

OR

Que.3 (c) Find the maxima and minima for the function $x^3 + y^3 - 3x - 12y + 20$, if they exist . 6

(d) Show that $(y-x)^4 + (x-2)^4$ has minimum at $(2,2)$. 4

Que.4 (a) Find direction derivative of $f(x,y,z) = 2x^2 + 3y^2 + z^2$ at point (2 , 1 , 3) in the direction of $\bar{a} = \bar{i} - 2\bar{k}$. 4

(b) Find unit normal vector of following surface $z^2 = x^2 + y^2$ at (3 , 4 , 5). 3

(c) Prove that $f(x,y,z) = \frac{x}{x^2+y^2}$ is Harmonic function. 3

OR

Que.4 (d) Prove that $f(x,y,z) = tan^{-1}\left(\frac{y}{x}\right)$ is Harmonic function. 4

(a) Prove that $\overline{\nabla} f(r) = f'(r)\overline{\nabla} r = f'(r)\frac{\bar{r}}{r}$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$, $r = |\bar{r}|$. 3

(e) Prove that $\overline{\nabla}\left(\frac{1}{r}\right) = -\frac{\bar{r}}{r^3}$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$, $r = |\bar{r}|$. 3

Que.5 (a) Verify $\overline{\nabla} \cdot (f\bar{v}) = f(\overline{\nabla} \cdot \bar{v}) + \bar{v} \cdot \overline{\nabla} f$ for $f = e^{xyz}$ and $\bar{v} = ax\bar{i} + by\bar{j} + cz\bar{k}$. 4

(b) Prove that $\overline{\nabla} \times (f\bar{v}) = f(\overline{\nabla} \times \bar{v}) + \overline{\nabla} f \times \bar{v}$. 3

(c) Find $\overline{\nabla} \cdot \left(\frac{\bar{r}}{r^3}\right)$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$, $r = |\bar{r}|$. 3

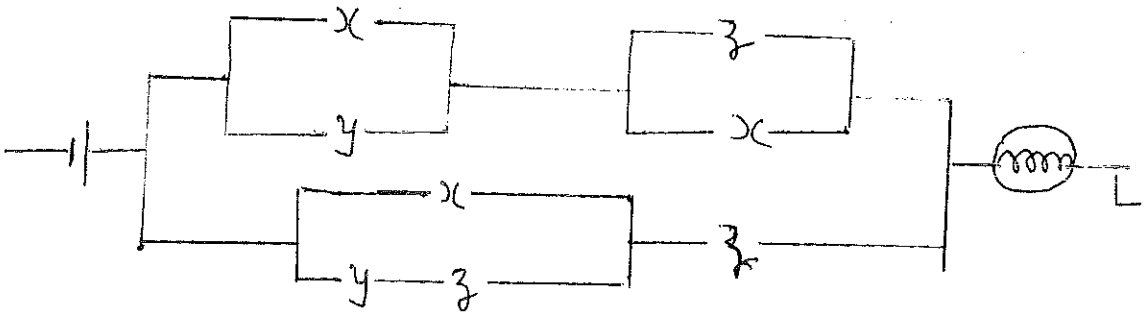
OR

Que.5 (d) Prove that $\overline{\nabla} \cdot (f\bar{v}) = f(\overline{\nabla} \cdot \bar{v}) + \bar{v} \cdot \overline{\nabla} f$. Hence prove that $\overline{\nabla} \cdot (f\overline{\nabla} g + g\overline{\nabla} f) = f\overline{\nabla}^2 g + g\overline{\nabla}^2 f + 2\overline{\nabla} f \cdot \overline{\nabla} g$. 4

(e) Verify $\overline{\nabla} \cdot (f\overline{\nabla} g) = f\overline{\nabla}^2 g + \overline{\nabla} f \cdot \overline{\nabla} g$ for $f = x + y + z$, $g = xyz$ 3

(f) Prove that $\nabla \cdot (r^n \bar{r}) = (n+3)r^n$, where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$, $r = |\bar{r}|$. 3

Que.6 (a) Find the boolean function of switching circuit given below and simplify it . Also draw the simplified circuit. 5

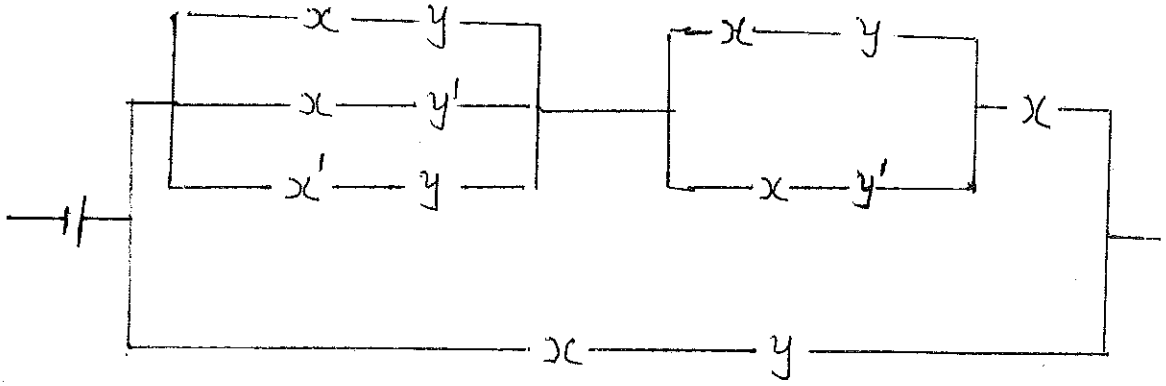


(b) If a and b are elements of boolean algebra B,satisfying the relation $a \leqslant b$ then prove that $a + bc = b(a + c)$, $\forall\, c \in B$. 3

(c) If $a + x = b + x$ & $a + x' = b + x'$ then prove that $a = b$. 2

OR

Que.6 (d) Find the boolean function of switching circuit given below and simplify it . Also draw the simplified circuit. 5



(e) Prove that in Boolean algebra , every triple of elements a, b, c satisfies the identity $ab + bc + ca = (a + b)(b + c)(c + a)$. 3

(f) Prove that for every a & $b \in B$, $(a + b)' = a'b'$. 2

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SEAT No._____ No. of Printed Pages : 3

[51/A-25]

SARDAR PATEL UNIVERSITY

B.Sc. (*SEMESTER – IV*) EXAMINATION-2017

Tuesday, April 18, 2017

2.00 p.m. to 4.00 p.m.

US04EMTH06(Operation Research-II)

Maximum Marks: 70

Q.1 Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

(1) In assignment problem if number of rows is greater than column then .....
(a) dummy column is added . (b) dummy row added .
(c) row with cost 1 is added. (d) column with cost 1 is added.

