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0204M0038

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Botany (Cytology and Molecular Techniques)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions:

All questions are compulsory and write your Answer no. properly as per given Question number.
Que-1 to 4 sub question A carry equal marks (14) or (07+07) and have internal option.
Que-1 to 2 sub question B carry (4 marks) Que-3 to 4 sub question B carry (3 marks)

Que.1: (a). **Describe** Structure and function of Nucleus **(14 marks)**

OR

Que.1: (a). **i).** Types of Endoplasmic reticulum. **(07 marks)**

ii). Structure of Plasmodesmata. **(07 marks)**

Que.1: (b) **Write short Answer (Answer ANY FOUR out of SIX)** **(04 marks)**

(i). Thickened areas of plasma membranes of two adjacent cells known as _____.

(ii). Peroxisomes contain_____(Hydrolysases / Oxidases / Transferases / Isomerases).

(iii) Lysosomes categorized in four Types, Namely,_____,_____,_____, _____,

(iv) What is Phagocytosis ?

(v) The enzymes which are normally within the cells are called_____.

(vi) Give name of content which form the plasma membrane.

Que.2: (a). Genomics-software, methods and applications **(14 marks)**

OR

Que.2: (a). **i).** Operon hypothesis. **(07 marks)**

ii). m-RNA functions. **(07 marks)**

Que.2: (b) **Write short Answer (Answer ANY FOUR out of SIX)** **(04 marks)**

(i). What is Balbiani rings.

(ii). What is the Role of Vector in Recombinant DNA.

(iii) What is called split genes?

(iv) What is Z-DNA ?

(v) Role of Promoter in Lac operon.

(vi) Define : Cell signaling.

P. T O

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Que.3: (a). Centrifugation : differential, density gradient and ultracentrifugation. **(14 marks)**

OR

Que.3: (a). **i).** Photographic methods.. **(07 marks)**

ii). Cytophotometer. **(07 marks)**

Que.3: (b) **Write short Answer (Answer ANY THREE out of Five)** **(03 marks)**

(i). Electron microscope discovered by _____.

(ii). What is the function of Condenser in Compound Microscope.

(iii) Give two names of Acidic stains?

(iv) Which stain used for DNA staining ?

(v) What is Micrometry.

Que.4: (a). Define Chromatography ? Describe Thin layer and Gas layer Chromatography. **(14 marks)**

OR

Que.4: (a). **i).** Gel electrophoresis. **(07 marks)**

ii). DNA Purification. **(07 marks)**

Que.4: (b) **Write short Answer (Answer ANY THREE out of Five)** **(03 marks)**

(i). What is Partition Chromatography.

(ii). Full form of HPTLC.

(iii) What is Karyotyping?

(iv) Define Protiomics ?

(v) What is Role of Agarose in electrophoresis .

0204M0039 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Zoology (Genetics)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.				
Q-1	(A)	Write the following		
		(i)	What are jumping genes? Explain.	07
		(ii)	What are the characteristics of eukaryotic genome? Briefly discuss each one.	07
			OR	
		(i)	Describe properties of heterochromatin.	07
		(ii)	Write an account on solenoid structure?	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What are Alu sequences?	
		(ii)	What is satellite DNA?	
		(iii)	What is reassociation kinetics?	
		(iv)	Give name of two acidic proteins involved in nucleosome assembly.	
		(v)	Write full form of ZFP non-histone protein.	
		(vi)	What is the location of X-inactivation centre?	
Q-2	(A)	Write the following		
		(i)	What is mutagenesis? Describe in detail.	07
		(ii)	Explain: Incomplete dominance and Multiple alleles.	07
			OR	
		(i)	Discuss maternal inheritance giving example of variegation in four o'clock plant.	07
		(ii)	Write a note on initiation of eukaryotic DNA replication.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Define: Transversions	
		(ii)	Define: Sex-linked inheritance. Give one example.	
		(iii)	What is the effect of base tautomerization on DNA?	
		(iv)	Give examples of maternal effect.	
		(v)	Reciprocal cross is useful to differentiate between _____ and _____inheritance pattern.	
		(vi)	Extreme 5' end of DNA replication require_____ enzyme.	
Q-3	(A)	Write the following		
		(i)	Discuss: Duplications and Translocations	07
		(ii)	Write a detailed account on aneuploidy and non-disjunction.	07
			OR	
		(i)	What are multifactorial disorders? Discuss giving examples.	07
		(ii)	What are oncogenes? Discuss.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Give 2 examples of autosomal syndromes.	
		(ii)	What is fragile-X syndrome?	
		(iii)	What is a chromosomal break?	
		(iv)	Define 'Inborn errors of metabolism'.	
		(v)	Give 1 example of an inborn error of metabolism.	

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Q-4	(A)	Write the following		
		(i)	How does *E.coli* control the transcription of genes needed in lactose metabolism?	07
		(ii)	Write applications of genetic engineering.	07
			OR	
		(i)	Explain: Negative control of the *trp* operon.	07
		(ii)	Discuss: Enzymes used in genetic engineering.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	If genes are transcribed together into a single mRNA, then that mRNA is known as _____.	
		(ii)	Write full form of NCBI.	
		(iii)	In _____ type of operon the transcription is normally on and must be turned off.	
		(iv)	Which nitrogen base is generally required at 3'end of primers for PCR?	
		(v)	5' UTR in *trp* operon is also known as_____ .	

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Geology (Crystallography)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

1. (A) Write a note on general principles of crystallography. **14**

OR

(A) (i) Tetartohedral classes. **07**

(ii) Classes represented by 4/m 2/m 2/m and 4. **07**

(B) Short Questions (Any four out of six) **04**

(i) Define crystallography.

(ii) What are international notations?

(iii) How many classes are represented by large number of minerals?

(iv) State the symmetry of cuprite.

(v) Give H. M. symbol for FeS_2.

(vi) Name the minerals represented by 4 m m.

2. (A) Write a critical note on rhombohedral division. **14**

OR

(A) (i) Classes represented by 2/m and 2. **07**

(ii) Zincite and benitoite types. **07**

(B) Short Questions (Any four out of six) **04**

(i) State the symmetry affected by hemimorphism.

(ii) Name any two quarter forms with indices.

(iii) Define tetartohedrism.

(iv) State the H. M. symbol for epsomite.

(v) Name the minerals represented by m m 2.

(vi) Give significance of clinopinacoid in clinohedral class.

3. (A) Discuss Bravais lattices and development of space lattices. **14**

OR

(A) (i) Percussion figures. **07**

(ii) Twinning terminology and types of twinning. **07**

(B) Short Questions (Any three out of five) **03**

(i) Define point group.

(ii) State the crystal habit of mica.

(iii) Define zoning.

(iv) State the types of crystal irregularities.

(v) Give the significance of etch marks.

4. (A) Write explanatory note on X-Ray Fluorescence. **14**

OR

(A) (i) Clinographic and stereographic projections. **07**

(ii) X-ray crystal structure of common salt. **07**

(B) Short Questions (Any three out of five) **03**

(i) Define SEM.

(ii) What are crystal projections?

(iii) Name the most basic crystal projection.

(iv) State the plane of projection for horizontal projection.

(v) Write about single crystal method of X-ray analysis.

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0204M0041

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

407

Life Science (Prin. of Plant Sciences & Ecology)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Explain different types of Plastids in detail. **[07]**

ii) Discuss ultrastructure of Plasmodesmata and add its significance. **[07]**

OR

i) Discuss Vacuole in plant cell. **[07]**

ii) Discuss the ultrastructure and functions of Plant Cell Wall. **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) Plant cells remain cemented together by an intracellular matrix known as _____.

ii) Give name of chemical compound deposited in Secondary cell wall.

iii) Write down the Homeostatic function of Vacuole in Plant.

iv) Write down the size of Chloroplast found in Chlamydomonas.

v) Mention the role of Integral Protein in cell membrane.

2 (A) Answer in Detail:

i) Explain the physiological effects of Ethylene with its applications. **[07]**

ii) Describe the physiological actions of Auxin. Add its applications. **[07]**

OR

i) Discuss the physiological role of Cytokinin in plant growth. Add its applications. **[07]**

ii) Describe the physiological effects of Gibberellic acid. Mention its applications. **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) Mention the physiological role of Salicylic acid.

ii) Distinguish between Growth and Development.

iii) State any two examples of Cytokinin.

iv) Give the full form of IAA.

v) Explain the role of Brassinosteroids in brief.

vi) Mention the significance of Jasmonic acid in plant physiology.

3 (A) Answer in Detail:

i) Explain aseptic condition in Plant Tissue Culture technique. **[07]**

ii) Write a note on: Self-Pollination **[07]**

OR

i) Give a detailed account on: NBPGR **[07]**

ii) Explain basic concepts of Plant Breeding. **[07]**

3 (B) Answer in Short: (Any Three) **[03]**

i) Define: Callus

ii) Explain: Insect Pollination

iii) What is the importance of Nutrient Media in Plant tissue Culture?

iv) Explain: Emasculation

v) What is Layering?

P. T. O

4 (A) **Answer in Detail:**

i) Discuss Mutualism, Commensalism and Proto Co-operation as principal positive interactions prevalent in nature. Cite appropriate examples. **[07]**

ii) Define Biogeochemical Cycle. Explain various events of Nitrogen Cycle in detail with suitable diagram. **[07]**

OR

i) Describe Population Characteristics with suitable illustrations. **[07]**

ii) Define Food Chain. Describe various types of Ecological Pyramids with suitable illustrations. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) Discuss Gause's Competitive Exclusion Principle.

ii) Distinguish between Primary and Secondary Productivity.

iii) Explain Liebig's Law of Minimum and Shelford's Law of Tolerance.

iv) Explain: Food Web

v) Differentiate between Intraspecific and Interspecific Competition.

vi) Explain: Energy Flow in Ecosystem

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0204M0042

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Environmental Science (Water Quality-New)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q1- A	Describe in detail (i) The hydrological cycle and (ii) Utilization of water.	14
	OR	
Q1-A (i)	Explain different natural conditions that influence the water quality.	07
Q1-A (ii)	Discuss the surface water and the ground water in detail with diagram.	07
Q-1 B	Short Question (Any four)	04

1. Mention the distribution of fresh water on the Earth with percentage.
2. What is unsaturated zone?
3. Define rainwater harvesting?
4. What is the main use of hydrologic modeling?
5. What is black water and grey water?
6. Why runoff water management is required?

Q2-A	Discuss determination of organic matter in detail.	14
	OR	
Q2-A (i)	Describe suspended solids and its determination technique.	07
Q2-A (ii)	How phosphorus can be determining from water sample?	07
Q2-B	Short Question (Any four)	04

1. Define: Grab sampling.
2. Enlist points to be noted while labeling a water sample.
3. What is the maximum holding period of wastewater sample for the analysis of Nitrogen and phosphorus.
4. Which form of the nitrogen is present in the wastewater?

P. T. O

5. Which instruments can be used for the analysis of heavy metal?
6. What are the sources of color and odor present in wastewater.

Q3-A Explain advanced wastewater treatment method for the removal of suspended solids and dissolved solids. 14

OR

Q3-A (i) Describe: Primary treatment of wastewater. 07

(ii) Discuss anaerobic and aerobic treatment. 07

Q3-B Short Question (Any three) 03

1. Define: Reverse osmosis.
2. Give the name of bacteria involved in the process of nitrification.
3. What is alum?
4. Describe Facultative pond.
5. What is flocculation?

Q4-A Explain the manufacturing process, waste characteristics, wastewater treatment and environmental hazards of Dairy Industry. 14

OR

Q4-A (i) Discuss manufacturing process and wastewater treatment process of Sugar Industry and distillery. 07

(ii) What are the sources of waste generation in Tanneries? Explain its treatment process. 07

Q4-B Short Question (Any three) 03

1. Chemical used for the process of bleaching in pulp and paper industry.
2. Explain characteristics of textile industry effluent.
3. Effect of Dye and dye intermediate industry effluent on Environment.
4. Give the name of chemicals used to destroy pesticides.
5. Draw a basic flow chart of WWTP.

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M.Sc. (Sem.-2) Examination

407

Environmental Science (Environmental Chemistry-Old)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q1- A Evolution of the primitive Atmosphere 14

OR

Q1-A (i) Short note on Greenhouse Effect 07

Q1-A (ii) Short note on Climate Change 07

Q-1 B Short Question (Any four) 04

1. What is mean Residence time?
2. What is meant by source and sink?
3. Are there other planets with atmospheres?
4. Is there water on other planets?
5. What is the composition of the earth's atmosphere?
6. What are the 5 types of atmosphere?

Q2-A Explain ozone layer depletion, its couses, effects and its solution. 14

OR

Q2-A (i) Nitrogen oxides as a ozone depleters 07

Q2-A (ii) The Montreal Protocol 07

Q2-B Short Question (Any four) 04

1. Uses of CFC
2. What are ozone layer depletion and its effects?
3. How does chlorofluorocarbon destroy the ozone layer?
4. Which greenhouse gas is responsible for ozone layer depletion?

P. T. O

5. Why is ozone depletion bad?
6. How can we reduce ozone levels?

Q3-A Explain hydroxyl radical as an oxidant 14

OR

Q3-A (i) Explain Photochemical smog 07

(ii) Explain Oxidation of Methane 07

Q3-B Short Question (Any three) 03

1. What is the oxidation number of carbon in methane?
2. Explain aerobic and anaerobic oxidation.
3. What is fog and smog?
4. What kinds of particles are found in Earth's atmosphere?
5. Are hydroxyl radicals harmful?

Q4-A Explain sources and chemistry of acid rain. 14

OR

Q4-A (i) Explain oxidation and deposition of sulfur oxides. 07

(ii) Explain effect of acid emissions. 07

Q4-B Short Question (Any three) 03

1. How is acid rain prevented?
2. Is rain water acidic or alkaline?
3. What are some ways to improve air quality?
4. What determine air quality?
5. Why workplace air quality does is important?

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0204M0043

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

407

Biochemistry (Plant & Env. Biochemistry)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.

Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Describe structure and functions of Plant Cell Wall. **[07]**

ii) Discuss ultrastructure of Chloroplast. **[07]**

OR

i) Describe the topography of Vacuole and emphasize its structure. **[07]**

ii) Explain structure and functions of Plasmodesmata. **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) State any two differences between composition of PS-I and PS-II.

ii) What is Cyclic Photophosphorylation?

iii) Write down the Homeostatic function of Vacuole in Plants.

iv) Which type of Chloroplast is found in Chlamydomonas?

v) Mention the role of PS-II during photosynthesis.

2 (A) Answer in Detail:

i) Discuss the physiological role of Gibberellic acid. Add its applications. **[07]**

ii) Describe the physiological effects of Auxin. Mention its applications. **[07]**

OR

i) Explain the physiological actions of ABA with its applications. **[07]**

ii) Describe the physiological effects of Cytokinin. Mention its applications. **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) State physiological action of Salicylic acid in brief.

ii) Mention the role of Brassinosteroids in plant growth.

iii) Give the full form of IBA.

iv) Explain the role of Jasmonic acid in plant physiology.

v) Explain role of Ethylene in regulation of plant growth.

vi) Mention any two examples of Cytokinin.

3 (A) Answer in Detail:

i) Explain the basic concepts and objectives of Plant Breeding. **[07]**

ii) Describe: Hybrid Vigor **[07]**

OR

i) Describe Plant Tissue Culture technique and add its applications. **[07]**

ii) Explain steps involved in Cross-pollinated Crops production. **[07]**

3 (B) Answer in Short: (Any Three) **[03]**

i) What is NBPGR?

ii) Define: Self-Pollination

iii) Name various methods used for sterilization in PTC.

iv) Give names of any two plants showing Self-pollination.

v) Define: Callus

P. T. O.

4 (A) **Answer in Detail:**

i) Give a detailed account on: Mutualism and Commensalism **[07]**

ii) Discuss Single Channel and Y-Shaped Energy Flow models of typical ecosystem with suitable diagrams. **[07]**

OR

i) Describe the role of ecological factors Light and Temperature in relation to plant and animal physiology. **[07]**

ii) Define Biogeochemical Cycle. Explain Sulphur Cycle in detail with appropriate diagram. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) Explain Liebig's Law of Minimum and Shelford's Law of Tolerance.

ii) Define: Gross Primary Productivity

iii) Explain: Acid Rain

iv) Differentiate between Standing State and Standing Crop in ecosystem ecology.

v) Outline different categories of Municipal Solid Waste.

vi) Explain: Soil Profile

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0204M0044

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Biomedical Techology (Clinical Biochemistry)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	Explain production, functions and examination of cerebrospinal fluid.	07
		(ii)	Discuss: Major types of renal stones and biochemical tests for it.	07
			OR	
		(i)	Explain importance of iron and describe determination of iron binding capacity.	07
		(ii)	Describe colorimetric method for estimation of potassium. Discuss hypo- and hyperkalemia.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What are the types of gall stones?	
		(ii)	Name the method used for determination of chloride.	
		(iii)	Level of calcium is regulated by _____ and _____ hormones.	
		(iv)	What is the normal range of chloride in plasma?	
		(v)	Explain the position of gall bladder in our body.	
		(vi)	What is the total serum calcium level in healthy humans?	
Q-2	(A)	Write the following		
		(i)	Describe functions and clinical significance of G-6-PDH.	07
		(ii)	Explain the clinical importance of enzymes.	07
			OR	
		(i)	Describe aminotransferases and their clinical importance.	07
		(ii)	Explain LDH and its clinical importance.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	SGPT is found in _____.	
		(ii)	Amylase is secreted by_____.	
		(iii)	Working pH of alkaline phosphatase is _____.	
		(iv)	Write full form of G-6-PDH.	
		(v)	What are enzymes?	
		(vi)	Acid phosphatase is produced from_____.	
Q-3	(A)	Write the following		
		(i)	Write a note on the determination of fibrinogen.	07
		(ii)	Write a method for the determination of A/G ratio.	07
			OR	
		(i)	Write a note on Lipoproteins.	07
		(ii)	Explain separation of immunoglobulins.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Write two main functions of gamma globulin.	
		(ii)	What is transferritin?	
		(iii)	What is the half-life of albumin?	
		(iv)	What is ceruloplasmin?	
		(v)	Give the full forms: VLDL, HDL, LDL and IDL.	
Q-4	(A)	Write the following		
		(i)	Describe the heart's 'natural pacemaker'.	07
		(ii)	Write a note on cardiac function tests.	07
			OR	
		(i)	Write a brief note on Inflammation of heart wall.	07
		(ii)	Explain importance of biochemical tests for CVD.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Add a note on rheumatic heart disease.	
		(ii)	What is palpation and auscultation?	
		(iii)	Mention trophic effect of heart.	
		(iv)	Define BNP test.	
		(v)	Explain role of intercalated discs.	

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0204M0045

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

407

Biotechology (Applied Microbiology)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Q.1. (A) Describe the design aspects of a batch fermenter having three-multi-bladed impeller with a neat labelled diagram. 14

OR

Q.1. (A) (i) Narrate preservation techniques used for industrially important microbial strains. Write significance of preservation. 07

(ii) Explain the medium optimization using the simplex search method. Write its importance over conventional method. 07

Q.1. (B) Write 1-2 line answers to <u>any four</u> of the following 04

(i) What do you mean by 'Tachometer'?

(ii) Explain – 'Off line sensors'

(iii) Explain - 'Rotameter

(iv) Why AISI 316 steel is used for construction of a fermenter vessel?

(v) Enlist methods of screening of industrially important microbes.

(vi) What is derivative control system?

Q.2. (A) Describe the procedure of different physiological state fungal cultures used for inoculum development with suitable examples and write its significance. 14

OR

Q.2. (A) (i) Discuss industrial scale batch sterilization of fermentation media using moist heat. 07

(ii) Discuss various approaches used for cell disruption and how they affect in product recovery? 07

Q.2. (B) Write 1-2 line answers to <u>any four</u> of the following 04

(i) Define - K_La

(ii) Enlist methods used for measuring OTR

(iii) Name any two packing material used in adsorption chromatography.

(iv) What is liquid-liquid extraction?

(v) Write major difference between depth filter and absolute filter

(vi) What are Newtonian and non-Newtonian fluids?

Q.3. (A) Describe various fermented food and role of microorganisms associated 14

P. T O

with them.

OR

Q.3. (A) (i) Explain step-wise production of cheese with flow chart. 07

(ii) Write detail note on nutraceuticals. 07

Q.3. (B) Write 1-2 line answers to <u>any three</u> of the following 03

(i) What is the benefit of HTST?

(ii) What is the difference between prebiotics and probiotics?

(iii) Enlist types of cheese

(iv) What are starter cultures?

(v) Explain - phytochemicals

Q.4. (A) What is algal biomass? Discuss uses of algal biomass with examples and write their importance. 14

OR

Q.4. (A) (i) Discuss general steps involved in cultivation process of edible mushrooms. What is the advantage of this technology? 07

(ii) Describe microbial production of β-carotene and write its application. 07

Q.4. (B) Write 1-2 line answers to <u>any three</u> of the following 03

(i) Explain difference between (+) and (-) strain of *B. trispora.*

(ii) What are the peculiar characteristics of baker's yeast?

(iii) Define – 'spawns'

(iv) What is the C:N ratio required for SCO production?

(v) Enlist various processes for production of SCP

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| /33 **0204M0046** Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Int. Biotechology (Biostatistics & Bioinfo.)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Que-1 (A) The incubation periods (years) of a random sample of 14 HIV infected individuals is: 12.0, 10.5, 5.2, 9.5, 6.3, 13.1, 13.5, 12.5, 10.7, 7.2, 14.9, 6.5, 8.1, and 7.9. Calculate the sample Mean, Median, Variance and Standard Deviation. [14]

(OR)

1. Compare Binomial and Normal distributions. [7]
2. Explain types of errors and add a note on Level of significance. [7]

(B) Answer any Four of the following in brief [4]

1. If Average of a series of values is 10 and their Variance is 4, then Coefficient of variation is: (a) 10% (b) 20% (c) 40% (d) 80%
2. The computed value of Chi-Square is always positive (True/False)
3. A normal curve is ..... shaped.
4. What is ANOVA?
5. What is the Mode in the distribution 25, 17, 23, 23, 24, 25, and 23?
6. What is SPSS?

Que-2 (A) Describe principle and techniques used in digital image analysis. [14]

(OR)

1. Discuss medical scan analysis and its uses. [7]
2. Briefly explain applications of digital image analysis. [7]

(B) Answer any Four of the following [4]

1. What is Remote sensing?
2. What is Pixel?
3. Spatial coordinates of digital image (x,y) are proportional to brightness (True/False)
4. What is pose?
5. Write principle of MRI
6. Initial step in any image processing technique is .....

Que-3 (A) Write a brief note on drug design by blocking enzyme activity, nucleic acid and peptide synthesis approaches. [14]

(OR)

1. Explain molecular docking methods. [7]
2. Discuss briefly construction of phylogenetic tree by neighbour joining method. [7]

(B) Answer any Three of the following in brief [3]

1. A compound that has desirable properties to become a drug is called
   (a) Lead (b) Find (c) Fit drug (d) Fit compound
2. What are identifiers in PERL?
3. Give example of binding operator in PERL
4. What is the use of MATLAB?
5. QSAR is .....

Que-4 (A) Discuss various research methods used in nanoscience. [14]

(OR)

1. Explain synthesis and self-assembly of nanoparticles [7]
2. Describe role of nanobiotechnology in cancer and surgery. [7]

(B) Answer any Three of the following in brief [3]

1. What is tissue engineering?
2. Which kind of nano materials can be used to make Fabrics?_____
3. Nano-materials are used in light emitted electro luminescence devices (True/False)
4. Give use of silica-coated Iron oxide nano-particles in nanoscience
5. Name metallic nano-particles extensively used as catalyst in nanotechnology.

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0204M0047

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Human Genetics (Molecular Biology)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	Write principle, method & applications of agarose gel electrophoresis.	07
		(ii)	Give brief account on various types of DNA modifier enzymes.	07
			OR	
		(i)	What is PAGE? Write method & applications of PAGE.	07
		(ii)	Write quantitative & qualitative analysis technique for isolated DNA.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Which shape of molecule shows faster separation during electrophoresis?	
		(ii)	Which electrophoresis technique used to separate > 20kb DNA?	
		(iii)	RNase P is an example of ribozyme because it contains _____.	
		(iv)	Trizol solution is very important for isolation of _____.	
		(v)	What is star activity of restriction enzyme?	
		(vi)	Differentiate between exonuclease and endonuclease.	
Q-2	(A)	Write the following		
		(i)	Write brief note on types and applications of ELISA.	07
		(ii)	Discuss protein blotting technique in detail.	07
			OR	
		(i)	What is PCR? Write various steps and applications of PCR technique.	07
		(ii)	Describe steps involved in oligonucleotide synthesis.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Molecular Beacons useful in _____PCR technique.	
		(ii)	What is multiplex PCR?	
		(iii)	Write contribution of Karry Mullis in the field of molecular biology.	
		(iv)	What is the principle of Southern hybridization technique?	
		(v)	Which RNase inhibitor used in Northern blotting technique?	
		(vi)	Why DBN paper is more useful in RNA related blotting technique?	
Q-3	(A)	Write the following		
		(i)	Write an account on Maxam and Gilbert DNA sequencing technique.	07
		(ii)	Give detail account on capillary sequencing technique.	07
			OR	
		(i)	Write an account on chain termination method for DNA sequencing.	07
		(ii)	What is microarray? Describe method and applications of it.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Give full form of SOLID.	
		(ii)	What are three general steps used to perform NGS?	
		(iii)	Give name of different types of DNA microarray.	
		(iv)	How chain elongation termination carried out in Sanger DNA sequencing?	
		(v)	Which molecule used to cleave the phosphodiester bond in chemical degradation method of DNA sequencing?	
Q-4	(A)	Write the following		
		(i)	Explain in detail preparative centrifugation.	07
		(ii)	Give a brief description of gel permeation and affinity chromatography.	07
			OR	
		(i)	Describe the instrumentation and working principle of infrared spectrometer. Add a note on FTIR.	07
		(ii)	Give a,detailed account on TLC and HPTLC.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is a monochromator?	
		(ii)	Differentiate adsorption and partition chromatography.	
		(iii)	What is preconditioning in chromatography?	
		(iv)	What are chaotropic agents? Give an example.	
		(v)	What is Lambert's law?	

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0204M0048 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Bioinformatics (Classical & Molecular Genetics)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Q 1. (A) Give a note on various principles of inheritance [14 marks]

OR

(A) Describe linkage with suitable examples. [7 marks]

(A) Define Gene editing. Give a brief note on various gene editing methods [7 marks]

(B) Answer any four [4 marks]

1.What is anti codon?

2. In a DNA strand the nucleotides are held together by:

(A) Peptide bonds (B) Phosphodiester bonds

(C) Glycosidic bonds (D) Hydrogen bonds

3. What is test cross?

4. Fundamental principles of genetics were developed by

(A) Gregor Johann (B) Edward Jenner

(C) J.Watson and F.Crick (D) Darwin and Lamark

5. On comparing wrinkled seeded plant and round-seeded plant, round-seeded pea plant are classified as

(A)genotype (B)dominant

(C)recessive (D)phenotype

6. What is term used for alternate forms of a gene?

(A)Dominant (B)Recessive

(C)Genotype (D)Alleles

Q 2.(A) Explain protein synthesis mechanism. [14 marks]

OR

(A) Explain DNA replication. [7 marks]

(A) Define mutation and explain various types of mutations. [7 marks]

(B) Answer Any four [4 marks]

1. What is a Shine-Dalgarno sequence?

A. the replication origin B. the transcription initiation site

C. the translation initiation site D. the polyadenylation signal

2. Which structure of an eukaryotic mRNA acts as the ribosome entry site?

A. the 5' cap B. the AUG triplet sequence

C. the 5' untranslated region D. the 3' untranslated region

3. Which of following mRNA processes is catalyzed by a ribozyme?

A. Transcription B. Capping

C. Splicing D. Polyadenylation

4. DNA is replicated:

a) Conservatively b) Distributively

c) Semi-conservatively d) Dispersively

5. Which of the following sugar is found in RNA?

a) 2- deoxy Ribose b) 3-deoxy Ribose

c) D- Ribose d) D- Xylulose

6. All are nucleosides except

a) Cytosine b) Guanosine

P. T. O

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c) Inosine d) Adenosine

Q 3.(A) Explain Give a note on Polymerase chain reaction method. [14 Marks]

OR

(A) Give a note various forms of DNA. [7 marks]

(A) What are molecular scissors? Give examples [7 marks]

(B) Answer Any Three [3 marks]

1. Define cloning vectors.
2. Thermus aquaticus is the source of
   a) Taq polymerase b) Vent polymerase
   c) both a and b d) primase enzyme
3. A nonsense mutation involves:
   a) a regulatory sequence. b) an AG splice acceptor site.
   c) the creation of a different amino acid d) the creation of a stop codon.
4. Which out of the following techniques is used for the detection of gene of interest –
   a) Southern Blotting b) Polymerase chain reaction
   c) Northern Blotting d) DNA Foot printing
5. The percentage of human genome which encodes proteins is approximately
   a) Less than 2% b) 5%
   c) 25% d) 99%

Q 4. (A) Write a brief note on Bioethics and Biosafety [14 marks]

OR

(A) What is IPR? Give brief note on it. [7 marks]

(A) DBT guidelines for Genetically modified organisms [7 marks]

(B) Answer Any Three [3 marks]

1. Which of the following is covered by the term 'Intellectual Property Rights'?
   A.Copyrights B.Know-how
   C.Trade dress D.All of the above
2. Which of the following is the Symbol of Maharaja of Air India is
   A. Copyright B. Patent
   C. Trademark D. All of the above
3. Design does not include
   A.features of shape B. composition of lines or colours
   C. mode or principle of construction D. None of the above
4. Which of the following is (are) included in Geographical indications of Goods
   A. Handicraft B. Foodstuff
   C. Manufactured D. All of the above
5. Intellectual Property Rights (IPR) protect the use of information and ideas that are of
   A. Ethical value B. Moral value
   C. Social value D. Commercial value

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0204M0049

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

407

Electronics (Microwave & Instrumentation-1)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Instructions:

(i) Symbols and terminology have their usual meanings.

Q.1(A) (i) Explain structure and properties of E-plane tee. [07]

(ii) What is circulator? Explain application of magic tee as a circulator. [07]

OR

Q.1(A) (i) Define scattering parameters for a two port network. Obtain S- matrix for H-palne tee. [07]

(ii) What are the different types of strip lines? Draw their structures. Discuss important properties of shielded stripline. [07]

Q.1(B) Answer in brief **Any Four** questions from the following: (Each question is of **one** mark). [04]

(i) What are the applications of microwave attenuator?

(ii) How many elements are there in S-matrix of a magic tee?

(iii) What are the types of directional coupler?

(iv) Define coupling factor of a directional coupler

(v) An isolator is a network having very high attenuation in the forward and backward direction. (True/False).

(vi) State two advantages of a strip lines over other types of transmission lines.

Q.2(A) (i) With neat diagram describe construction and working of reflex klystron. [07]

(ii) Obtain equation for bunching parameter in reflex klystron. [07]

OR

Q.2(A) (i) Explain the construction and working of TWT. [07]

(ii) Obtain the Hull cut-off condition for a cylindrical Magnetron oscillator. [07]

Q.2(B) Answer in brief **Any Four** questions from the following: (Each question is of **one** mark). [04]

(i) _____ is a microwave amplifier. (Reflex klystron, TWT, Magic tee)

(ii) Define π modes in magnetron.

(iii) What is skin effect?

(iv) State main advantages of MMIC.

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(v) What are the types of planer inductor films?

(vi) State applications of magnetron oscillator.