(2) In Assignment Problem the value of decision variable x_{ij} is.....
(a) no restriction (b) one or two (c) one or zero (d) none of these

(3) Number of basic allocation in any row or column in Assignment Problem can be.....
(a) Exactly one (b) at most one (c) at least one (d) none of these

(4) The saddle point in the game is a_{14} then player $B's$ pure strategy is.....
(a) one (b) two (c) three (d) four

(5) If player A plays strategy A_1 with probability 1, then he plays the game with .....strategy.
(a) pure (b) mixed (c) optimal (d) none of them

(6) The value of the game

	B1	B2
A1	5	3
A2	4	2

(a) 2 (b) 3 (c) 4 (d) 5

(7) In sequencing if smallest time for a job belongs to machine-I then that job has to placed..... of the sequence.
(a) a the middle (b) at the starting (c) at the end (d) none of these

(8) .....operation is carried out on a machine at a time.
(a) Two (b) atleast one (c) only one (d) none of them

(9) .....event represents beginning of more than one activities.
(a) burst (b) merge (c) merge (d) none of these

(10) Activity which is completed before starting new activity is called.....
(a) dummy (b) predecessor (c) successor (d) none of these

Q.2 Attempt any Ten: [20]

(1) What is an unbalanced assignment problem? How to resolve it?

(2) Write rule to draw minimum number of line.

(3) Solve the assignment problem:

	P	Q	R	S
A	27	35	26	21
B	23	38	14	36
C	49	30	29	26
D	28	35	33	19

(4) Define: (i) Fair game (ii) Saddle point

(5) Explain the method to obtain saddle point of a game if it exists.

(6) Find optimum strategy and value of the game for

		Player B	
		B_1	B_2
Player A	A_1	2	7
	A_2	2	5

(7) What is no passing rule in job sequencing?

(8) Give the optimum job sequence for the following sequencing problem

No.of Jobs	1	2	3	4	5	6	7
Machine M_1	3	12	15	6	10	11	9
Machine M_2	8	10	10	6	12	1	3

(9) Define: (i) Total Elapsed time (ii) Idle time on a Machine.

(10) Define Merge and Burst event.

(11) Explain the error of Dangling in network diagram representation.

(12) Define total float and free float.

Q.3

(a) Solve the assignment problem:

	P	Q	R	S
A	32	41	57	18
B	48	54	62	34
C	20	31	81	57
D	71	43	41	47

[04]

(b) Solve the following assignment problem: [06]

	A	B	C	D	E	F
I	20	15	26	40	32	12
II	15	32	46	26	28	20
III	11	15	2	12	6	14
IV	8	24	12	22	22	20
V	12	20	18	10	22	15

OR

Q.3

(c) Write the steps for solving an assignment problem by Hungarian method. [05]

(d) Solve the following assignment problem: [05]

	1	2	3	4	5	6
A	13	13	16	23	19	9
B	11	19	26	16	17	18
C	12	11	4	9	6	10
D	7	15	9	14	14	13
E	9	13	12	8	14	11
F	13	13	16	23	19	9

Q.4

(a) Find the range of values of p and q which will render the entry $(2, 2)$ a saddle point for the following game: [04]

		Player B		
		B_1	B_2	B_3
Player A	A_1	2	4	5
	A_2	10	7	q
	A_3	4	p	6

(b) Solve the following game using the principle of dominance: [06]

		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	-5	3	1	20
	A_2	5	5	4	6
	A_3	-4	2	0	-5

OR

Q.4

(c) Explain the dominance rules for game theory. [05]

(d) Solve the following game using graphical method [05]

		Player B				
		I	II	III	IV	V
Player A	I	2	−4	6	−3	5
	II	−3	4	−4	1	0

Q.5

(a) Give Johnsons algorithm for determining the optimal sequence for processing n jobs through two machines. [04]

(b) Find the sequence by Johnson's method that minimizes the total elapsed time and idle time for machine A and machine B required to complete the following jobs: [06]

Jobs	1	2	3	4	5	6	7
Machine I	10	12	13	7	14	5	16
Machine II	15	11	8	9	6	7	16

OR

Q.5

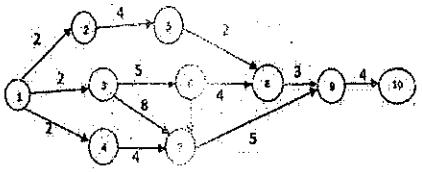
(c) Find the sequence by Johnson's method that minimizes the total elapsed time and idle time for machine A and machine B required to complete the following tasks: [05]

Tasks	A	B	C	D	E	F	G	H	I
Time on Machine I	2	5	4	9	6	8	7	5	4
Time on Machine II	6	8	7	4	3	9	3	8	11

(d) Find the sequence that minimizes the total elapsed time required to complete the following tasks: [05]

Tasks	A	B	C	D	E	F	G
Time on machine I	3	8	7	4	9	8	7
Time on machine II	4	3	2	5	1	4	3
Time on machine III	6	7	5	11	5	6	12

Q.6 For the following network diagram obtain the critical path, total float, independent float and free float. [10]