Q.3(A) (i) Write notes on micro electrodes and body surface electrodes. [07]

(ii) Describe how blood pressure is measured? Explain an instrument used to measure blood pressure. [07]

OR

Q.3(A) (i) Describe any three bioelectric potentials. [07]

(ii) Explain the electrocardiography with suitable figure. [07]

Q.3(B) Answer in brief **Any Three** questions from the following: (Each question is of **one** mark). [03]

(i) Write the name of methods for direct measurement of blood pressure.

(ii) What is a full form of EEG?

(iii) What are values of systolic and diastolic blood pressures in normal human?

(iv) What is electrode?

(v) How does stethoscope help doctor?

Q.4(A) (i) Discuss briefly the special purpose oscilloscopes with respect to their typical applications. [07]

(ii) Write a note on UV, visible and IR sources of radiation. [07]

OR

Q.4(A) (i) Discuss the spectrum analyzer instrument and give its classification. [07]

(ii) Describe operation of a spectrophotometer. [07]

Q.4(B) Answer in brief **Any Three** questions from the following: (Each question is of **one** mark). [03]

(i) What do you mean by monochromator?

(ii) Draw block diagram of dual beam oscilloscope.

(iii) Write the limitation of 'Sampling Oscilloscope'.

(iv) State different type of detector and define each one of them.

(v) Name different type of cells used in spectrophotometers for keeping sample.

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0204M0050

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Food Science (Nutrition for Fitness & Life)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary

1 (A) **Answer in Detail:**

i) What is MGRS? Discuss the MGRS performance criteria for six gross motor mile stones. **[07]**

ii) Discuss the nutrients need and the recommended dietary allowances during Infancy. **[07]**

OR

i) Describe the age-related physiological changes common among elderly people. **[07]**

ii) Discuss the ways to increase the energy density of Infant food. **[07]**

1 (B) **Answer in Short: (Any Three)** **[03]**

i) What do you understand by LBW and VLBW Infant?

ii) Enlist two advantages of breastfeeding.

iii) What is TEE?

iv) What is Parkinson's disease?

v) Write down the RDA of calcium and Iron for geriatric male population.

2 (A) **Answer in Detail:**

i) What are the food fads and fallacies? Discuss the factors influencing dietary intake of individual. **[07]**

ii) Discus anthropometric measurements to assess the nutritional status in sports person. **[07]**

OR

i) What is specific fitness? Discuss the specific fitness components related to sports. **[07]**

ii) Give definition of health according to WHO and also discuss the different types of physical activity requires for the maintenance of health. **[07]**

2 (B) **Answer in Short: (Any Four)** **[04]**

i) Write two sign and symptoms of Iron deficiency.

ii) What is cardiovascular fitness?

iii) Write the name of biochemical test needed for liver function.

iv) What is pica?

v) What is aerobic physical activity?

vi) What is MCH?

3 (A) **Answer in Detail:**

i) Give a critical review of different energy systems for endurance and power activity. **[07]**

ii) Discuss about nutritional requirements during sports performance. **[07]**

OR

i) What are the objectives for designing pre-game and post-game meal discuss in detail? **[07]**

ii) Explain the carbohydrate loading and its significance in sports. **[07]**

P. T. O

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3 (B)		**Answer in Short: (Any Three)**	[03]
	i)	How much fluid is taken during an event at one time?	
	ii)	Write full form of FITT.	
	iii)	How much time it takes to last energy in muscles in lactic energy system.	
	iv)	Give one difference between isometric and isotonic strength.	
	v)	Give any two significant role of holistic health.	
4 (A)		**Answer in Detail:**	
	i)	What is the significance of hydration during exercise and sports event?	[07]
	ii)	Give a detail account on the vegetarian diet.	[07]
		OR	
	i)	Write down the steps of Surya-Namaskar and its importance for health and Fitness.	[07]
	ii)	Write down the requirement of diet during stress management.	[07]
4 (B)		**Answer in Short: (Any Four)**	[04]
	i)	What is the urine colour chart for hydration?	
	ii)	Which form of carbohydrate is used in sport drink?	
	iii)	Write down full form of BCCAA.	
	iv)	What are the three doshas of Ayurveda?	
	v)	Define lactovegetarian diet.	
	vi)	What is Doping?	

0204M0051

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Forensic Science (Fingerprints & Imperssions)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Ques.1 (a) Answer the following questions:

i. Explain why rolled and plain prints are taken in the F.I. slips? 7Marks

ii. What is Delta and Core? Explain with figures. 7Marks

OR

i. Write down the composition of sweat. 7Marks

ii. Describe the Galton's Detail. 7Marks

Ques.1 (b) Answer the following questions: (Any Four) 4Marks

i. Name the valued prints.

ii. When unvalued pattern in the fulcrum, they are shown by _____ letters.

iii. The elevated portion of friction skin is not a finger prints. (True/False)

iv. A pattern without count is _____ .

v. Central pocket loop is a part of _____ type of pattern.

vi. Are all ridges in a finger continues?

Ques.2 (a) Answer the following questions:

i. Write down the probability of (i) 3 Loops (ii) 3 Whorls. 7Marks

ii. What is ridge count and Ridge tracing? Explain with figures. 7Marks

OR

i. How can you detect forger finger prints? 7Marks

ii. Describe the Identification of Prisoners Act 1920. 7Marks

Ques.2 (b) Answer the following questions: (Any Four) 4Marks

i. What is next to I,O _____ (In loop)?

ii. What is before OOI _____ (In whorl)?

iii. The ten digit fingerprint classification is divided in to _____ stage.

iv. Identity cannot be established without fixed points. (True/False)

v. To developed chance print on multi coloured surface _____ powder is used.

vi. How many pigeon holes are there in primary classification?

Ques.3 (a) Answer the following questions:

i. What is chance print? Give classification of chance prints. 7Marks

ii. What is the duration of latent print according to various environment factors? 7Marks

OR

i. Explain the powdering method used to develop chance print at the scene of crime. 7Marks

ii. Explain the chemical method used to develop chance print at the scene of crime. 7Marks

Ques.3 (b) Answer the following questions: (Any three) 3Marks

i. For taking finger impression always use _____ ink.

ii. Ridges are changing after death. (True/False)

iii. Palm and sole print cannot be used to establish identity. (True/False)

iv. A loop without count is _____ .

v. Faces can lie but fingerprints never. (True/False)

P.T.O.

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Ques.4 (a) Answer the following questions:

i. What is AFIS? Explain the procedure and utility of the system. 7Marks

ii. Give the contribution of pioneers in Finger print science. 7Marks

OR

i. What is the difference between the twinned loop and lateral pocket loop? 7Marks

ii. Describe the contributions given by Sir E.R Henry. 7Marks

Ques.4 (b) Answer the following questions: (Any three) 3Marks

i. Draw the valued and unvalued sign in 10 digit against primary classification

31					
27					

ii. Draw the primary classification of

W	W	← W	webbed → W	W
W	← webbed /	→ W	W	W

iii. Draw the primary classification of

Missing	A	\	W	\
/	T	/	missing	/

iv. Draw the full classification of

a	A	-	W	a
/	T	r	W	/

v. Draw the full classification

\	A	\	a	t
a	A	/	r	/

----------X----------X----------

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0204M0052

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Toxicology (Molecular Toxicology)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

Que. 1 (A) Write the following:

(i) Explain DNA packing in a eukaryotic chromosome. [7]

(ii) Write a note on a trp operon. [7]

OR

(i) Describe the initiation and elongation of translation. [7]

(ii) Explain the Hershey and Chase experiment to prove genetic material. [7]

Que. 1 (B) Answer the following (any four out of six): [4]

(i) Write down the function of helicase and primase.

(ii) Define polysomes.

(iii) What is euchromatin?

(iv) Write down the function of tRNA.

(v) How is pre-mRNA splicing carried out?

(vi) Define post translational modification.

Que. 2 (A) Write the following:

(i) Write a note on microarray. [7]

(ii) Describe the process of molecular cloning and state its applications. [7]

OR

(i) Write a note on production of transgenic animals. [7]

(ii) Define PCR and explain in detail the Taqman based chemistry of Real time PCR. [7]

Que. 2 (B) Answer the following (any four out of six): [4]

(i) Define the nomenclature of EcoRI restriction enzyme.

(ii) Enlist at least two probes used in real time PCR.

(iii) What are genomic libraries?

(iv) State two applications of microarray technique.

(v) Principle of Sanger sequencing.

(vi) State the techniques by which a transgene is incorporated into the Embryonic Stem (ES) cells.

P. T. O.

Model 2

Que. 3 (A) Write the following:

(i) Write down the introduction for toxicogenomics. [7]

(ii) Describe different agents that damages to DNA. [7]

OR

(i) Write a note on a genotoxicity and its mechanism. [7]

(ii) Explain any two DNA damage repair mechanism in detail. [7]

Que. 3 (B) Answer the following (any three out of five): [3]

(i) Define AP site.

(ii) List out the main part of genomics.

(iii) Write down the importance of DNA photolyase.

(iv) What is the effect of uv light on nitrogen base?

(v) Define mutation.

Que. 4 (A) Write the following:

(i) Describe classification of receptor with emphasis on Ionchannel receptors [7]

(ii) Write a brief note on mitochondria independent extrinsic pathway in apoptosis [7]

OR

(i) Describe role of pro-survival and pro-apoptotic proteins in regulation of apoptosis. [7]

(ii) Write briefly signalling event in mitochondria dependent programmed cell death by intrinsic pathway [7]

Que. 4 (B) Answer the following (any three out of five): [3]

(i) Name two techniques for apoptosis.

(ii) Name two cellular targets of apoptosis

(iii) Name two executor caspases

(iv) Write full form of FAK

(v) Define GPCR

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0204M0053

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Cancer Biology (Cytogentrics-2)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All Questions are compulsory
Draw neat and labeled diagram wherever necessary

Q-1 A **14**

(i) **Describe the banding method used to study abnormalities of chromosome 1,9,16 & Y.** 7

(ii) **Explain in details Nick translation.** 7

OR

A

(i) **Describe method of sister chromatid exchanges.** 7

(ii) **Write a note on enzymatic pre-treatment of the slide in M-FISH.** 7

Q-1 B **Multiple Choice Questions (Any four out of six)** 4

1 **QM banding method was developed by which scientist?**

a Zeiss b Giemsa
c T Caspersson d Cascade

2 **Antifade is used for preparation of_____.**

a Counter Stain b Hybridization buffer
c Probe d Washing buffer

3 **Who first invented GTG staining?**

a Gustav Giemsa b Tijo
c Peter Nowell d Painter

4 **_____ is used in SKY-FISH technique.**

a Real-time PCR b Microarray
c Interferometer d DD-PCR

5 **Which reagent is used as washing detergent in fluorescence in situ hybridization assay?**

a NaOH b NP-40
c PI d DAPI

6 **Identify which one is a probe labeling technique?**

a FISH b Nick translation
c FFPE FISH d Gel electrophoresis

P.T.O.

Q-2 A

(i) Describe stokes phenomenon for fluorescence microscopy. 14

(ii) Describe the clinical significance and technical considerations of different banding methods. 7 7

OR

A

(i) Write a note on application of FISH and its limitation. 7

(ii) Explain in detail silver staining for nucleolar organizing regions (NORs). 7

Q-2 B Multiple Choice Questions (Any four out of six) 4

1 Satellite stalk is generally observed on which chromosome?

a Acrocentric b Sub metacentric

c Metacentric d Telocentric

2 Most common chromosomal abnormalities observed in Chronic Lymphocytic Leukemia is_____.

a N-MYC rearrangements b Trisomy 8

c 11q23 rearrangements d Trisomy 12

3 Which is the variant translocation of t(15;17)?

a t(1;17) b t(9;22)

c t(11;17) d t(2;17)

4 The difference between the excitation maximum and the emission maximum is called_____.

a Filter range b Exciter

c Stokes shift d Wavelength range

5 Which cancer is formed by cancerous plasma cells?

a Multiple Myeloma b Lymphoma

c Burkitt's Lymphoma d Burkitt's Myeloma

6 Which is the major route cytogenetic change in Chronic Myeloid Leukemia?

a Trisomy 12 b Trisomy 10

c Trisomy 1 d Trisomy 8

Q-3 A

(i) Briefly explain cytogenetic risk group and disease monitoring of Acute Myeloid Leukemia. 14 7

(ii) Write commonly used disinfectants and explain clean-up procedures for different spillages in laboratory. 7

OR

A

(i) Define masked Philadelphia/variant Philadelphia with one example. 7

(ii) Describe the variables affecting laboratory testing during the analytical phase. 7

Q-3 B Multiple Choice Questions (Any three out of five) 3

1 ERBB2 gene is amplified and over expressed in_____.

a Lung cancer b Germ cell tumor

c Breast cancer d Neuroblastoma

2 **Which chemicals have a flashpoint at or above 37.8°C and below 93.3°C?**

a Reactive b Flammable

c Combustible d Ignitable

3 **CLIA stands for_____.**

a The Clinical Laboratory Improvement Assessment b The Clinical Laboratory Improvement Amendments

c The Clinical Laboratory improved Assessment d The Clinical Laboratory Improvement Association

4 **Combustible liquids have a flashpoint at or above 37.8°C and below_____.**

a 96.5°C b 95°C

c 94.4°C d 93.3°C

5 **Westguard -2_{2S} rule in Quality Control indicates_____.**

a Either of the two controls falls outside ±2SD b Either of the two controls falls outside ±3SD

c Two consecutive control values for both the levels fall outside ±2SD d Two consecutive control values for the same level fall outside ±2SD

Q-4 A 14

(i) **Describe the criteria for disease monitoring in CML.** 7

(ii) **Write a note on electrical safety and precautionary measures taken for it in a laboratory.** 7

OR

A

(i) **Describe cytogenetic risk groups in Acute Lymphocytic Leukemia.** 7

(ii) **Name the institutes providing regulations for laboratories. Describe any three factors of management requirement in NABL-accredited laboratory.** 7

Q-4 B **Multiple Choice Questions (Any three out of five)** 3

1 **The most common translocation involving 11q23 observed in Acute Lymphoblastic Leukemia is _____.**

a t(9;11)(p23;q23) b t(4;11)(q21;q23)

c t(10;11)(p12;q23) d t(11;19)(q23;p13.3)

2 **47 to 50 chromosome numbers are in _____.**

a High hyperdiploidy b Multisomy

c Hypodiploidy d Trisomy

3 **A type of air filter-HEPA stands for_____.**

a High-efficiency particulate arrestance b High-efficiency particulate assessment

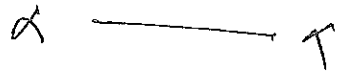
c High-efficiency performance arrestance d High-efficiency performance assessment

4 **Closeness of agreement between independent results of measurements obtained under stipulated conditions is_____.**

a Reliability
b Accuracy
c Precision
d Linearity

5 MRA stands for_____.

a Mutual Recognition Arrangements
b Mutual Recognition Association
c Mutual Recognition amendment
d Mutual Recognition Assessment



0204M0054

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Polymer Science (Polymer Structure)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1 (A) Write the following.

I How the Tacticity and Isomerism structure of polymer affect the properties of polymer? 07

ii Discuss in detail the prediction of polymer properties by Group contribution method. 07

OR

i Explain the Fringed Micelle Theory and how Amorphous structure affects the polymer properties. 07

ii Describe the Degree of crystallinity and its effects on polymer properties. 07

Q.1 (B) Any Four out of six (Answer in one or two lines only)

i The trans form of polydiene is Gutta Percha. **(True/False)** 01

ii Write the volume density. 01

iii Give the name of thermoplastic material having cross linked structure. 01

iv Write the four names of amorphous polymer materials. 01

v The non-crystalline regions of polymers are usually called..... 01

vi Explain the significance of PVT relationship. 01

Q.2 (A) Write the following.

i Discuss the chemical resistance properties of different polymers according to their structure. 07

ii Explain in Solubility parameter and its determination. 07

OR

i Discuss the effect of structure on Yield Strength and Fracture toughness in polymers. 07

ii Define Cohesive Energy Density and Latent heat of crystallization of polymers. 07

Q.2 (B) Any Four out of six (Answer in one or two lines only)

i On decreasing crystallinity the impact strength will ..... **(Increase/Decrease)** 01

ii Filler decreases the Glass Transition value. **(True/False)** 01

iii Give the significance of Temperature in solubility parameter. 01

iv Which one is more Elastic and why? **(Rubber/Steel).** 01

v What will be the effect of orientation of polymer on toughness? 01

vi Explain the behavior of test speed on tensile properties of Thermoplastics. 01

Q.3 (A) Write the following.

i What is Transition temperature in polymers? Explain the factors affect Glass transition. 07

ii Explain the method for calculation of Heat capacity of polymers? 07

OR

i Define β Transitions and relationship between Tm & Tg for polymers. 07

ii Discuss in details Enthalpy and Entropy for polymers. 07

P. T. O

Q.3	(B)	**Any Three out of five (Answer in one or two lines only)**	
	i	For Polystyrene Tm (isotactic) > Tm (syndiotactic). (**True or False**)	01
	ii	Polymers with Tg/Tm ratios below 0.5 are highly symmetrical. (**True or False**)	01
	iii	Tg and Tm of polymers goes .....with increasing length of the aliphatic side chain.(**Up/Down**)	01
	iv	Write the significance of Gibbs free energy formula.	01
	v	What is relation of Tg and Tm for copolymers?	01
Q.4	(A)	**Write the following.**	
	i	Explain the Effect of frequency of voltage on Dielectric constant.	07
	ii	Give detailed review on Arc resistance.	07
		OR	
	i	Describe the Effect of polymer additives on optical properties of polymer.	07
	ii	What is volume resistivity? Give the test procedure with significance in details.	07
Q.4	(B)	**Any Three out of five (Answer in one or two lines only)**	
	i	What is the role of angle to explain Haze?	01
	ii	Give the significance of clarity.	01
	iii	Power factor of polymer is identified by ASTM-D.....	01
	iv	What is the importance of gloss?	01
	v	Explain the molar polarisation of polymers.	01

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0204M0056

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Horticulture Science (Ornamental Horticulture)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Q.1.A. Explain outdoor landscaping. 14

OR

Q.1 A. Write brief notes on: 14

i. Objectives of landscaping ii Indoor landscaping

Q.1 B. Explain in one line any four: 04

Xeriscaping, designs of landscaping, non-plant elements on landscaping, care of indoor plants, theme gardens, advantages of indoor landscaping.

Q.2. A. Explain choice of plants for a ground cover and its after care in detail. 14

OR

Q.2.A.Write Short notes on : 14

i.Flower garden ii. Hardscaping

Q.2. B. Explain in one line any four: 04

Topiary, name one ornamental shrub, winter seasonal plants, trees with unique foliage, care of flowers, name of any one ornamental tree.

Q.3. A. Explain any one theme garden in detail. 14

OR

Q.3.A.Describe: 14

i. Types of gardens ii. Gardening tools

Q.3. B. Explain in one line any three: 03

Ecotourism, Gazebo, Pergola, Lawn, Nursery.

Q.4. A Justify the need for growing medicinal plants in a home garden. 14

OR

Q.4 A Explain: 14

i.Climbers ii. Cacti and Succulents

Q.4. B. Explain in one line any three: 03

Bottle gardens, vertical gardens, terrarium, ikebana, dried flowers

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0204M0057 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Clinical Research (Pharma-medicines)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Que. 1 (A) Write the following

(i) Phases in Clinical Development of Drug **07**

(ii) High Throughput Screening **07**

OR

(i) SAR and QSAR **07**

(ii) Computer Assisted Drug Designing **07**

Que.1 (B) Answer the following (Any four) **04**

(i) Define: Sponsor

(ii) Give full form of FIH

(iii) NDA is to be submitted before phase 1. True/False?

(iv) What is the aim of phase 2 trials?

(v) Define: Phase O

(vi) Why phase 3 trials are called as confirmatory trials?

Que. 2 (A) Write the following

(i) Non Clinical Overview and Non Clinical Summaries **07**

(ii) Explain E4 Preclinical Guideline in brief **07**

OR

(i) Guidelines for Non Clinical Safety Studies **07**

(ii) Preclinical Guideline: S1A **07**

Que.2 (B) Answer the following (Any four) **04**

(i) Define: Pharmacoepidemiology

(ii) Name the solvent of Sulfanilamide Elixir

(iii) Can placebo be given to control group in a trial? Yes/No

(iv) Give full form of FDC

(v) Give the significance of Washout Period.

(vi) Give full form of RCT

P. T.O.

Module IV Pharma-Medicine & Clinical Research

Que. 3 (A) Write the following

a) The Belmont Report **07**

b) The 1937 Disaster **07**

OR

(i) Thalidomide Tragedy **07**

(ii) 14 Ethical Principles for Medical Research Involving Human Subjects **07**

(B) Answer the following (Any three) **03**

(i) Define: Meta-analysis

(ii) Give full form of CDA

(iii) Phase I trials are to be conducted on animals. True/False?

(iv) Enlist the stakeholders of a Clinical Trial

(v) Define: Dropout

Que. 4 (A) Write the following

a) Short Note: Contract Research Organization **07**

b) CR Professional Training and Development **07**

OR

c) Preparations and Planning for Clinical Trials **07**

d) Discuss in detail various types of trials **07**

(B) Answer the following (Any Three) **03**

(i) Define: Diagnostic Trial

(ii) Give the difference between Pilot Study and Pivotal Study

(iii) _____ study design is best for drugs with long half life

(iv) Patients can be enrolled as subject in Phase I study. True/False? Justify your answer

(v) Name the drug regulatory agency of Europe

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0204M0058

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

407

Geoinformatics (Photography & Digital Image)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q1A. a. Explain with diagram the concept of relief displacement on a vertical photograph. What are various causes of relief displacement. 07

b. An aircraft was flying height of 25000 feet above the ground and takes a vertical aerial photograph of an object which is 30 meters height. The image of the object is at a distance of 6 inches from the nadir point. Find out the relief displacement. 07

OR

Q1A. a. Explain the concept of projection. 07

b. What are the differences between maps and aerial photographs? 07

Q1B. Solve any four the following multiple option questions. 04

1. In which of the following aerial photographs the horizon appears?
   a. Vertical
   b. Near-vertical
   c. Low-oblique
   d. High-oblique

2. In which of the following aerial photographs the Nadir and the principle points coincide?
   a. Vertical
   b. Near-vertical
   c. Low-oblique

P.T.O.

d. High-oblique

3. Which type of the following projections is used in aerial photographs?
   a. Parallel
   b. Orthogonal
   c. Central
   d. None of the above.

4. Persons with normal vision are said to have
   a. Monocular vision
   b. Binocular vision
   c. Combination Monocular and Binocular vision
   d. None of above options

5. In positive parallax

   a. When the target object offsets to the right in the left image, and offsets to the left in the right image, then your binocular focus is lead to fall behind the display.
   b. When the paired parallax images superimpose on the display, then your binocular focus is lead to fall on the same display
   c. When the target object offsets to the left in the left image, and offsets to the right in the right image, then your binocular focus is lead to fall in front of the display.
   d. none of the above options

6. The coverage is least if photography is

   a. High Oblique
   b. Low Oblique
   c. Vertical
   d. none of the above options

Q 2 (A) – Write a detailed note on Supervised and Unsupervised classification based on different classifiers and discuss its limitations - 14

OR

Q 2 A(i) - What is the difference between K-means and Iso-Data - 7

Qu2 A (ii) - Write a note on Image merging – multi-temporal and multi-sensor and discuss its advantages -07

M005 8-3

*Question 2 (B) MCQs (Any Four out of Six) 04

1. what ANN stands for

   a) Artificial Neural Number b) Artificial Neural Network

   c) Augmented Neural Network d) Augmented Neural net

2. _____ are somewhat like sets whose elements have degrees of membership?

   a) Confusion Sets b) Future sets

   c) Fuzzy Sets d) Uncertain Sets

3. Polygons digitized for Signature file in supervised classification is called_____
   a) Training Sets b) Signature Sets
   c) Supervised Sets d) Selection Sets

4. If the signature is non-parametric then the following decision rule is offered
   a) Mahalanobis b) Maximum likelihood
   c) Minimum Distance d) Feature Space

5. If the signature is Parametric then the following decision rule is offered
   a) Parallelepiped b) Feature Space
   c) Minimum likelihood d) Maximum likelihood

6. The process of evaluation of a classified image file is called
   a) Evaluation Matrix b) Accuracy Assessment
   c) Error assessment d) Statistical Assessment

Q 3A: Answer the following 14

i) Explain in details about hyper spectral remote sensing and its comparison with multispectral remote sensing.

ii) Explain one of the following methods of conversion digital number to radiance

- Empirical
- Theoretical

P.T.O.

OR 14

i) Explain spectral angle mapper

ii) Define Radiance and reflectance

Q3 B: MCQ (any 3 out of 5) 03

a) Hyperspectral remote sensing uses

i) Narrow spectral band

ii) Broad spectral band

iii) None of above

b) A graphical representation of spectral reflectance VS wavelength is called:

i) Spectral signature

ii) Growth profile

iii) Spectral growth

c) Spectral unmixing provides information on:

i) Quantitative information on feature

ii) About number of bands used in hyperspectral remote sensing

iii) None of above

d) End member can be described as:

i) Having pure spectra

ii) Having mixed spectra

iii) None of above

e) Hyper spectral remote sensing data analysis involves:

i) Dimensionality reduction

ii) No reduction in dimensionality

iii) None of above

f) Spectral mixture may be:

i) due to sum of two or more pure end member in resolution cell

ii) due to single species in resolution cell

iii) none of above

Q4 A: Answer the following 14

i) Explain Linear and nonlinear type of spectral mixing methods.

ii) Explain Lidar remote sensing. How the height of tree is estimated?

OR 14

i) Explain applications of Lidar remote sensing
ii) Explain application of hyperspectral remote sensing

Q 4 B: Do as Directed (any 3 out of 5) 03

i) Lidar is an active remote sensing technique (yes/no)
ii) Lidar can work day and night (yes/no)
iii) We can assess digital surface model from Lidar (yes/no)
iv) Bathymetry measurements can be done from Lidar measurements (Yes/No)
v) Lidar uses coherent source of light (Yes /No)

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0204M0059

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

407

Climate Change (Effect of Climate Change)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1.A. Explain Climate change impacts on water resources . 14

OR

Q.1 A. Write brief notes on: 14

i. Water demand ii. Climate ready water utilities

Q.1 B. Explain in one line any four: 04

Green infrastructure, climate ready estuaries, water supply, water quality, water cycle, healthy water sheds.

Q.2. A. Explain Climate change impact on human health in detail. 14

OR

Q.2.A. Write Short notes on : 14

i. National mission on sustainable agriculture ii. Climate change impact on fisheries

Q.2. B. Explain in one line any four: 04

SOC, Ocean acidification, Carbon sequestration, mineralization and immobilization, food insecurity, coral bleaching.

Q.3 A. Explain Forest dispersion, shifting and Forest Fire. 14

OR

Q.3 A (i) What are tree responses to temperature and increased CO_2 concentration. 07

Q.3 A (ii) Explain biodiversity related adaptation mechanisms and strategies. 07

Q.3 B. Answer the following in one or two lines. (Any Three) 03

a) Enlist the names of fauna found in taiga biome.

b) In which year California fire took place ?

c) Define: Biodiversity.

d) Explain the term: "Ecophysiology"

e) Name six major land biome.

Q.4. A Explain the production mechanisms & significance of renewable energy sources. 14

OR

Q.4 A Explain : 14

i. Effects of climate change on power plants ii. Wind farms

Q.4. B. Explain in one line any three: 03

Solar energy, heat plants, forest biomass, fuel production, risks

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0304M0082

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Botany (Plant Ecology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q1- A What is population ecology? Explain its characteristics in detail. 14

OR

Q1-A (i) What is biogeochemical cycle? Explain Nitrogen cycle in detail. 07

Q1-A (ii) Short note on structure of ecosystem. 07

Q-1 B Short Question (Any four) 04

1. What is mortality?
2. Which are the main types of ecosystem?
3. Commensalism
4. What is net primary productivity?
5. Define food chain.
6. Give examples of main fragile ecosystem of Gujarat.

Q2-A Explain qualitative and quantitative characteristic of plant community. 14

OR

Q2-A (i) Short note on ecological niche. 07

Q2-A (ii) Explain process of ecological succession. 07

Q2-B Short Question (Any four) 04

1. Define: Extinction.
2. What are phytosociological methods?
3. Define: Climax stage in succession.
4. Role of NBA
5. Name methods of estimating population density.
6. Define: Community.

Q3-A Explain greenhouse gases: its sources and role in climate change. 14

P.T.O

OR

Q3-A (i)	Short note on ecological adaptations.	07
(ii)	Explain ozone layer formation and ozone depletion.	07
Q3-B	Short Question (Any three)	03

1. What is global warming?
2. What is CFCs? Write its sources.
3. What are the major sources of soil pollution?
4. What are quality parameters of air pollution?
5. Define phytoremediation.

Q4-A	Explain data acquisition, processing and use of software in remote sensing.	14

OR

Q4-A (i)	Short note on application of remote sensing in disaster management.	07
(ii)	Short note on GPS.	07
Q4-B	Short Question (Any three)	03

1. Define application of remote sensing in biodiversity mapping.
2. Define: RADAR.
3. Role of IRS.
4. How remote sensing is useful in hydrology?
5. What is remote sensing?

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0304M0083

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Zoology (Radiation Biology & Biostatistics)

April 2019

Time : 2-30 Hours]

[Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	What is Radioactive decay? Discuss properties of radioactive isotopes.	07
		(ii)	Write an account on X-Rays.	07
			OR	
		(i)	Discuss properties and effects of UV-A and UV-B.	07
		(ii)	Explain in detail differential radiosensitivity. Discuss the related Law with examples.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Which radioisotopes are used in Biology? Why?	
		(ii)	Define the unit: Becqueral	
		(iii)	Explain: ALARA.	
		(iv)	State the legal SAR limit for cell phones.	
		(v)	What is meant by D_{37} value?	
		(vi)	State the properties of β^- particles.	
Q-2	(A)	Write the following		
		(i)	Describe the effect of radiation on various cell organelles.	07
		(ii)	Discuss the impact of radiation on the haematopoietic and digestive systems.	07
			OR	
		(i)	Explain: Radiation therapy for Cancer.	07
		(ii)	Write a detailed account on: Radiation hormesis.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is 'maturation depletion' effect?	
		(ii)	Distinguish between stochastic and non-stochastic effects.	
		(iii)	List the factors influencing radiation effects.	
		(iv)	How does radiation affect the immune function?	
		(v)	What is meant by 'Electrosmog'?	
		(vi)	Explain: Bystander effect of radiation exposure.	
Q-3	(A)	Write the following		
		(i)	Explain in detail classification, types and representation of Data.	07
		(ii)	Determine the % CV for the data: 5.5, 4.0, 3.5, 4.6, 6.8, 5.2, 3.8	07
			OR	
		(i)	Write a note on the methods of Sampling.	07
		(ii)	Define and calculate Mean, Median and Mode for the data given: X_i = 1.5, 1.2, 2.5, 1.2, 2.1, 5.1, 1.1, 1.2, 5.2	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Explain: Significance of Biostatistics.	
		(ii)	Give an example of probabilistic sampling.	
		(iii)	Distinguish between: $\bar{X}$ and μ.	
		(iv)	Define: Range of the data.	
		(v)	When is Mean = Median = Mode?	