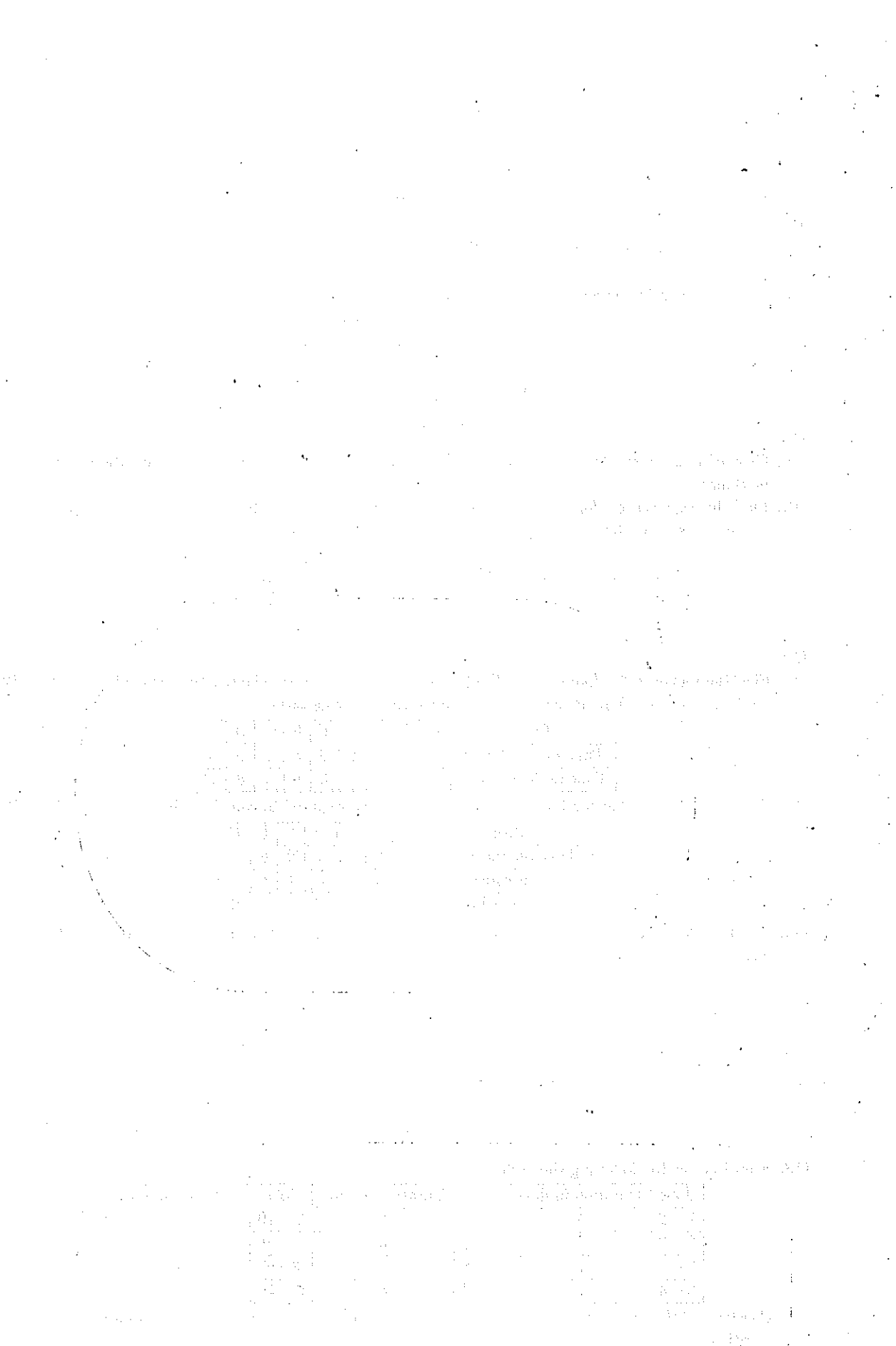


OR

Q.6 A project has the following time schedule: [10]

Jobs	Duration in days	Jobs	Duration in days	Jobs	Duration in days
1 – 2	2	3 – 5	5	6 – 10	4
2 – 3	7	4 – 6	3	7 – 9	4
2 – 4	3	5 – 8	5	8 – 9	1
3 – 4	3	6 – 7	8	9 – 10	7

Construct PERT network and compute total float for each activity and Find Critical path with its duration.



SEAT No._____

[52/A-24]

SARDAR PATEL UNIVERSITY

B.Sc. Semester – IV Examinations

18th April, 2017

Tuesday

Course Code: - US04ESTA01

(Operation Research-II)

Time:-02:00 to 04:00 Marks: - 70

Note: - Simple/ Scientific calculator is allowed.

Q.1. Select an appropriate answer for the given choice. [10]

1. An assumption of assignment problems _____.
   a) the number of assignees and the number of tasks are the same
   b) the objective is to optimize the number of assignments not made
   c) each task is to be performed by more than one assignee
   d) All of these.
2. If an assignment problem consists of 8 workers and 7 projects, _____.
   a) one worker will not get a project assign.
   b) one worker will be assigned two projects
   c) each worker will contribute work toward the seventh project
   d) one project will not get a worker assigned.
3. The method used for solving an assignment problem is called_____.
   a) Hungarian method
   b) reduced matrix method
   c) MODI method
   d) none of these.
4. Games which involve more than two players are called _____.
   a)conflicting games
   b)negotiable games
   c)n-person games.
   d)none of these.
5. In a zero sum game _____.
   a) one player wins, the other loses.
   b) the sum of each player winnings if the game is played many times must be zero.
   c) the game is unfair-each person has equal chance of winning
   d) long run profits must be zero.
6. The size of the payoff matrix is reduced by using the principle of_____.
   a) Game inversion
   b) Dominance property
   c) rotation reduction.
   d)none of these.
7. In the graphical method for solving 2xn game, the highest point on this lowest boundary gives the _____Point.
   a) minimum
   b) minimax
   c) maximin
   d)none of these.
8. Which of the following statements is true?

Company A	I	II	III	IV
I	2	6	5	2
II	4	4	4	1
III	1	1	1	0

a) A1 is superior to A2	b) A3 is inferior to A2	c) both (a) and (b)	d)none of these.

9. The Objective of network analysis to

a) Minimize total p roject duration	b) Minimize total project profit.	c) Minimize production delays, interruption and conflicts.	d) None of these

10. If an activity has zero slack, it implies that

a) It lies on the critical path.	b) It is a dummy activity.	c) The project progressing well.	d) None of these

Q.2. Attempt any **Ten** questions from the following questions:- [20]

1. What is an assignment problem? State its mathematical form.
2. What is an optimal criterion in the assignment problem?
3. How will you develop new revised opportunity cost matrix?
4. What are the characteristics of Game theory?
5. State the four properties which a competitive situation should have, if it is competitive game.
6. What is Game theory? State its applications.
7. What are Inferior and Superior strategies?
8. State the rules for Dominance property.
9. Solve the following 2x2 game without saddle points:

$$\begin{vmatrix} 2 & 1 \\ 1 & 6 \end{vmatrix}$$

10. What is PERT and CPM?
11. What is independent float and free float?
12. State Rules for Network Diagram

Q.3.(a) A departmental head has four subordinates, and four tasks to be performed. The subordinates differ in efficiency, and the tasks differ in their instincts difficulty. His estimate, of the time each man would take to perform each task, is given in the matrix below: [05]

Man-hours

Tasks	E	F	G	H
A	8	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

How should the tasks be allocated, one to a man, so as to minimize the total man-hours?

(b) A project work consists of four major jobs for which an equal number of contractors have submitted tenders. The tender amount quoted (in lakh rupees) is given in the matrix. [05]

Job

Contractor	A	B	C	D
1	10	24	30	15
2	16	22	28	12
3	12	20	32	10
4	9	26	34	16

Find the assignment which minimizes the total cost of the project, when each contractor has to be assigned at least one job.

OR

Q.3.(a) A city corporation has decided to carry out road repairs on main four arteries of the city. The government has agreed to make a special grant of Rs. 50 lakh towards the cost with a condition that the repairs be done at the lowest cost and quickest time. If the conditions warrant, a supplementary taken grant will also be considered favorably. The corporation has floated tenders and five contractors have sent in their bides. In order to expedite work, one road will be awarded to only one contractor. [06]

Cost of repairs (Rs in lakh)

Contractor\Roads	R1	R2	R3	R4
C1	9	14	19	15
C2	7	17	20	19
C3	9	18	21	18
C4	10	12	18	19
C5	10	15	21	16

a) Find the best way of assigning the repair work to the contractors and the cost.

b) If it is necessary to seek supplementary grants, what should be the amount sought?

c) Which of the five contractors will be unsuccessful in his bid?