P.T.O

Q-4	**(A)**	**Write the following**		
		(i)	**Explain the various measures of Dispersion.**	**07**
		(ii)	**Use Chi-square analysis to verify whether the experimental data conform to the expected 3:1 Monohybrid hypothesis: At F2, 60 red eyed and 22 white eyed Drosophila were observed in the experimental cross.**	**07**
			OR	
		(i)	**Find the value of Pearson's correlation coefficient 'r' between Hb content (X) and Iron levels (Y). Explain correlation and the inference of the result.** **X (g/dl) = 10.5 7.2 9.4 8.6 10.1 8.0** **Y(µg/ml) = 0.53 0.20 0.35 0.29 0.65 0.22**	**07**
		(ii)	**Using Student's 't' test, determine whether the experimental values differ significantly from the Control data , at the 95 % confidence limits.** **Control (n=6): 10 ± 0.3** **Experimental (n=6): 6.5 ± 0.7**	**07**
	(B)	**MCQ / SQ (Any Three out of Five)**		**03**
		(i)	**Name one parametric test.**	
		(ii)	**The value of the correlation coefficient 'r' = —0.27. State the inference.**	
		(iii)	**Explain NULL hypothesis.**	
		(iv)	**If n=5 for Group I and n=6 for Group II, then degree of freedom is: _____.**	
		(v)	**Give the relationship between Error and Sample size.**	

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0304M0084

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Geology (Stratigraphy and Micropalaeontology)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

1. Write notes: (A) Lithostratigraphy and biostratigraphy. (14)

OR

(A) (i) Time units and rock time units. (07)

(ii) Stratigraphic divisions. (07)

(C) Write brief answers (any four out of six): (04)

(1). Define chronostratigraphy.
(2). Define event stratigraphy.
(3). Mention two principles of stratigraphic classification.
(4). Define pedo-stratigraphy.
(5). Mention systems of Lower Palaeozoic era.
(6). What is net rate of accumulation in eugeosyncline?

2. Describe: (A) Nature of lithostratigraphic units and rank of biostratigraphic units. (14)

OR

(A) (i) Classification, climate, lithology, orogeny and life forms of Lower Palaeozoic stratigraphy. (07)

(ii) Classification, climate, lithology, orogeny and life forms of Upper Palaeozoic stratigraphy. (07)

(C) Write short answer (any four out of six): (04)

(1). What is cyclothem.
(2). Define rank of lithostratigraphic unit.
(3). What is type section?
(4). What is a bed?
(5). What is soil and palaeosol in lithostratigraphy?
(6). Define suite.

3. Explain: (A) Stain acetate peel method and picking and mounting dried samples. (14)

OR

(A) (i) Significance of Ostracoda. (07)

(ii) Classification of foraminifera as per wall structure and composition. (07)

(C) Write in short (any three out of five): (03)

(1). Define Procaryote.
(2). What is the phylum of Radiolaria?
(3). Sarcodina is included in which Kingdom?
(4). Provide Chemical composition of washing soda.
(5). Write chemical composition of domestic bleach.

4. Discuss: (A) Significance of trace fossils for sedimentology and palaeoenvironmental investigations. (14)

OR

(A) (i) Stromatolites, thrombolites and travertine. (07)

(ii) Ethological classifications of trace fossils. (07)

(C) Write in brief (any three out of five): (03)

(1). What is ichnia catenaria?
(2). What is hypichnia?
(3). Mention wall composition of spores.
(4). Give kingdom and division of green algae.
(5). Define lebensspuren.

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0304M0085

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Life Science (Mammalian Physiology)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Instructions: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Explain the System Organization of Body. [07]

ii) Describe the various Supportive Cells of Central and Peripheral nervous system. Add a note on different types of Neurons. [07]

OR

i) Explain physiology of Muscle Contraction with special emphasis on Sliding-filament Theory. [07]

ii) Describe the process of Depolarization, Repolarization and Hyperpolarization. [07]

1 (B) Answer in Short: (Any Three) [03]

i) Discuss the Pleural Cavity.

ii) Explain organs involved in Support.

iii) What are Ganglia and Tracts?

iv) What is Saltatory Conduction?

v) How can you distinguish Sympathetic and Parasympathetic nerve fibres?

2 (A) Answer in Detail:

i) Explain in detail the three Phases of Respiration. [07]

ii) Explain the Regulation and Role of Gastric Juices. [07]

OR

i) Discuss the Mechanical Digestion in gastrointestinal tract. [07]

ii) Describe hormones of Posterior Pituitary Gland. Add their regulation. [07]

2 (B) Answer in Short: (Any Four) [04]

i) What is Bohr effect?

ii) What is Haldane effect?

iii) Enlist the composition of Saliva.

iv) Define Contact digestion.

v) Explain the role of Parathyroid hormones in Calcium homeostasis.

vi) Name any two Catecholamines.

3 (A) Answer in Detail:

i) Write a note on Plasma Proteins and their separation with clinical interpretation. [07]

ii) Explain the process of initiation and conduction of Heart Beat. [07]

OR

i) Write a note on cascade of events occurring during Blood Clotting. [07]

ii) Write a note on Cellular Components of blood. [07]

3 (B) Answer in Short: (Any Three) [03]

i) Megakaryopoiesis leads to formation of _____.

ii) Explain: Passive Immunity

iii) Mitral Valve is a _____cuspid valve.

iv) In electrocardiogram tracings, the 'P-wave' stands for _____.

v) In B-lymphocytes, "B" derived from _____.

P.T.O

4 (A) **Answer in Detail:**

i) Explain the structure and blood supply to the Kidney. **[07]**

ii) Explain Menstrual Cycle in female reproductive system. Add its regulation. **[07]**

OR

i) Give a brief description of Reabsorption and Secretory processes during urine formation. Add a note on Countercurrent mechanism. **[07]**

ii) Describe principal organs of Male Reproductive System with their structure and functions. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) What are Osmoregulators?

ii) What are Effective and In-effective Osmoles?

iii) What is T_m limited process? Give an example.

iv) State the location and function of Leydig cells.

v) Define: Ovulation

vi) Explain: Androgens

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0304M0086

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Environmental Science (Environmental Health & Safety-Old)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q.1 (A) Explain advantages and disadvantages of mechanical thickening technology. **[14]**

OR

Q.1 A (i) Write a note on Centrifuge Dewatering. **[07]**

Q.1 A (ii) Elaborate on precoat drum filter. **[07]**

Q.1 (B) Answer the following in one or two lines. **(Any Four)** **[04]**

a) Define: Trash.
b) Explain the term green technology.
c) What is doctors blade?
d) Give full form of MSW.
e) What is R^3WE ?
f) What are the three components of integrated waste management strategy?

Q.2 (A) Write a note on household batteries. **[14]**

OR

Q.2 A (i) Write a note on magnetic separation. **[07]**

Q.2 A (ii) Give an account on Vertical and Horizontal baling. **[07]**

Q.2 (B) Answer the following in one or two lines. **(Any Four)** **[04]**

a) Give acronym of HHWM.
b) What is the use of zinc air batteries?
c) Explain the term crumb tyre.
d) What is RDF?
e) Which are the three methods of reducing the number of scrap tyres.
f) Who provides names of paint brands that contains less than 200 ppm Hg ?

Q.3 (A) Give an account on In-vessel system. **[14]**

OR

Q.3 A (i) Write a note on generation of landfill gases. **[07]**

Q.3 A (ii) Explain the constraint on use of compost. **[07]**

Q.3 (B) Answer the following in one or two lines. **(Any three)** **[03]**

a) What is landfilling?
b) Define: Methanogenic.
c) Explain the term aerobic.
d) Give full form of COD
e) What is leachate?

P.T.O

Q.4 (A) Explain treatment technologies for medical and hospital waste. **[14]**

OR

Q.4 A (i) What are the preventive measures from radiation. **[07]**

Q.4 A (ii) Give a brief account on chemical treatment, storage and disposal of hazardous waste management. **[07]**

Q.4 (B) Answer the following in one or two lines. **(Any three)** **[03]**

a) Define: conditioning.
b) Give the acronym of ICRP.
c) What is TCLP used for ?
d) What are the three procedures for disposal of radio-waste?
e) What is vitrification?

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0304M0086 – 3 Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

408

Environmental Science (Int. Solid Waste Mgmt-New)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q1- A	Voluntary approach to environmental protection	14
	OR	
Q1-A (i)	Explain Selected Standard Industrial Classification (SIC) Codes	07
Q1-A (ii)	Explain Accident prevention and worker motivation.	07
Q-1 B	Short Question (Any four)	04

1. What is an EHS audit?
2. What are the benefits of worker motivation?
3. How can we prevent accidents?
4. What are SIC codes used for?
5. Why SIC codes are important?
6. Why is organizational management important?

Q2-A	Explain waste and stormwater discharge and management	14
	OR	
Q2-A (i)	Explain Soil monitoring	07
Q2-A (ii)	Explain storage of hazardous material.	07
Q2-B	Short Question (Any four)	04

1. What are the techniques of waste management?
2. How can we control environmental pollution?
3. What is stormwater management?

P.T.O

4. what are the 4 types of hazardous waste?

5. how do you store hazardous waste?

6. how is groundwater level measured?

Q3-A Write about different types of hazards and its managements. 14

OR

Q3-A (i) Explain electrical safety 07

(ii) Explain Fire safety 07

Q3-B Short Question (Any three) 03

1. How can I do to reduce air pollution?
2. What is life and fire safety?
3. What are the main hazards in construction?
4. What is health and safety in construction?
5. What is fire protection technology?

Q4-A Explain noise pollution, Regulation, control and rules. 14

OR

Q4-A (i) Explain source of Noise 07

(ii) Explain effect of noise pollution 07

Q4-B Short Question (Any three) 03

1. Noise pollution measured in _____ unit.
2. Give names of two sources of noise pollution.
3. What is noise mapping?
4. What is sound?
5. What are the 5 characteristics of sound?

Q 153

0304M0087

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Biochemistry (Human Physiology)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Instructions: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Describe briefly the Neural regulation of Heart Rate. [07]

ii) Describe the Cellular Components of blood and their physiological role. [07]

OR

i) Describe the cascade of Blood Clotting mechanism. [07]

ii) Write a note on separation of Plasma Proteins and their clinical interpretation. [07]

1 (B) Answer in Short: (Any Three) [03]

i) The Coronary Circulation System provides blood supply to _____ muscle.

ii) Production of antibody in response to antigen exposure is _____ immunity.

iii) Bicuspid Valve is also known as_____valve.

iv) In electrocardiogram tracings, QRS 'Spikes' Complex stands for_____.

v) Define: Pace Maker

2 (A) Answer in Detail:

i) Explain in detail the three Phases of Respiration. [07]

ii) Describe the Control of Respiration. [07]

OR

i) Explain the Oxygen-haemoglobin saturation and dissociation. [07]

ii) Describe the Lung Volumes and Capacities. [07]

2 (B) Answer in Short: (Any Four) [04]

i) What is anatomical Dead Space?

ii) What is Bohr Effect?

iii) What is Chloride Shift?

iv) What is Reverse Haldane effect?

v) What is the role of 2, 3-Biphosphoglycerate?

vi) Calculate the Alveolar Ventilation per minute.

3 (A) Answer in Detail:

i) Explain mechanism of Food Intake and its regulation. [07]

ii) Discuss the Secretion and Regulation of Gastric juices. [07]

OR

i) Explain Digestion of Carbohydrate and its significance. [07]

ii) Discuss the mechanism of Absorption of digested food. [07]

3 (B) Answer in Short: (Any Three) [03]

i) Discuss the role of Muscularis Mucosae.

ii) Give Dental formula of Human.

iii) Enlist components of Saliva.

iv) Discuss the role of Cholecystokinin.

v) Define process of Segmentation.

P.T.O

4 (A) **Answer in Detail:**

i) Explain the various Body Fluids and their vital role in Homeostasis. **[07]**

ii) Explain the ABC Transporters. Add a note on Aquaporins. **[07]**

OR

i) Give a brief account of Glomerular Filtration. Add a note on how to calculate Renal blood and plasma flow. **[07]**

ii) Explain the role of Hormone in regulation of urinary excretion of Water and Electrolytes by Kidney. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) What are Osmoconformers?

ii) What are Urinary Incontinence and Enuresis Nocturna?

iii) What are Effective and In-effective Osmoles?

iv) What are Starling's forces?

v) Mention the target tissues of Vasopressin.

vi) State the role of Kidney in Renin-Angiotensin pathway.

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Biomedical Techology (Toxicology)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	Explain in detail acute and subacute toxicity.	07
		(ii)	Discuss animal and plant toxicants.	07
			OR	
		(i)	Discuss Phase I reactions in Biotransformation.	07
		(ii)	Explain in detail LD_{50}	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Name regulatory bodies in toxicity assessment.	
		(ii)	What is biliary excretion?	
		(iii)	Define NOEL.	
		(iv)	What is LC 50	
		(v)	What are Xenobiotics?	
		(vi)	Define risk assessment.	
Q-2	(A)	Write the following		
		(i)	Discuss different classes of food additives.	07
		(ii)	Describe factors influencing biological effects of radiation.	07
			OR	
		(i)	Write a detailed account on radiation dosimetry.	07
		(ii)	Give an account of properties of pesticides.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Write the full form of ADI.	
		(ii)	Define teratogen.	
		(iii)	_____ and _____ toxins are produced by some species of frogs.	
		(iv)	From which plant family, the pesticide Rotenon is obtained?	
		(v)	Give name of any secondary air pollutant?	
		(vi)	What are metalloids?	
Q-3	(A)	Write the following		
		(i)	Discuss: Acute renal failure.	07
		(ii)	Write a note on haematotoxicity.	07
			OR	
		(i)	Explain giving details: Cholestasis	07
		(ii)	Explain: Demyelination and Neuropathy	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is silicosis?	
		(ii)	Name any two neurotoxicants that interfere with signalling processes.	
		(iii)	What is teratogenicity?	
		(iv)	Define: cardiomyopathy.	
		(v)	Name melanocidal chemicals.	
Q-4	(A)	Write the following		
		(i)	Discuss different methods to prevent further absorption of toxin in Clinical Toxicology.	07
		(ii)	Write a detailed note on: Death-investigation in forensic toxicology.	07
			OR	
		(i)	Describe methods employed for analysis of post-mortem samples in forensic laboratory.	07
		(ii)	Write a detailed note on: Clinical Toxicology and treatment strategies.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	State: "Declaration of Helsinki".	
		(ii)	Explain: Genotoxicity	
		(iii)	Enlist various sources of lead metal exposure in occupational workers.	
		(iv)	Define: Clinical trials.	
		(v)	Give full forms of: (a). FTC (b). ABFT	

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0304M089

Candidate's Seat No :_____

M.Sc. (Sem.-II) Examination

BT - 408

General Regulation & Recombinant DNT Technology

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions : (1) Figures to the right indicate Full Marks.

1 (a) Describe molecular aspects of lambda phage interaction with E.Col : with reference to dysogeny. 14

OR

(a) Define operon and explain arabinose operon. 7

(b) Write a note on lactose operon 7

(b) Answer nay four : 4

(i) lac. repressor

(ii) helix turn helix motif

(iii) Domains of sigma factor

(iv) Consensus sequences of promotrs

(v) Upelement

(vi) Catabolite repression and AMP.

2 (a) Describe indetail the methods of DNA sequencing. 14

OR

(a) Write a note on restriction endonucleases. 7

(b) What is CDNA? Explain CDNA library.

(b) Answer any four : 4

(i) steps of RNA isolation

(ii) Blunt end DNA ligation

(iii) Linkers

(iv) Adapters

(v) Recognition sequences of A IN T & Bam HI.

3 (a) Discuss the uses of plasmids as vectors in detail. 14

OR

(a) Explain colony hybridization technique. 7

(b) What is artificial chromosome? Write a note on YAC vector 7

(b) Answer any three : 3

(i) Transfection

(ii) Electropotation

(iii) Types of vectors

(iv) Properties of good vector

(v) Draw diagram of PBR 322

4 (a) What is DNA foot printing? Explain the same in detail. 14

OR

(a) What is a probe? Discuss labelling of probes. 7

(b) Write a note on microarrays. 7

(b) Answer any three : 3

(i) DNA finger printing

(ii) DNA chips

(iii) Sowthern hybridization

(iv) Nonradioactive probes

(v) Application of microarrays.

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Int. Biotechology (Genetic Engineering)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Que-1 (A) Explain the types, mode of action and importance of restriction enzymes used in genetic engineering [14]

OR

1. Describe the structure YAC and explain its use in genetic engineering [7]
2. Explain linkers and adapters used with gene manipulation techniques. [7]

(B) Answer any Four of the following [4]

1. Give one function of polynucleotide kinase.
2. Which selection marker is present in pUC19 vector?
3. Name two reporter gene use in genetic engineering
4. Name the source of restriction enzyme *Hind*III
5. What is cDNA?
6. Differentiate between Cosmid and Phagemid.

Que-2 (A) Explain different techniques used for DNA transfection [14]

OR

1. Describe the methods for genetic engineering of fungi [7]
2. Justify the need and steps for creating cell competence for DNA transfer [7]

(B) Answer any Four of the following in brief [4]

1. What is gene gun?
2. Write down the components of optical injection.
3. Name viruses used for DNA transfer
4. DNA solution injected into bacterial cell using micromanipulators is known as
   (A) Microinjection (B) Optical injection (C) Macroinjection (D) Transfection
5. Which metal is used to coat DNA particles for transfection by biolistic?
6. What is microencapsulation?

Que-3 (A) Explain the process of short-gun sequencing with diagram. [14]

OR

1. Give principle and applications of Southern blotting. [7]
2. What are DNA probes? Give its use in genetic engineering. [7]

(B) Answer any Three of the following in brief [3]

1. What is colony hybridization?
2. What are uses of Nitrocellulose membrane?
3. Give example of homologous probe.
4. Name the source of polymerase commonly used for PCR
5. Select extension temperature (°C) in PCR from below:
   (A) 72 (B) 92 (C) 25 (D) 60

Que-4 (A) Give an account of plant cell bioreactor and its advantages [14]

OR

1. Describe the importance of genetic engineering in Medical and Industrial fields. [7]
2. Define animal cloning and give its importance in agriculture [7]

(B) Answer any Three of the following [3]

1. Where was the first ever mammal was cloned?
2. Which of the following have GMO variant commercially available?
   (A) Cotton (B) Soybean (C) Papaya (D) All
3. Give function of *Cry* protein
4. What is recombinant Insulin?
5. Name two commercially important products obtained from transgenic plant.

0304M0091

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Human Genetics (Bioinformatics & Biostat.)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	Write a note on virtual libraries.	07
		(ii)	What is bioinformatics? Explain the application in research.	07
			OR	
		(i)	Describe various parts of computers.	07
		(ii)	Write a note on biological databases in detail.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is the full form of CPU?	
		(ii)	What is BLAST?	
		(iii)	What is Homology modelling?	
		(iv)	What is KEGG?	
		(v)	Define: Insilico.	
		(vi)	Write a full form of NCBI.	
Q-2	(A)	Write the following		
		(i)	Write a note on gene and protein sequence data banks.	07
		(ii)	How to access sequence databases from the internet.	07
			OR	
		(i)	Describe any two databases in detail.	07
		(ii)	Write a note on primer designing.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Which database used for searching chemicals?	
		(ii)	What is full form of RAM?	
		(iii)	Which database used for deriving protein 2D structure?	
		(iv)	What is PubMed?	
		(v)	Write any two software of primer designing.	
		(vi)	What is Docking?	
Q-3	(A)	Write the following		
		(i)	Types, Organisation and classification of Data.	07
		(ii)	Explain the significance and methods of sampling.	07
			OR	
		(i)	Discuss various modes of Data representation. Explain sampling.	07
		(ii)	Give an account of the measures of central tendency.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Define Median.	
		(ii)	Give the formula to calculate mean from data grouped in continuous class intervals.	
		(iii)	Distinguish between primary and secondary data.	
		(iv)	Calculate the mean: 1.05 5.01 1.10 1.50 4.15 3.51 2.10	
		(v)	Give an example to show Bimodal data.	
Q-4	(A)	Write the following		
		(i)	What are the various measures of dispersion? Explain in detail.	07
		(ii)	Calculate the Standard Deviation and S.E of the data given: Data: 21.3 18.7 20.5 22.7 19.6 20.2 24.3	07
			OR	
		(i)	Explain: correlation. Calculate the Pearson's Correlation Co-efficient of the data given for age and mitosis scored: X (age in yrs) = 25 28 38 42 46 47 52 55 Y (mitosis count) = 190 192 190 194 180 160 130 135	07
		(ii)	What are the various tests of hypothesis? Use the student 't' test to determine the significance (at the 5% level) of the difference between the control and experimental data Control (n=3) 10.1 ± 0.3	07

P.T.O

			Experimental (n=3) 12.2 ± 0.2	
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Define Parametric tests.	
		(ii)	What is meant by NULL Hypothesis?	
		(iii)	Draw a Normal Distribution curve.	
		(iv)	Explain: Relation between Error and sample size.	
		(v)	What is the use of Regression Analysis?	

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0304M0092

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Bioinformatics (Algorithms & Data Structures)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Qu 1 (A) Explain template of function in C with proper example. 14 Marks

OR

Qu 1 (A) Answer the Following: 7 + 7 = 14 Marks

a. What is the difference between Structure & Array? Explain with example.

b. Write a program to pass string as parameter and print reverse of it with category 4 function in C.

Qu 1 (B) Answer any Four of the following 04 Marks

1. What is the output:

```
#include <stdio.h>
void main ()
{
   int a[2][3] = {1, 2, 3, 4, 5};
   int i = 0, j = 0;
   for (i = 0; i < 2; i++)
   for (j = 0; j < 3; j++)
   printf("%d", a[i][j]);
}
```

a. 1 2 3 4 5 0 b. 1 2 3 4 5 junk c. 1 2 3 4 5 5 d. Run time error

2. What does the following declaration signify?

char *arr[10];

a. arr is a array of 10 character pointers. b. arr is a array of function pointer.

c. arr is a array of characters. d. arr is a pointer to array of characters.

3. What does the following declaration signify?

char **argv;

a. argv is a pointer to pointer.

b. argv is a pointer to a char pointer.

c. argv is a function pointer.

d. argv is a member of function pointer.

4. Write the definition of a function named find which takes as parameter 2 strings and returns an integer.

5. A function is said to be recursive if it is defined inline in another function. True / False

6. Given a structure as below:

```
struct data
{
        int a;
} *d;
```

The syntax to access a is:

a. d.a b. d[a] c. d->a d. None

Qu 2 (A): Answer the Following: 7 + 7 = 14 Marks

a. Explain structures in C with examples. Create a structure student with rollno, name and marks as members. Input data for a student and display its details.

P.T.O

b. What is the difference between Array and self-referential structures. Explain with examples

OR

Qu 2 (A) : Write a program to take STRING from the user and find out number of characters present in it with recursion. 14 Marks

Qu 2 (B): Answer any Four 04 Marks

1. Define Recursion
2. By using which method sorting is not possible?

   a. Insertion b. Selection
   c. Deletion d. Exchange
3. The method to insert in an element in a stack is OPEN called _____
4. A FILE structure is activated using the OPEN\\\ FUNCTION
5. A _____ node in a binary tree.
6. Which of the following data structure is not linear data structure?

   a. Arrays b. Linked lists
   c. Both of above d. None of above

Qu 3 (A): What is the difference between STACK and QUEUE in C? Give a proper example 14 Marks

OR

Qu 3 (A) : Answer of the Following : 7 + 7 = 14 Marks

a. Write a program to create character set using QUEUE with self-referential structure and find out how many characters are inserted by user.
b. What is data structure? Explain in detail.

Qu 3 (B): Answer any Three 03 Marks

1. How will you free the memory allocated by the following program?

```
#include<stdio.h>
int main()
{
   int **p, i, j;
   p = (int **) malloc(MAXROW * sizeof(int*));
   return 0;
}
```

a. memfree(int p); b. dealloc(p); c. malloc(p, 0); d. free(p);

2. Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?

   a) Deleting a node whose location in given b) Searching of an unsorted list for a given item
   c) Inverting a node after the node with given location d) Traversing a list to process each node
3. In linked list each node contain minimum of two fields. One field is data field to store the data second field is?

   a) Pointer to character b) Pointer to integer
   c) Pointer to node d) Node
4. A Queue is a _____.
5. _____ is a Last in First Out (LIFO)

Qu 4 (A) : Answer any two of the Following 7 + 7 = 14 Marks

M0092-3

a. Explain Big O notation with sorting algorithm example
b. Explain Dynamic Programming. Explain how it is implemented in SW Algorithm

OR

Qu 4 (A): Explain a binary tree and types of traversals in binary trees. 14 Marks

Qu 4 (B): Answer any Three: 03 Marks

1. What would be the asymptotic time complexity to add an element in the linked list?

   a) O(1) b) O(n)
   c) O(n2) d) None

2. Which of the following cannot be a structure member?

   A) Another structure B) Function
   C) Array D) None of the mentioned

3. A structure variable cannot be passed as a parameter to a function true / false.

4. Linked lists are best suited
   a. for relatively permanent collections of data
   b. for the size of the structure and the data in the structure are constantly changing
   c. for both of above situation
   d. for none of above situation

5. Each array declaration need not give, implicitly or explicitly, the information about
   a. the name of array
   b. the data type of array
   c. the first data from the set to be stored
   d. the index set of the array

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0304M0093

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Electronics (Microprocessor & C-Language)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:
1. **Maximum marks 70.**
2. **Attempt all questions.**
3. **Symbols carry their usual meanings.**
4. **Scientific calculators are allowed.**

Q1.(A) (i) List three features of Programmable Interval Timer. Draw a pin diagram and a functional block diagram of 8253/8254 programmable interval timer. Discuss various blocks of the functional block diagram. **[07]**

(ii) Draw and discuss a block diagram of Typical Modem Device and discuss the following modulation techniques with relevant schematic diagrams: (a) Frequency shift keying (FSK), (b) Amplitude shift keying (ASK), (c) Phase shift keying (PSK). **[07]**

OR

(i) Draw the pin diagram and the functional block diagram of 8259 PIC. Discuss various blocks of the functional block diagram of 8259 PIC. **[07]**

(ii) List various types of communication systems and discuss synchronous data transfer format. **[07]**

(B) Answer **any four** questions from the following: (each carry **one** mark). **[04]**

(i) List the difference between 8253 and 8254.
(ii) What is a MODEM?
(iii) 8253 has _____modes of operations (six, seven, eight)
(iv) List three features of 8259 PIC.
(v) Give the format of Asynchronous data transfer.
(vi) _____data transfer is used to transfer a group of characters at a time (asynchronous/ synchronous).

Q2.(A) (i) Show interface connections and write a program to measure and control temperature of furnace employing a microprocessor-based system. **[07]**

(ii) Draw a circuit diagram of Sine to Square wave Converter and waveforms of rectified square wave. Write a program for frequency measurement. **[07]**

OR

P.T.O

(i) Draw a pin diagram and a block diagram of INTEL-8086 Microprocessor and discuss various blocks of it. Also discuss various registers of INTEL 8086 MPU **[07]**

(ii) Discuss with a schematic diagram how to control and display the speed of a motor using a microprocessor based system? Write a program using delay subroutine for the same. **[07]**

(B) Answer **any three** from the following (each carry **one** mark) **[03]**

(i) The 8086 is a 16-bit____ processor. (N-channel:H-MOS, P-channel:C-MOS)
(ii) The 8086 uses ___ address lines and ___data lines.
(iii) The 8086 can directly address up to___ bytes of memory.
(iv) The 8086 has _____operating modes. (write number)
(v) Pin number _____ is assigned for ALE signal of 8086.

Q3.(A) (i) Area of a triangle is given by the formula **[07]**

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where a, b and c are sides of the triangle and 2s = (a+b+c). Write a program to read the sides of a triangle and calculate area. Program should print all sides and area of the triangle.

(ii) Write a program to evaluate sin(x) using the following series expansion with an accuracy of 0.001 **[07]**

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots\ldots\ldots\ldots$$

OR

(i) Write a program to read 100 integer values and then to calculate and print average of lowest and highest values in the series. **[07]**

(ii) Draw block diagram of multiple selection using **else if**. **[07]**
Write a program to read coordinates of a point, check whether the point falls on origin, axis or in which quadrant. Program should print proper message.

(B) Attempt **any four** from the following **[04]**

(i) Point out errors in the following statement
```
#define PI = 3.14159;
```
(ii) Write output of the following program segment
```
float x = 123.45678;
printf("%8.2f    %11.3e", x, x);
```
(iii) Mention weather the following statements are **true or false**
a). all static variables are automatically initialised to zero.
b). assignment operator has left to right associativity.

(iv) Write C statement for the following

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

(v) Write a **for loop** to print the following
0, 1, 4, 9, 16,.....100

(vi) How **while loop** is different from **do while loop ?**

Q4.(A) (i) Write a program to read a series of 50 values and then sort them in ascending order. The program should print both the original series and sorted series. **[07]**

(ii) Palindrome is a word which spell same forward and backward. Write a program to read a word and check whether it is a palindrome or not. **[07]**

OR

(i) Write a program to read n number of values, calculate and print the standard deviation of the series using the following equation. **[07]**

$$s = \sqrt{\frac{1}{n}\sum (x_i - m)^2}$$ where m is the mean of the series.

The program should print mean and standard deviation of the series.

(ii) Write a program to read two matrices A and B, generate a third matrix C by adding A and B and then print the resultant matrix. The program also should print the largest value in the new matrix. **[07]**

(B) Attempt **any three** from the following **[03]**

(i) What will be output of the following program segment?

```
printf("%d", strcmp("push", "pull");
```

(ii) Identify errors in the following statements

```
float value[row][col];
int x[10] = 5;
```

(iii) What will happen when the following statement is executed

```
for( ; ; )
    printf("help me");
```

(iv) Write the output of the following segment

```
float x[5] = {1.1, 11.1, 111.1, 1111.1};
printf("%f %f", x[0] + 10, x[1] + x[4]);
```

(v) How much memory is needed to store the following variable **x**

```
double x[10][5];
```

****

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0304M0094

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Food Science (Nutritional Physiology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Discuss the functions of major Systems of Body. **[07]**

ii) Describe biosynthesis and physiological actions of Thyroid hormones. Add their regulation. **[07]**

OR

i) Briefly describe Nerve Impulse Transmission. **[07]**

ii) Give a detailed account on: Prostaglandins **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) Discuss Responsiveness as living characteristics.

ii) Give full form of: ACTH

iii) Distinguish between Steroid and Peptide Hormones.

iv) What is EPSP? Give one example.

v) Explain: Sliding-filament Theory

2 (A) Answer in Detail:

i) Explain the Chemical Digestion. **[07]**

ii) Explain the Lung Volumes and Capacities. **[07]**

OR

i) Discuss the Regulation of digestive secretions. **[07]**

ii) Briefly describe the control of Respiration. **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) Define Contact Digestion.

ii) Explain the role of Satiety Centre.

iii) Compare Peristalsis Vs Segmentation.

iv) What are Apnea and Dyspnea?

v) Name the accessory muscles involved in Forced Inspiration.

vi) What is Dead Space?

3 (A) Answer in Detail:

i) Explain the Neural regulation of Heart Beat. **[07]**

ii) Write a brief note on Plasma Protein types and their alterations in clinical condition. **[07]**

OR

i) Write a note on Blood Clotting mechanism. **[07]**

ii) Write a note on Adaptive Immunity. Cite examples **[07]**

3 (B) Answer in Short: (Any Three) **[03]**

i) Define Monoclonal Gammopathy.

ii) Name two Cytokines secreted by NK cells.

iii) Papain digestion of antibody separates _____ and _____ fragments.

iv) In electrocardiogram tracings the QRS 'Spikes' Complex stands for _____.

v) In B-Cell and T-Cell lymphocytes "B" and "T" are derived from _____ and _____.