(b) State and discuss the methods for solving an assignment problem. [04]

Q.4.(a) Explain Maxi-min and Mini-max principle using Game theory? [05]

(b) Two players independently select one of 'mouse', 'cat', 'tiger' and ' elephant' and simultaneously reveals their choices. It is known that the cat chases the mouse (for score 1), the tiger chases the cat (for score 2), the elephant chases the tiger (for score3) and the mouse chases the elephant (for score 4). All other combinations yield a zero score. Formulate the payoff matrix and determine the value of the game if it exists. [05]

OR

Q.4.(a) i)Define the terms:-

a) Pure strategies b) Mixed strategies. [05]

ii) Define saddle point and the value of game. State the rules for detecting a saddle point

(b) i)For the following pay-off matrix for firm A, determine the optimal strategies for both firms and the value of the game. [05]

	Firm B		
Firm A	-3	-2	-3
	2	0	2
	5	-2	-4

ii) For which values of 'X' the game with the following pay-off matrix is strictly determinable?

	B		
A	B1	B2	B3
A1	X	6	2

A2	-1	X	-7
A3	-2	4	X

Q.5.(a) Obtain the optimal strategies for any zero-sum two person game where optimal strategies are not pure strategies and for which the player A's payoff matrix is [05]

Player B

$$\text{Player A} \begin{matrix} x1 \\ x2 \end{matrix} \begin{bmatrix} y1 & y2 \\ v11 & v12 \\ v21 & v22 \end{bmatrix}$$

(b) How will you solve 2xn game graphically? [05]

OR

Q.5.(a) Solve the following (2 X 4) game. [05]

Player B

Player	I	II	III	IV
I	2	2	3	-1
II	4	3	2	6

(b) Two competitors A and B are competing for the same product. Their different strategies are given in the following payoff matrix: [05]

Company B

Company A	I	II	III	IV
I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	0

Obtain optimum strategies for the both the players.

Q.6. A project has the following time Schedule. Construct a PERT network and compute [10]

1. Critical Path and its duration.
2. Calculate Total float, Free float and independent float available for the project.

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-7
Time in Weeks	2	2	2	4	5	8	4
Activity	6-8	7-9	8-9	9-10			
Time in Weeks	4	5	3	4			

Or

Q.6.(a) Write the steps of Backward Pass Calculation for calculating the critical path analysis. [05]

(b) Explain in brief Activity and Event commonly used in the Network diagram? [05]

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[61/A-24] SEAT No._____ No. of Printed Pages : 3

SARDAR PATEL UNIVERSITY

B.Sc. Semester – IV Examination

Saturday, 15th April, 2017

US04ESTA04

(Biostatistics – II)

Time: 2.00 to 4.00 p.m M.Marks: 70

Note: (i) Statistical table will be allowed /provided on request (ii) Simple/Scientific calculator is allowed.
(iii) Q.3 to 6 each sub question have 5 marks.

Q.1 Multiple Choice Questions (10×1)

(1) In hypothesis testing, the hypothesis tentatively assumed to be true is

(a) the alternative hypothesis (b) the null hypothesis

(c) either the null or the alternative (d) None of these alternatives is correct.

(2) In the regression $Y = 4X + 2$, what does the 2 represent?

(a) Y intercept (b) Slope of the line

(c) Any value of the independent variable that is selected (d) None of the above

(3) A group of 10 men were given a special diet for two weeks to test weight loss in pounds. The observed data was:

Man	1	2	3	4	5	6	7	8	9	10
Weight before	181	171	190	187	210	202	166	173	183	184
Weight after	178	172	185	184	201	201	160	168	180	179

To determine if the data provide sufficient evidence to indicate the special diet leads to a weight loss, the appropriate test procedure is :

(a) unpaired t - test (b) paired t - test

(c) both (a) and (b) (d) None of these

(4) The area under the normal curve between $z = -1$ and $z = 0$ is _____ the area under the normal curve between $z = 0$ and $z = 1$.

(a) Less than (b) Greater than (c) Equal to (d) None of these

(5) If $r_{XY} = -0.84$ then $r_{YX} = ?$

(a) -0.84 (b) 0.84 (c) 0.48 (d) None

(6) Under what conditions would you use the paired t-test?

(a) When there is a single sample of data (b) When the two samples of data are independent

(c) When there are two proportions (d) when the two samples of data are not independent

(7) The regression lines of X on Y and Y on X

(a) Do not intersect (b) Intersect at any point

(c) Intersect at $(\overline{X}, \overline{Y})$ (d) None of these

(8) If the random variable Z is the standard normal score, which of the following probabilities could easily be determined without referring to a table?

(a) $P(Z > 2.86)$ (b) $P(Z < 0)$ (c) $P(Z < -1.82)$ (d) $P(Z > -0.5)$

(9) The degrees of freedom in t - test for testing specified mean for single population is

(a) $n + 1$ (b) $(n - 1)/2$ (c) $n - 1$ (d) $2n - 1$

(10) Which of the following values cannot occur in a chi square distribution?

(a) 38.4 (b) 0.61 (c) 110 (d) -2.45

Q.2 Short Type Questions (Attempt Any Ten) (10×2)

(1) What is Scatter plot (diagram)? Write down its limitations.

(2) Two types of drugs were used in 5 patients each for reducing their weights. The decrease in the weight after using the drugs for six months was recorded as given below:

Drug - A	11	13	12	14	10
Drug - B	12	9	8	15	9

Identify the objective of the study. Which statistical test would you use for the same? Write down the required test procedure.

(3) The coefficient of correlation between two variables X and Y is 0.72, the covariance is 36 and the variance of X is 36, then find the standard deviation of Y.

(4) State any four properties of Normal distribution.

(5) Define two types of errors in the testing of hypothesis.

(6) What does a coefficient of correlation 0.7 means?

(7) Write down the teststatistic would you use for the following:

(i) Comparing two population means based on large samples from the two populations respectively.

(ii) Comparing two population means based on small samples from the two populations respectively.

(8) List out the various properties of regression coefficients.

(9) Juhi earned a score of 940 on a national achievement test. The mean test score was 850 with a standard deviation of 100. What percentage of students had a higher score than Juhi? (Assume that test scores are normally distributed.)

(10) Let $X \sim N(86, 25)$, determine $P(70 < X < 80)$.

(11) State the conditions under which paired t – test is used.

(12) Write in brief on chi square test in a 2×2 contingency table.

Q.3(a) Define (i) correlation coefficient (ii) Regression equation of X on Y.

(b) From the following data calculate (i) the correlation coefficient and comment on it (ii) two regression coefficients (iii) predict the height of oak tree at the age of 43 years.