P.T.O

M0094 – 2

4 (A) Answer in Detail:

i) Briefly describe the different types of Nephrons and Renal Blood Supply. **[07]**

ii) Define Antioxidants. Give detailed Classification of Antioxidants with suitable examples. **[07]**

OR

i) Give a brief account of hormonal control of Urine Formation and Concentration. **[07]**

ii) Describe principal organs of Female Reproductive System with their structure and functions. **[07]**

4 (B) Answer in Short: (Any Four) **[04]**

i) Write down the formula to calculate Renal Plasma Flow.

ii) What are Osmoconformers?

iii) What are Effective Osmoles?

iv) Explain: Detoxification

v) Mention location and function of Leydig cells.

vi) Explain: Menstruation Phase

—X—

0304M0095

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Forensic Science

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Ques.1 (a) Answer the following questions:

i. What are principles of Handwriting? Explain. 7Marks

ii. Write note on Questioned signatures, Natural signatures and specimen signatures. 7Marks

OR

i. Define 'Document' according Indian Evidence Act. Also discuss various questions raised on authenticity of documents. 7Marks

ii. What are principles of Handwriting identification? Explain. 7Marks

Ques.1 (b) Answer the following questions: (Any Four) 4Marks

i. When a question is raised about the authenticity of a document or a part thereof, that document is known as _____ .

ii. GEQD was first established at:
(a) 1906, Shimla (b) 1006, Calcutta
(c) 1906, Delhi (d) 1906, Chandigarh

iii. Albert Osborn authored the classic book-
(a) Suspect Document, 1910 (b) Questioned Document, 1910
(c) Documents, 1910 (d) None of the above

iv. Which of the following is classed as poor movement?
(a) Thumb movement (b) Wrist movement
(c) Whole arm movement (d) Finger movement

v. The force or pressure applied on the writing instrument is known as _____ .

vi. The variation in the width of the stroke is known as _____ .

Ques.2 (a) Answer the following questions:

i. Explain in detail the security features observed in Rs.500/- Indian currency Note. 7Marks

ii. What is simulated forgery? Describe process of its examination. 7Marks

OR

i. Write short note on: 7Marks
(a) Movement in Writing (b) Line quality (c) Pen Position

ii. What is traced forgery? Describe process of its examination. 7Marks

Ques.2 (b) Answer the following questions: (Any Four) 4Marks

i. What is OMRON feature?

ii. What are signs of traced forgery?

iii. The natural variation in writing and signature are form of-
(a) Forgery (b) Disguise (c) Genuineness (d) None of the above

iv. The following technique can be used for the examination of indented writings-
(a) UV light (b) Electrostatic process (c) Oblique light (d) Both (b) & (c)

v. The paper of currency notes is made up of –
(a) 50% Cotton/Linen Rag (b) 100% Cotton/ Linen Rag
(c) 70% Cotton/Linen Rag (d) None of the above

vi. The earlier forms of Indian inks consisted of suspension of-
(a) Activated charcoal in honey (b) Lamp black in water
(c) Both (a) and (b) (d) Iron and gallotinate

P.T.O

M0095 = 2

Ques.3 (a) Answer the following questions:

i. Describe procedure for care and handling in collection and examination of questioned documents. 7Marks

ii. Describe basic tools needed for forensic document examination. 7Marks

OR

i. Refer to the individual characteristics terminology used in writing and signature verification. 7Marks

ii. Describe various types of inks and their forensic examination in detail. 7Marks

Ques.3 (b) Answer the following questions: (Any three) 3Marks

i. Give two examples of mechanical erasures.

ii. What do you understand by feathering of ink?

iii. Transplanted signatures are exactly same as model genuine signature, But still considered as forged. (True or False)

iv. A letter with unknown author is known as-

(a) Secret (b) anonymous letter

(c) synonymous letter (d) unauthentic letter

v. Unusual departure of line from its intended course is termed as _____ .

Ques.4 (a) Answer the following questions:

i. Write a note on introduction of computer Forensic in Documents Science. 7Marks

ii. Write a note on Scanner. 7Marks

OR

i. Write note on "Mechanical Typewriter". 7Marks

ii. Explain the types of writing instruments with their ink compositions. 7Marks

Ques.4 (b) Answer the following questions: (Any three) 3Marks

i. Who invented mechanical and electo typewriters?

ii. Give compositions of fountain pen ink.

iii. What are trash marks?

iv. Which moisturizer agent is used to wet the mechanical typewriter ribbons?

v. Define "White-collar crime"?

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0304M0096

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Toxicology (Biochemical & Immuno Toxicology)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Instructions: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

Que. 1 (A) Write the following:

(i) What is the significance of understanding mechanism of toxicity? What are the main applications of studying the pathways of toxicity? [7]

(ii) Which mechanism facilitates the distribution of a toxicant to the target site? Highlight various steps followed for the distribution of toxicant? [7]

OR

(i) What are the potential stages of development of toxicity after chemical exposure? [7]

(ii) How a bioassay is identified in the drug discovery process? What do you understand by drug discovery? [7]

Que. 1 (B) Answer the following (any four out of six): [4]

(i) What is assay Validation?

(ii) Write the types of high throughput screening techniques in toxicity testing.

(iii) Define: Bioassay

(iv) Write the key advantage of high throughput screening assay.

(v) What is Presystemic elimination

(vi) Write the name of any two enzyme involved in biotransformation mechanism.

Que. 2 (A) Write the following:

(i) What is immunity? Discuss in detail innate and adaptive immunity. [7]

(ii) What is autoimmunity? Briefly describe the autoimmune disorders. [7]

OR

(i) Define Hypersensitivity and discuss type I and type II of Hypersensitivity. [7]

(ii) Differentiate between cell mediated and humoral mediated immunity. [7]

Que. 2 (B) Answer the following (any four out of six): [4]

(i) Name the Ig that can cross the placenta.

(ii) Define Immunotoxicology.

(iii) What is the role of Ig G and Ig A?

(iv) Write the functions of mast cell and neutrophil in immune system.

(v) What is Clonal Selection?

(vi) Write the name of primary and secondary immune organs.

P.T.O

Que. 3 (A) Write the following:

(i) Discuss the four levels of protein structure. [7]

(ii) Discuss the methods used in toxicoproteomics analysis. [7]

OR

(i) Discuss the method to determine protein structure. [7]

(ii) Discuss the different functions of protein. [7]

Que. 3 (B) Answer the following (any three out of five): [3]

(i) What is isoelectric point (pI) of amino acid?

(ii) Write the name of any two biomarker for toxicoproteomics analysis.

(iii) Write the full form of MALDI-TOF and SELDI.

(iv) Write the name of covalent bonds present in protein structure.

(v) What is protein microarray?

Que. 4 (A) Write the following:

(i) Give detailed description of metabolomic data analysis and clinical applications [7]

(ii) Write a brief note on metabolomic sample source, collection and handling of metabolomic study [7]

OR

(i) Give a brief note on various detection techniques used in metabolomic analysis [7]

(ii) Write briefly on basic work flow of metabolomic profiling [7]

Que. 4 (B) Answer the following (any three out of five): [3]

(i) metabolome

(ii) Name two detection techniques used for metabolome profiling

(iii) Two sample source for metabolome analysis

(iv) Full form of HMDB

(v) Name two separation techniques used for metabolome profiling

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0304M0097

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

408

Cancer Biology (Cellular & Molecular Basis)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All Questions are compulsory
Draw neat and labeled diagram wherever necessary

Q-1 A **14**

(i) **What are the different modes of tumor blood vessels formation? Describe in detail all steps of sprouting angiogenesis.** 7

(ii) **Explain in detail on premetastatic niche formation.** 7

OR

A

(i) **Explain in detail the endogenous inhibitor Thrombospondin-1.** 7

(ii) **Write a note on tissue tropism.** 7

Q-1 B **Multiple Choice Questions (Any four out of six)** 4

1 **Which gene is member of lung metastasis gene expression signature?**

a ST6GALNAC5 b STAT3
c MMP2 d HBEGF

2 **_____ capillaries have numerous "pores" in the endothelium and are found wherever active capillary absorption or filtrate formation occurs.**

a Fenestrated b Sinusoid
c Tortuous d Continuous

3 **_____ tumor does not produce osteolytic bone metastasis.**

a Lung b Kidney
c Breast d Prostate

4 **_____ is the most widely used pharmacodynamic biomarker in order to monitor the systemic effect of most antiangiogenic agents.**

a Increase in blood pressure (hypertension) b ROS-synthase activity
c NO-synthase activity d Decrease in blood pressure (hypotension)

5 **Interaction between RANKL/RANK receptor is essential for _____.**

a Osteoclastogenesis b Angiogenesis
c Lymphangiogenesis d Osteoblastogenesis

6 **Tumor vessels lined by tumor cells is known as _____.**

a Vascular mimicry b Vasculogenesis
c Sprouting angiogenesis d Vessel co-option

P.T.O

M0097 – 2

Q-2 A

(i) **Write all about classification of tumors blood vessels and write in short about mother vessels (MVs).** 14

(ii) **Write a note on lymph-node metastasis.** 7

OR

A

(i) **Briefly describe role of Endothelial Progenitor Cells (EPC) in tumor angiogenesis.** 7

(ii) **Describe metastasis cascade in detail.** 7

Q-2 B **Multiple Choice Questions (Any four out of six)** 4

1 **Expression of RUNX2 results into _____.**

a Bone Metastasis
b Liver Metastasis
c Brain Metastasis
d Lymph-node Metastasis

2 **_____is a hallmark of solid tumors that drives the production of angiogenic factors, including VEGF, within tumors.**

a Hypoxia
b Typoxia
c Normoxia
d Choromoxia

3 **Survival in the circulation is classified as _____.**

a Tumorigenic function
b Metastasis initiation function
c Metastasis progression function
d Macrometastatic colonization function

4 **_____ is a process of transcapillary pillar formation inside pre-existing vessels resulting in the formation of new vessels.**

a Intussusception angiogenesis
b Capillary formation
c Vasculogenic mimicry
d Mother vessel formation

5 **Which model suggests that metastasis occurs early in tumor progression and independent of tumor cells at the primary site?**

a Traditional Model
b Clonal Selection Model
c Parallel Evaluation Model
d Clonal Dominance Model

6 **Folkman and his collaborators hypothesized that _____ lack blood vessels and hence rare sites of metastasis.**

a Cartilage and vitreons
b Lung and brain
c Liver and bone
d Lung and liver

Q-3 A

(i) **Write a brief note on Warburg phenomenon and explain how it acts on cancer cells.** 14 7

(ii) **Write a short note about cytosine modification in epigenetic process.** 7

OR

A

(i) **Justify how mitochondrial DNA mutations act as tumorogenic drivers.** 7

(ii) **Write a note on clinical application of epigenetic biomarker in cancer.** 7

Q-3 B **Multiple Choice Questions (Any three out of five)** 3

1 **GCDo941 is aderivative of P1103 against all isoforms of class I PI3ks in the _____ range.**

a Micromolar
b Millimolar
c Nanomolar
d Molar

2 **_____ forms a complex with its partner MAX.**

a MYC
b RB

c RAS d RAF

3 **What is the name of the scientific field that examines inheritable traits not caused by changes in the DNA code?**

a Genogenetics b Methylation
c Non-codal genetics d Epigenetic

4 **In human DNA, which nucleotide base is methylated at the 5' position?**

a Adenosine b Cytosine
c Guanine d Thymine

5 **What characteristic of DNA allows methylation patterns to be maintained through replication and cell division?**

a Semiconservative replication b Recombination and repair
c The absence of uracil d Deoxyribonucleotide synthesis

Q-4 A 14

(i) **Explain in detail the crabtree effect.** 7

(ii) **Write a short note about problem with epigenetic therapies in cancer.** 7

OR

A

(i) **Explain the process of autophagy as tumor suppressor mechanism.** 7

(ii) **What is the difference between genetics and epigenetic?** 7

Q-4 B **Multiple Choice Questions (Any three out of five)** 3

1 **Glutamine metabolism provides both NADH and _____ for increased lipogenesis of the cancer cell.**

a Pyruvate b Isocitrate
c Citrate d Oxalate

2 **The well established increased intake of glucose by cancer cells has found widespread clinical utility in the imaging of cancer using FDG in _____ scans.**

a MRI b X-Ray
c PET d USG

3 **HK I and II directly interact with mitochondria at specific voltage-dependent anion channels (VDACs).**

a HK I and II b LDH A & B
c Isocitrate d α – Keto glutarate

4 **Which of the following is an example of epigenetic inheritance?**

a Purine dimers b Mismatch mutations
c Coding regions of genes d Histone methylation patterns

5 **DNA methylation and modification of histones are well known mechanisms of epigenetics. Another mechanism plays an important role in epigenetics. Which one of the following RNAs is most likely to be involved?**

a Messenger RNA (mRNA) b Ribosomal RNA (rRNA)
c Transfer RNA (tRNA) d Non-coding RNA (ncRNA)

—X—

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0304M0098

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Polymer Science (Molecular Motion)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Note- Attempt all the Questions. Marks of each question are given in the bracket.

Q.1a. What are the stereo regular polymers? Explain geometrical isomerism in polymer with example. [7]

Or

Q.1a. Explain (i) Staggered and eclipsed states,(ii) Gaussian chain in detail

Q1b . Define the end to end distance in polymer chain and derive the equation of end to end distance for and ideal polymer chain? [7]

Or

Q1b. Define tacticity and their type and also write the significance of tacticity?

Q.1c .Any four out of six [1x4]

(i) Define Conformations

(ii) Define Configurations

(iii) What is the Potential Energy?

(iv) Explain the Random coil

(v) Define Isomerism

(vi) Gauche confirmation

Q.2a .Explain the given topic with the help of suitable curve [7]

(i) Bingham Plastic (ii) Dilatants (iii) Pseudo plastics

Or

Q.2a Explain different type of mechanical deformation in plastic materials?

Q.2b. Derive the WLF equation of Polymer? [7]

Or

Q.2b. What is the viscoelasticity? Explain Voigt Kelvin model?

Q.2c. Any Four out of Six [1x4]

(i)Define the creep –

(ii)Define stress relaxation

(iii)Elastic property of plastic materials –

(iv)Viscous property of plastic materials

(v)Draw Maxwell model

(vi)Explain Hook's Law

P.T.O

FM-00098-2

Q.3a. Explain Newtonian and non Newtonian fluids in detail ? [7]

Or

Q.3a. Explain the shear thinning and shear thickening in detail?

Q.3b. Explain the power law of fluids? [7]

Or

Q.3 b. Define the glass transition temperature? and describe the factors affecting the Tg ?

Q.3 c. Answer any three [1x3]

(i) Define laminar flow

(ii) Define shear rate

(iii) Define Viscosity

(iv) Define Isothermal flow

(v) Reynolds no.

Q.4 a Define Degree of crystallinity and Explain factors affecting degree of crystallinity? [7]

Or

Q.4a. What is the Tg of Polycarbonate (PC) with Mn= 10000?. Given Tg infinite =150 ^{0}C, and K=2x10^{5}

Q.4 b. Explain any fibre spinning process with suitable diagram ? [7]

Or

Q.4 b. Explain solid state extrusion in detail?

Q.4c. Answer any three [1x3]

(i) Write the Flory equation

(ii) Write two example of non Newtonian fluid

(iii) Define Birefringence

(iv) Explain Tg

(v) Write the significance of Orientation

—X—

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0304M0099

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Computer Science (Python Programming)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q-1 A Write The Following.

(I) What is Python? Explain the basic elements of python in detail also explain the strings and input in python . **(14)**

Or

(I) What is function in python? Explain with example also Explain the modules in details. **(14)**

Q-1 B. Short Questions(Attempt Four) **(4)**

1.What is Lists?

2.What is Dictionary.

3. What is Global variables.

4. Types of testing?.

5. What is Sets.

6. What is Tuples.

Q-2 A Write The Following.

(I) What is Dictionary ? Explain it's all methods and function in details. **(14)**

Or

(I) What is tuple? Explain it's all methods and function in details. **(14)**

P.T.O

Q-2 B. Short Questions(Attempt Four) (4)

(1) What is the usage of help()function in Python.

(2) What is the usage of dir()function in Python.

(3) What are negative indexes.

(4) What is inheritance.

(5) What is Scoping.

(6) What is Assertion.