Oak Tree	1	2	3	4	5	6	7	8	9	10	11	12
Age (years)	97	93	88	81	75	57	52	45	28	15	12	11
Height (inches)	12.5	12.5	8.0	9.5	16.5	11.0	10.5	9.0	6.0	1.5	1.0	1.0

OR

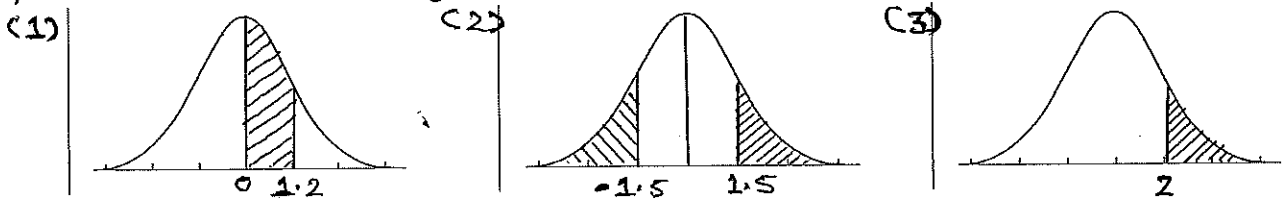
Q.3(a) Write a note on Karl Pearson's correlation coefficient method.

(b) A random sample of eight drivers insured with a company and having similar auto insurance policies was selected. The following table lists their drier experiences (in years) and monthly auto insurance premiums (in dollars)

Driving Experience	5	2	12	9	15	6	25	16
Monthly Insurance Premiums	64	87	50	71	44	56	42	60

(i) Does the insurance premium depends on driving experience? Justify your answer by calculating most suitable statistical measure (ii) find the least squares regression line by choosing appropriate dependent and independent variables (iii) Predict the monthly auto insurance premium for driver with 10 years of driving experience.

Q.4(a) Find the area of the indicated region under the standard normal curve.



(b) Studies have determined that the average gestation period (time between conception and giving birth to a child) for humans to be 266 days, with standard deviation is about 16 days. If the gestation period is normally distributed, then find the percentage of pregnancies which would be (i) between 260 to 280 days (ii) more than 39 weeks?

OR

Q.4(a) The lengths of Atlantic croaker fish are normally distributed with a mean of 10 inches and standard deviation of 2 inches. An Atlantic croaker fish is randomly selected.
Find the probability that the length of randomly selected fish is (i) less than 7 inches (ii) between 7 and 15 inches (iii) more than 15 inches.

(b) Pulse rates of adult men are normally distributed with a mean of 70 and standard deviation of 8. Find the probability that a randomly selected man have pulse rate (i) greater than 78 (ii) between 60 to 72
(iii) More than median.

Q.5(a) Write a note on unpaired t – test.

(b) A study was performed on 200 school students to investigate whether regular vitamin – A supplementation was effective in preventing colds. 100 were randomized to receive daily vitamin – A supplements during the

month of march and other receive placebo (and did not receive vitamin – A). The no. of students getting at least one cold was computed in the two groups, and the results are given in the following 2×2 contingency table.

	Cold	No cold	Total
Vitamin - A	15	85	100
Placebo	25	75	100
Total	40	160	200

Is vitamin – A supplement is effective in preventing colds? Test at $\propto = 0.05$

OR

Q.5 Recorded from a maternity hospital for 91 births in a given week indicated the following.

Mother's age (years)	Type of birth	
	No complications	With complications
Under 25	42	3
25 - 29	14	1
30 - 34	8	4
35 & over	12	7

(i) Test at 5% level of significance, the hypothesis that the incidences of complications are independent of the age of the mother (ii) If the null hypothesis is rejected after an analysis of the data, can we conclude that the incidence of complications is higher in upper age-group (35 & over) than in lower age-group (Under 25)?

Q.6(a) A sample of 8 patients had their lung capacity measured before and after a certain treatment with the following results:

Patient	1	2	3	4	5	6	7	8
Before	750	860	950	830	750	680	720	810
After	850	880	930	860	800	740	760	800

Use t - test to test the hypothesis that the treatment provides no increase in lung capacity.

(b) A medical researcher wishes to see whether the pulse rates of smokers are higher than the non smokers. Samples of 100 smokers and 100 non smokers are selected. The results are shown below:

Smokers	Non - smokers
$n_1 = 100$	$n_2 = 100$
$\overline{X_1} = 90$	$\overline{X_2} = 88$
$S_1 = 5$	$S_2 = 6$

Can the researcher conclude that smokers have higher pulse rate than non – smokers? Test at $\propto = 0.05$

OR

Q.6(a) The albumin blood levels of 10 dialysis patients are:

39	36	34	30	28	33	34	29	21	32

Perform a one – sided test of the hypothesis that the mean albumin level among the dialysis patients is greater than or equal to 35?

(b) Two diets were to be compared. Seventy five individuals were selected at random from a population of overweight people. Forty of this group were assigned to diet A and the remaining thirty five were placed on diet B. The weight losses in pounds over a period of one week were found and the following information was recorded.

	Sample size	Sample mean(lbs)	Sample variance
Diet - A	40	10.3	7.00
Diet - B	35	7.3	3.25

Is Diet – A is better than diet – B? Test at $\alpha = 0.05$.

———— X — X ————

SEAT No._____ No of Printed Pages : 02

[85/A-43]

SARDAR PATEL UNIVERSITY

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

2017

THURSDAY, 13th APRIL

Time: 2.00 p.m. to 4.00 p.m.

US04EZOO01 (ZOOLOGY-ELECTIVE)

(CHORDATES, PHYSIOLOGY, IMMUNOLOGY AND ECOLOGY)

Note: 1. Answers of all the questions (including multiple choice questions) should be written in the provided answer book only

2. Figures to the right indicate the full marks of sub question

3. Draw neat and labelled diagrams wherever necessary

Maximum Marks: 70

Q. 1. Multiple choice questions **(10)**

1. The tail in Scoliodon is _____.
   a. Homocercal **b.** Heterocercal **c.** Hypocercal **d.** Hypercercal
2. The heart in *Scoliodon* receives _____.
   a. Both arterial & venous blood **b.** only arterial blood
   c. Only venous blood **d.** blood from gills
3. Red pulp and white pulp are found in _____.
   a. Bone **b.** Tooth **c.** Skeletal muscles **d.** Spleen
4. Both B and T cells of immune system are produced in _____.
   a. Spleen **b.** Bone marrow **c.** Thymus **d.** Lymph nodes
5. The ability of the body to defend itself against specific invading agents is called _____.
   a. Innate immunity **b.** Immunology **c.** Adaptive immunity **d.** Non-specific immunity
6. The age of sexual maturity is called _____.
   a. Manopause **b.** Menarche **c.** Puberty **d.** Pregnancy
7. Leydig cells secrete _____.
   a. FSH **b.** LH **c.** Testosterone **d.** GnRH
8. In freshwater ecosystem, the uppermost layer is called _____.
   a. Epilimnion **b.** Hypolimnion **c.** Metalimnion **d.** Thermocline
9. Homeothermic animals are also called _____ animals.
   a. Endothermic **b.** Ectothermic **c.** Exothermic **d.** Mesothermic
10. Study of interaction between living organisms and their environment is known as _____.
    a. Ecology **b.** Eco-geography **c.** Ethology **d.** Synecology

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

1. Give details about fins of *Scoliodon*
2. Draw and describe placoid scale of *Scoliodon*
3. Describe the structure of heart of Scoliodon
4. Enlist lymphatic trunks
5. Mention about the fluids involved in non-specific immune response
6. What are Epitopes? What are haptens?
7. State location and function of Seminal vesicles
8. What is implantation?
9. Write about Epididymis
10. Write any two effects of light on animals
11. Define: Homeothermic and poikilothermic animals
12. Define ecosystem. Enlist biotic and abiotic factors of ecosystem

Q. 3. Describe in detail digestive system of Scoliodon with diagram **(10)**

OR

Q. 3. **a.** Describe mechanism and physiology of respiration of Dogfish **(06)**

b. Draw neat and labeled diagrams of brain of *Scoliodon* **(04)**

Q. 4. **a.** Describe the structure of antibody in detail with diagram **(06)**

b. Mention primary and secondary lymphatic organs and state their locations. **(04)**

OR

Q. 4. Write a detailed note about first line of defense of innate immunity **(10)**

Q. 5. **a.** Describe the process of Oogenesis and draw the diagram **(06)**

b. Draw a neat and labeled diagram of sperm and describe **(04)**

OR

Q. 5. **a.** Write about different phases of Menstrual Cycle **(06)**

b. Write about fertilization briefly **(04)**

Q. 6. **a.** Write about adaptations of organisms in response to extreme temperatures **(06)**

b. Write a short note on the components of pond ecosystem **(04)**

OR

Q. 6. **a.** Explain about effect of temperature on reproduction of organisms **(06)**

b. Write a short note on dormancy **(04)**

(A-19) Seat No.:_____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

B.Sc. IV-SEMESTER EXAM-2017 (2010 BATCH) (NC)

ELECTIVE ZOOLOGY, US04EZOO01 (CHORDATES,PHYSIOLOGY& ECOLOGY)

20-03-2017,Monday **Time: 2pm to 4pm** **Marks: 70**

Q-1. MULTIPLE CHOICE QUESTIONS. **(10)**

1. The function of lateral line system is

   (a) Photoreceptor (b) Thermoreceptor (c) Chemoreceptor (d) Rheoreceptor

2. Tail in Shark is

   (a) Hypocercal (b) Heterocercal (c) Hypercercal (d) Homocercal

3. Liver of Shark is_____ lobed.

   (a) Two (b) Three (c) Four (d) Five

4. Implantation of Human embryo occurs at

   (a) Ovary (b) Oviduct (c) Uterus (d) Vagina

5. Polar body is form during

   (a) Fertilization (b) Oogenesis (c) Spermatogenesis (d) All of these

6. Which one of the following enzymes produced by acrosome of Human sperm?

   (a) Hyaluronidase (b) Pepsinogen (c) Testis (d) Lactase

7. Which one of the following is considered as a lymphoid organ?

   (a)Kidney (b) Stomach (c) Spleen (d) Testis

8. Which one is responsible for the maturation of T-cells?

   (a) Thymus gland (b) Thyroid gland (c) Spleen (d) All of these

9. Phytoplankton is included under

   (a) Decomposers (b) Producers (c) Consumers (d) Abiotic components

10. Name the animal which belongs to Homeotherms

    (a) Frog (b) Calotes (c) Camel (d) Python

(P.T.O.)

Q-2. ANSWER THE FOLLOWING QUESTIONS IN SHORT (ANY TEN). (20)

1. Draw and labeled the diagram of Shark external characters.
2. Write about economic importance of Shark.
3. Name the sensory organs present in Shark.
4. Name & give the functions of hormones synthesized by Human Ovary.
5. Draw and labeled the T.S. of Human Testis.
6. Write about menopause stage.
7. Explain the term antigen and antibody.
8. Write about maturation of T and B cells.
9. Draw and labeled the structure of Immunoglobulin.
10. Explain the term Poikilotherms with example.
11. Classify the fresh water media according to temperature range.
12. Name the abiotic components of ecosystem.

Q-3. (a) Describe the alimentary canal of Shark. (7)

(b) Explain the mechanism of respiration in Shark. (3)

OR

Q-3. (a) Describe the structure and working of Shark heart. (7)

(b) Draw and labeled the female reproductive system of Shark. (3)

Q-4. (a) Write about puberty changes occur in Human. (6)

(b) Explain the spermatogenesis in human. (4)

OR

Q-4. Describe the Human female reproductive system with labeled diagram. (10)

Q-5. (a)Describe the cell mediated immunity. (6)

(b) Write a note on structure and functions of Spleen. (4)

OR

Q-5. (a) Write about non - specific immunity. (6)

(b) Discuss about the characteristic and functions of IgG and IgA. (4)

Q-6. Write a note on effects of temperature on Animals. (10)

OR

Q-6. Describe the biotic components of the ecosystem in detail. (10)

SEAT No. [88/A-457]

No. of Printed Pages: 02

Sardar Patel University
B.Sc. Semester - IV Examination
Tuesday, 11th April, 2017
Course Code: USC04CSTA01
(Statistical Techniques)

Time: 2 .00 to 5.00 pm

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 6 each sub question have 5 marks

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Q.1 Multiple Choice Questions (10×1)

(1) If a regression equation is given as $Y = -0.1X + 20$ and the coefficient of determination is 0.49, then the value of correlation coefficient is
(a) 0.49 (b) -0.1 (c) 0.7 (d) -0.7

(2) Suppose the correlation coefficient between height (as measured in feet) versus weight (as measured in pounds) is 0.40. What is the correlation coefficient of height measured in inches versus weight measured in ounces? (12 inches = 1 foot, 16 ounces = 1 pound)
(a) 0.40 (b) -0.40 (c) 0.30 (d) cannot be determined

(3) Which of the following distribution used in the construction of charts for number of defects per item is
(a) Binomial (b) Poisson (c) Normal (d) All of these

(4) Which of the following method is used to estimate the unknown constants in the equation $Y = a + bX$?
(a) Free hand curve method (b) least squares method
(c) method of smallest deviation (d) All of these

(5) Time series analysis is used to
(a) understand the past behaviors of time series (b) understand the present situation
(c) predicting the future values of the series (d) All of the above

(6) Twenty samples of size 150 are taken. The total number of defective items is 117. The Lower Control Limit for np – chart is
(a) 0.0390 (b) -1.2631 (c) -0.039 (d) 0

(7) Increase in the number of patients in the hospital due to heart stroke is
(a) secular trend (b) Irregular variation (c) Seasonal variation (d) Cyclic variation

(8) If the lower control limit of a p – chart is negative,
(a) A mistake has been made in computation (b) It is set to zero
(c) Use the absolute value of the lower control limit (d) None of these

(9) If the coefficient of determination is equal to 0.64, then the correlation coefficient
(a) must also be equal to 0.8 (b) can be either -0.8 or $+0.8$
(c) can be any value between -0.8 to $+0.8$ (d) must be -0.8

(10) Moving average method is used to find the
(a) secular trend (b) Irregular variation (c) Seasonal variation (d) Cyclic variation

Q.2 Short Type Questions (Attempt Any Ten) (10×2)

(1) Twelve samples of size four are selected from a production line.
(a) What is the value of the A_2 factor used to determine lower and upper control limits for mean?
(b) What are the values of D_3 and D_4 factors used to determine the lower and upper control limits for range?

(2) Prove that two independent variables are uncorrelated but converse is not true.

(3) What does a coefficient of determination 0.49 means?

(4) Mention the components of Time series. Write in brief about any one of them.

(5) What is the tangent of the angle between two regression lines? When will two regression lines parallel to each other?

(6) Write in brief about scatter plot with its limitations, if any.

(7) What do you mean by Time Series analysis?

(8) State the nature of the following correlations:
(i) Age of applicant for life insurance and the premium of insurance
(ii) The colour of sari and the intelligence of the lady who wears it.

(9) How will you estimate the unknown constants in the equation $Y = f(x)$? Write in brief about it?

(10) If one or more points fall below LCL in construction of p chart, what would you conclude from that?

(11) Determine 'a'and 'b' in the equation $Y = ab^X$ to the following data.

X	2	4	6	8	10
Y	3.07	12.85	31.47	57.38	91.29

(12) State the limits of ρ. When it will be maximum? Justify your answer by giving counter example.

Q.3 (a) Explain the meaning of correlation. State the extreme values of coefficient of correlation and interpret them. If the coefficient of rank correlation is 1, is it necessary that the coefficient of correlation is also 1? Give an example in

1

support of your answer.

(b) The following table shows the number of diabetic patients ('000) in a city from 2003 to 2012. Fit a second degree parabola and forecast the number of diabetic patients for the year 2013 and 2014.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
No. of patients	4.5	6.1	8.2	11.0	14.9	20.1	27.1	36.6	49.4	66.7

OR

Q.3 (a) Which method do you recommend to study relationship between individual possessing qualitative characteristics? Name and Write down about it.

(b) Using method of least squares fit a relation of the form $Y = aX^b$ to the following data. Estimate Y when $X = 8$ and 10.

X	2	3	4	5	6
Y	144	172.8	207.4	248.8	298.5

Q.4 (a) List out the various properties of regression coefficients. Prove any two.

(b) The success of a shopping center can be represented as a function of the distance (in kms) from the center of the population and the number of clients (in hundreds of people) who will visit. The data given in the table below:

No. of Customers	8	7	6	4	2	1
Distance	15	19	25	23	34	40

(i) Identify an independent and dependent variable (ii) compute r, the correlation coefficient
(iii) Determine the role of independent variable in the relationship that exists between these two variables. List out the other variables which can influence the dependent variable (iv) To receive 500 customers, at what distance from the center of the population should the shopping center be located?

OR

Q.4 (a) Why there are two regression lines? Is the two regression line intersects? When will two regression lines interchangeable?

(b) If X and Y are two independent variables with mean 5 and 10 and variance 4 and 9 respectively. Find the correlation coefficient between U and V where $U = 2X + 3Y$ and $V = 2X - 3Y$.

Q.5 (a) What is time series? State its importance. Why do we analyze time series? Give its component and discuss each of them.

(b) The following table shows the sales for ice – creams in three different seasons for the years 2011 through 2015. The sales are reported in millions of dollars. Calculate Seasonal trend values using least squares method.

Sales of ice – creams in three different seasons (in millions dollar)

Year	Winter	Spring	Summer
2011	6.7	4.6	10.0
2012	6.5	4.6	9.8
2013	6.9	5.0	10.4
2014	7.0	5.5	10.8
2015	7.6	6.1	11.7

OR

Q.5 (a) What do you understand by seasonal variation in time series? Explain the method of 'ratio to trend' to estimate seasonal variation in time series.

(b) From the following data, find the trend values by the method of semi-averages. Also, estimate the profit for 2017. Also find average annual increase in the profit.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Profit ('Lacs Rs).)	170	231	261	267	278	302	299	298	340

Q.6 (a) State the various causes of variations in the production process. Write in brief about them.

(b) From a pharmaceutical company samples of 275 bottles were taken daily for 15 days. The number of defective seals in these bottles is given below. Draw chart for fraction defectives and comment on it.

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of defective seals	28	18	40	42	32	62	50	10	30	22	80	62	76	56	30

OR

Q.6 (a) Name the control charts for attributes. Write in brief about each one of them.

(b) The following table gives the information regarding life hours of 4 LED lamps of 10 different samples. Obtain 3σ limits for $\bar{X}$ and R chart. Is the process is under control? Comment on it.

Sample no.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	3290	3180	3350	3370	3280	3240	3260	3410	3310	3510
R	360	210	50	100	50	400	500	200	300	600

—X—

SEAT No._____

[26/A24] SARDAR PATEL UNIVERSITY No. of Printed Pages : 4

B.Sc. EXAMINATION (SEMESTER: IV)

2017

April, 20th, 2017.

Thursday

Subject: Foundation of Statistics II

Subject code: USO4FSTA01

Time: 02.00 p.m. to 04.00 p.m. **Marks: 70**

1 Multiple Choice Questions [10]

(1) A _____ tells us the amount and direction of relationship between scores.
(a) regression coefficient (b) variance
(c) correlation coefficient (d) None of these

(2) Correlation coefficient is the ---------- of two regression coefficients
(a) Arithmetic Mean (b) Median (c) Mode (d) Geometric mean

(3) Ten pairs of data yield the regression equation Y = 22.5 + 1.02X.
Predict Y for X = 32?
(a) 58.46 (b) 55.14 (c) 57.81 (d) None.

(4) A Spearman rank correlation coefficient is equal to 1 when ---------- .
(a) $\sum d_i^2 < 0$ (b) $\sum d_i^2 = 0$ (c) $\sum d_i^2 > 0$ (d) None

(5) If X is a binomial distribution with n = 12 and $p = \frac{2}{3}$ then mean ------- variance.
(a) = (b) > (c) < (d) none

(6) If $f(x) = \frac{e^{-2}2^x}{x!}$, x = 0,1,2,-------,∞ and zero otherwise then P(X = 1) ..... P(X = 2).
(a) > (b) < (c) = (d) none

(7) When testing for independence in a contingency table with 4 rows and 3 columns, there are ---------- degrees of freedom
(a) 7 (b) 6 (c) 5 (d) None

(8) In Normal distribution mean, median and mode are?
(a) equal (b) not equal (c) not determined (d) none

(9) Which of the following is ***not correct*** about a standard normal distribution?
(a) $P(0 \leq Z \leq 1.50) = 0.4332$ (b) $P(Z \leq 1.0) = 0.1587$
(c) $P(Z \geq 2.0) = 0.0228$ (d) $P(Z \leq 2) = 0.9772$

(10) If X follows N(50, 64) distribution , then mean and standard deviation is
---------- and ---------,
(a) 50 and 64 (b) 8 and 50 (c) 50 and 8 (d) none

2 Short Questions (Attempt any TEN) [20]

(1) List out the various methods of studying correlation. According to you, which method is considered to be best?

(2) State the equations of both the regression lines and at what point two regression lines intersect?

(3) Define correlation coefficient. State its limits and interpret them.

(4) Two regression coefficients are - 0.4 and - 0.9 then find the correlation coefficient and state the result clearly you used.

(5) Diya earned a score of 940 on a national achievement test. The mean test score was 850 with a standard deviation of 100. What proportion of students had a higher score

than Diya? (Assume that test scores are normally distributed.)

(6) If $Z \sim N(0, 1)$ distribution then find (i) $P(Z < 0)$ (ii) $P(Z > 0)$ (iii) $P(-1 < Z < 0)$ (iv) $P(-1 < Z < 1)$ and draw the diagram for each. **(Use statistical table)**

(7) If for a Binomial distribution with $n = 7$, $P(X = 3) = P(X = 4)$ then find p.m.f. of X and $P(X = 0)$.

(8) Interviews with 185 persons engaged in a stressful occupation reveal that 76 were alcoholics, 81 were mentally depressed and 54 were both. Present the above data in the two-way frequency table.

(9) State the conditions for applicability of binomial distribution.

(10) Write in brief on chi square test in a 2×2 contingency table.

(11) Define Poisson distribution. If parameter value of a Poisson distribution is 2 then find $P(X < 2)$ and $P(X \geq 3)$.

(12) Name the probability distributions you have studied. Define the distribution for which Mean > Variance. State its mean and variance.

3 (a) The following data pertain to the resistance (ohms) and the failure time (minutes) of certain overloaded resisters: **[5]**

Resistance	43	29	44	33	33	47	34	31
Failure time	32	20	45	35	22	46	28	26

Assuming that there is a linear relationship between the resistance and the failure time, calculate r and interpret the value of r.

(b) Ten competitors in a beauty contest are ranked by three judges as follows. **[5]**

Judges	1	2	3	4	5	6	7	8	9	10
A	6	5	3	10	2	4	9	7	8	1
B	5	8	4	7	10	2	1	6	9	3
C	4	9	8	1	2	3	10	5	7	6

Which pair of judges has the nearest approach to common test of beauty

OR

3 (a) Calculate the correlation coefficient between the height X of fathers and height Y of their sons. **[5]**

X :	65	66	67	67	68	69	70	72
Y ;	67	68	65	68	72	72	69	71

Comment on the result.

(b) Obtain the rank correlation coefficient for the following data. **[5]**

X :	55	40	75	80	50	64	75	64	68	64
Y :	50	48	68	60	45	81	68	58	62	70

4 (a) An instructor wants to show the students that there is a linear correlation between the number of hours they spent watching TV(X) during a certain weekend and their scores (Y) on a test taken the following Monday. The number of television viewing hours and the test scores for 10 randomly selected students are : **[5]**

Predict the score of a student who spent 4 hours to watch TV.

X	0	1	2	3	3	5	5	5	6	7
Y	96	85	82	74	95	68	76	84	58	65

(b) Obtain the two equations of regression lines for the following data. **[5]**

Also obtain the estimate of X when Y = 70.

X :	72	69	68	67	66	67	70	65
Y :	71	72	72	68	68	65	69	67

OR

4 (a) The marks obtained by 10 students in Mathematics (X) and Statistics (Y) are given below. [5]

X :	75	30	60	80	53	35	15	40	38	48
Y :	85	45	54	91	58	63	35	43	45	44

Obtain the regression equation of Y on X. Find the marks in statistics when marks in Mathematics are 55.

(b) In an experiment the no .of grams of a given salt which dissolved in 100 gm of water was observed at eight different temperatures. [5]

Temperature(^{0}C)	0	10	20	30	40	50	60	70
Weight of salt(gm)	51.5	61.5	67.2	72.6	73.5	82.2	83.5	88.0

Predict the weight of salt which would dissolve at temperatures (a) 25^0C (b) 35^0C

5 (a) It was claim that 1 out 4 cardiologist recommend an aspirin to his/her patients to preventing the hardening of arteries. Suppose that the claim is true. If 8 cardiologists are selected at random and X be the number of cardiologists recommend an aspirin to his/her patients. [5]
(i) How X is distributed ? (ii) State mean and variance of X and (iii) $P(X \geq 5)$.

(b) If 2% of all patients with high blood pressure have bad side effects from a certain kind of medicine. Find the prob. that among 250 patients with high blood pressure treated with this medicine (i) Exactly 10, (ii) at least 5, (iii) at most 3, will have bad side effects. [5]

OR

5 (a) If the prob. is 0.20 that a certain bank will refuse a loan application. Find the prob. that the bank will refuse (i) Exactly 4 (ii) at least 3 (iii) at most 4, of 10 loan applications. [5]

(b) The probability that a patient will get reaction of a particular injection is 0.001. 2000 patients are given that injection. Find the probabilities that (a) *Exactly* 3 (b) *more than* 2, patients will get reaction. [5]

6 (a) The mean lifetime of 100 LED lights bulbs produced by a company is computed to be 3000 hours with a standard deviation of 120 hours. Find the probability that the life time of LED light bulb is (i) less than 2760 hrs (ii) between 2760 and 3240 hrs (iii) more than 3360 hrs. [5]

(b) A survey amongst women was conducted to study the family life. [5]

Education	Family life		Total
	Happy	Unhappy	
Educated	70	30	100
Uneducated	60	40	100
Total	130	70	200

Test whether there is any association between family life and education.

OR

6 (a) Among females between 25 & 75 years of age, diastolic blood pressure (b.p.) is normally distributed with mean $\mu = 75$ mmHg and standard deviation $\sigma = 15$ mmHg. What is the prob. that a randomly selected woman has a diastolic b.p (i) Less than 60 mmHg? (ii) Greater than 90 mmHg? (iii) Between 60 and 90 mmHg? [5]

(b) To determine the possible effect of a chemical treatment on the rate of seed germination, 100 chemically treated seeds and 150 untreated seeds are sown. The number of seeds that germinated is recorded. Do the data provide strong evidence that the rate of germination is different for the treated seeds and untreated seeds? **[5]**

Types of seed	Germinated	Not germinated	Total
Treated	84	16	100
Untreated	132	18	150
Total	216	34	250

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