Q-3 A **Write The Following.**

(I) What is testing? Explain the types of testing in details. Also explain the assertions and handling exceptions in python. (14)

Or

(I) Explain the OOPS concepts in python with example. Also explain the ADT in python. (14)

Q-3 B. Short Questions(Attempt Any three) (3)

1) Which of these is not a core data type?
   a).Lists b) Dictionary c)Tuples d)Class
2) Which of the following is a Python tuple?
   a) [1, 2, 3]. b) (1, 2, 3) c) {1, 2, 3} d) {}
3) Suppose t = (1, 2, 4, 3), which of the following is incorrect?
   a) print(t[3]) b) t[3] = 45 c) print(max(t)) d) print(len(t))
4) . Which of the following functions is a built-in function in python?
   a) seed() b) sqrt() c) factorial() d) print()
5) The function pow(x,y,z) is evaluated as:
   a) (x**y)**z b) (x**y) / z c) (x**y) % z d) (x**y)*z

Q-4 A **Write The Following.**

(I) What is Sorting? Explain all Sorting techniques with example and also with Algorithm. **(14)**

Or

(I) What is classical cypher? Explain Encryption and Decryption technic with example also explain the Has table in python. **(14)**

Q-4 B. Short Questions(Attempt Three) **(3)**

1. What is Hash tables.

2. What is Mutability.

3. What is Modules

4. What is Iteration.

5. What is Debugging.

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0304M0100

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Horticulture Science

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1.A. Explain classification and applications of a Green house. 14

OR

Q.1 A. Write brief notes on: 14

i. Construction materials used in a green house ii. Planting medium

Q.1 B. Explain in one line any four: 04

Foggers, automation in a green house, cooling pads, benches, ventilation, DIY green house

Q.2. A. Explain Significance of soilless culture in detail. 14

OR

Q.2.A. Write Short notes on: 14

i. Challenges of growing cacti ii. Foliage in green house

Q.2. B. Explain in one line any four: 04

Bioponics, NFT, Aeroponics, Aquaponics, Container culture, Ground culture

Q.3. A. Explain micropropagation and its applications. 14

OR

Q.3.A. Describe: 14

i.GM cultivars ii. rDNA technology

Q.3. B. Explain in one line any three: 03

Morphological markers, Explant, sterilization, MS medium, Molecular markers

Q.4. A. Justify the significance of composting . 14

OR

Q.4. A . Explain: 14

i. Soil fertility ii. Mulching

Q.4. B. Explain in one line any three: 03

Vermicompost, Weed, C:N ratio, pest, Organic farming

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0304M0101

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Clinical Research (Regulations in Clinical Research)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Que. 1 (A) Write the following

(i) Milestones in evolution of GCP **07**

(ii) Principles of ICH GCP **07**

OR

(i) ICMR Guidelines **07**

(ii) Indian Good Clinical Practices **07**

Que.1 (B) Answer the following (Any four) **04**

(i) Define: Clinical Trial

(ii) Name the four modules of ICH

(iii) During the conduct of the trial, if the laboratory location changes, is it required to get re-approval from EC for the amendment in protocol?

(iv) Give full form of CDER

(v) Define: Conflict of Interest

(vi)Give the significance of Pilot Study

Que. 2 (A) Write a note on following

(i) US Food and Drug Administration **07**

(ii) Roles and Responsibilities of Sponsor **07**

OR

(i) Medicines and Healthcare Products Regulatory Agency **07**

(ii) Clinical Ethics Committee **07**

Que.2 (B) Answer the following (Any four) **04**

(i) Enlist the essential components of an EC approval letter.

(ii) Give the composition of EC as per schedule Y

(iii) US FDA was established in the year _____

(iv) Is a patent granted in one country enforceable in other countries? Yes/No

(v) US FDA form 483 stands for _____

(vi) Schedule Y form 44 is required to fill for _____

P. T. O.

(M0101-2

Module V Regulation in Clinical Research

Que. 3 (A) Write the following

a) Short Note: Good Laboratory Practices **07**

b) Explain in brief CIOMS Guidelines **07**

OR

(i) Patents, Trademarks and Copyrights **07**

(ii) The Nuremberg Code **07**

(B) Answer the following (Any three) **03**

(i) Name appendix V of schedule Y

(ii) Give full form of MAH

(iii) Alcoholic beverages are regulated by USFDA. True/False

(iv) Define: Audit

(v) Give full form of TRIPS

Que. 4 (A) Write the following

a) Short Note: EMEA Guidelines **07**

b) Investigational New Drug Application **07**

OR

c) Abbreviated New Drug Application **07**

d) Essential Documents in Clinical Research **07**

(B) Answer the following (Any Three) **03**

(i) ICH GCP is a union of which three countries?

(ii) Give the difference between ADR and AE

(iii) A trial on vaccine is comes under the category of

(a) Treatment Trial

(b) Prevention Trial

(iv) Give the timelines of reporting SAE

(v) Give the full form of RMO

—X—

0304M0102

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Geoinformatics (Spatial Database & Modelling)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

(A) What is Normalization? Explain first three normal forms with its disadvantages, with the help of example. [14]

OR

Q.N1(A)

i) Explain with example a) Data Abstraction b) Concurrent access anomaly [7]

ii) Write the syntax of SQL statement : [2+2+3=7]

a) To create a table
b) To eliminate duplicate rows using select statement
c) To update records conditionally

Q.N.1(B)

Do as directed [any four] [4]

i)A null value is equivalent to zero in SQL. [Write True or False]

ii)RDBMS stores data in related tables . [Write True or False]

iii)For sorting data in SQL _____ is the default order. [Fill the blank space]

iv) Granting authorization for data access is the function of _____. [Fill the blank space]

v) DML enables users to _____ or _____ data. [Fill the blank spaces]

vi) Count(Expression) function returns the number of rows where the expression is not null. [Write True or False]

Q.N.2

(A) What do you understand by Spatial data model? Explain Topological Model of Vector data. [14]

OR

(A) i) What are the advantages and disadvantages of Network Model? [7]
ii) Write the different topological relationships between spatial objects. [7]

(B) Do as directed [Answer any four] [4]

i) Which of the following is the oldest database model:
   a) Hierarchical Model
   b) Network Model
   c) Relational Model
   d) Deductive Model

ii) Which of the following is an advantage of database:
   a) Reduction in redundancy

P.T.O

b) Security enforcement
c) Avoidance of inconsistency
d) All the above

iii) IDMS is a hierarchical database. [Write True or False]
iv) A Chain has start node, end node and left & right _____.[Fill the blank space]
v) TIN is the abbreviation of _____.[Fill the blank space]
vi) Topology of spatial data consists of _____, containment and connectivity. [Fill the blank space]

QN.3.(A)

(i) What is spatial data quality and list out the sources of errors in spatial data with suitable examples. [7]
(ii)Describe different spatial data quality parameters in ISO 2001 standards. [7]

OR

Q.N.3(B)

(i). Describe different methods that can be used to determine errors in spatial data. [7]
ii) Discuss the workflow to assess the accuracy of DEMs obtained from two different sources (Using ArcGIS Tools).

Q.3(C) Answer any three [7]

i) Whether Accuracy = Precision [3]
a) TRUE b) FALSE c) Can't Say

ii) The accuracy of LULC map can be best represented by:
a) User and Producer's Accuracy b) Positional accuracy c) RMSE d) Standard Deviation

iii) The description of processing history is referred to as:
a) Lineage b) Thematic Accuracy c) Temporal Accuracy d) Positional accuracy

iv) The error that is consistent in magnitude and direction is referred to as:
a) Random Error b) Systematic Error c) Thematic Error d) Digitization Error

v) The evaluation of similarity between spatial data geographical truth is referred as:
a) Data Uncertainity b) Data Quality c) Data Error d) Data Accuracy

Q.4.(A) Discuss different levels of measurements of data in GIS. [14]

OR

Q.N.4.(A)i) How the levels of measurements helps in GIS analysis. Discuss with suitable example.[7]

Q.N.4(A)ii) Draw a comparison between interval and ratio measurement scale with suitable examples.[7]

Q.N.4. (B) Answer any three [3]

i) Which one of the following map characterizes nominal scale of measurements:
a) LULC Map b) Population Density Map d) Slope Map d) Flow accumulation map

ii) Which one of the following is a ratio scale of measurement

a) Distance b) Direction c) Temperature d) Elevation

iii)The level of measurements where there is a definite zero point, is referred to as

a) Nominal b) Ordinal c) Interval d) Ratio

iv) Can you represent the data in nominal scale, if it is collected in interval/ratio scale.

a) Yes b) No c) Can't Say

v) If you want to rank the cities with respect to their population, which level of measurement would be suitable:

a) Ordinal b) Interval c) Ratio d) Nominal

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0304M0103

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

408

Climate Change (Tools & Techniques)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1.A. Explain difficulties while carrying out climate change impact assessment. 14

OR

Q.1 A. Write brief notes on: 14

i. Determinants of impacts of climate change ii. Low probability catastrophic events

Q.1 B. State true or false (any four): 04

1) Market impacts of climate change includes the lives lost.
2) When the impacts exceed the threshold then the damage is minimum.
3) Studying transient scenarios increases the vulnerability of a region.
4) Evaluation of the impacts is always quantitative.
5) Increase in replenishable ground water increases the adaptive capacity of an agricultural region.
6) Civil insecurity has an inverse relationship with adaptive capacity of a region.

Q.2. A. Explain how physical vulnerability of a coastal zone is assessed using remote sensing, GIS tools and techniques. 14

OR

Q.2.A. Write Short notes on : 14

i. Applications of remote sensing in disaster management ii. GIS softwares

Q.2. B. Explain in one line any four: 04

GPR, TIFF, Swath, spatial resolution of Quickbird, Raster, SONAR.

Q.3. A. Explain the fundamental laws of physics used in global climate models . 14

OR

Q.3.A. Describe: 14

i. Components of global climate models ii. Evaluation of climate models

Q.3. B. Answer any three: 03

1. Which of the followings is true:
   A. Dry air in the atmosphere is heavier than water vapour
   B. Dry air in the atmosphere is lighter than water vapour
   C. Dry air and water vapour have equal weights in the atmosphere
   D. Carbon dioxide is the most abundant gas in dry air
2. Green house gases:
   A. trap sun's heat
   B. trap the heat released from the earth's surface
   C. decrease earth's temperature

P.T.O

D. are not produced by burning of fossil fuels

3. Most critical aspect among the essential ones for the ocean circulation to be constantly functional
   A. formation of horizontal pressure gradients
   B. formation of vertical pressure gradients
   C. formation of deep water masses
   D. formation of density gradients
4. During evaporation, water experiences
   A. specific heat loss
   B. latent heat loss
   C. specific heat gain
   D. latent heat gain
5. While comparing the vertical profiles of particle reactive and bio-limiting elements for the Atlantic and the Pacific Ocean, why are the deep water concentrations always higher in the Pacific?
   A. The particle flux to depth is stronger in the Pacific than the Atlantic.
   B. The deep water in the Pacific is older than that in the Atlantic, so it has accumulated more of those elements with time.
   C. Particles in the Atlantic sink faster, so much of the material reaches the sediments rather than being remineralised in the water column.
   D. Pacific is bigger than the Atlantic

Q.4. A Justify the significance of statistical tools for climate change impact prediction. 14

OR

Q.4 A Explain: 14

i.Data collection ii. Social survey methods

Q.4. B. Explain in one line any three: 03

Content analysis, Narrative method, web-GIS-CLIMATE, storylines in 2019, Sensitivity analysis

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0404M0117

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Botany (Plant Physiology)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Q 1 A Describe in detail about N-P-K metabolism. [14]

OR

Q 1A (i) Discuss in brief about Nitrogen cycle. [07]

Q1 A (ii) Explain types of amino acids. [07]

Q 1 B Answer in one or two lines only. (Any four) [04]

1. State importance of P?
2. Mention any two examples of aldo hexose sugar?
3. Define abiotic nitrogen fixation?
4. What is BNF?
5. Draw a structure of Triglyceride.
6. Importance of Mo in plants.

Q 2 A Discuss TCA cycle and describe in detail. [14]

OR

Q 2 A (i) Explain in brief CAM pathway. [07]

Q 2 A (ii) Discuss various types of transpiration. [07]

Q 2 B Answer in one or two lines only. (Any four) [04]

1. Define photo pigment system.
2. State the locations of F_1 and F_0 particle.
3. Define translocation?
4. State the basic difference between C_3 and C_4 plants.
5. How many units of ATP are produced during glycolysis?
6. Which colour of light is absorbed by PS-I and PS-II?

Q 3 A Causes of dormancy and methods to break it. [14]

OR

Q 3 A (i) Explain in detail about growth indices. [07]

Q 3 A (ii) Discuss in detail about bioassay of Auxins with pathway. [07]

Q 3 B Answer in one or two lines only. (Any Three) [03]

1. Name any three genes involved in floral meristem.
2. Role of which growth regulator is important in process of seed germination?
3. What is ROS?
4. Mention any two importance of brassinosteroids.
5. State different types of dormancy.

Q 4 A Heat and salinity stress. [14]

OR

Q 4 A (i) Describe Pr and Pfr structure. [07]

Q 4 A (ii) Explain shoot apex modifications. [07]

Q 4 B Answer in one or two lines only. (Any Three) [03]

1. State different biotic factors which causes stress on plants?
2. What is the role played by Auxins during flowering?
3. What is vulnerability?
4. Write full form of LWR and NAR.
5. Define: bio chemical signalling

0404M0118

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Zoology (Immunology & Toxicology)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Time: 2.30 Hours			**Total Marks: 70**	
NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.				
Q-1	(A)	Write the following		
		(i)	Write a detailed note on humoral immune response.	07
		(ii)	Give a note on Immunoglobulins.	07
			OR	
		(i)	What are precipitation reactions? Explain the Ouchterlony method.	07
		(ii)	Explain diagnostic immunology in brief.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Explain agglutination.	
		(ii)	Define "APC"	
		(iii)	Add a note on epitope.	
		(iv)	Define attenuated virus.	
		(v)	Mention heteroantigens.	
		(vi)	Define cross-reactivity.	
Q-2	(A)	Write the following		
		(i)	Write a brief note on autoimmune diseases.	07
		(ii)	Give an account on primary immunodeficiencies.	07
			OR	
		(i)	Give a detailed account on "immunosuppressive drugs"	07
		(ii)	Discuss on Hypersensitivity type II in detail.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is serology?	
		(ii)	Mention epigenetics.	
		(iii)	Define MHC.	
		(iv)	Why are dendritic cells important?	
		(v)	Give a brief idea of "Mantoux test".	
		(vi)	Mention Allergic contact dermatitis.	
Q-3	(A)	Write the following		
		(i)	Give a detailed account of Xenobiotics.	07
		(ii)	Discuss Phase II Biotransformation reactions.	07
			OR	
		(i)	Write a note on absorption of toxicant.	07
		(ii)	Discuss in detail toxins of animal origin.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Define acute toxicity.	
		(ii)	Expand the term 'NOEL'	
		(iii)	Give any two factors affecting toxicity.	
		(iv)	Name different areas of Toxicology.	
		(v)	Explain LD_{50}.	

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M0118-2

Q-4	(A)	Write the following		
		(i)	Describe cardiomyopathies in detail.	07
		(ii)	Explain: carboxyhemoglobinemia	07
			OR	
		(i)	What is cholestasis? Explain in detail.	07
		(ii)	Explain neurotoxicity.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is tachycardia?	
		(ii)	Explain: Minamata disease.	
		(iii)	What is Amygdalin?	
		(iv)	What is hypoxia?	
		(v)	Define heart block.	

0404M0119 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Geology (Indian Stratigraphy)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Q-1. (A) Describe distribution, geological succession, and classification of the Palaeozoic era. **14**

OR

(A) (i) Geological succession and life of Devonian period. **07**
(ii) Palaeozoic succession of Kashmir Basin. **07**

(B) Answer the following short questions. (Any four out of six) **04**
(i) Give the composition of Kali formation.
(ii) Mention the age of Muth quartzite.
(iii) When first vertebrate appeared?
(iv) Mention economic importance of Paleozoic era.
(v) Give two examples of Silurian invertebrate fauna.
(vi) Name the locality of Bhimtal volcanics.

Q-2. (A) Explain Mesozoic rocks of Gujarat and Rajasthan. **14**

OR

(A) (i) Geological succession of the Triassic System. **07**
(ii) Marine rocks of Cretaceous age. **07**

(B) Answer the following short questions. (Any four out of six) **04**
(i) Mention the period when first Pterosaur appeared.
(ii) Who introduced the term "Cretaceous"?
(iii) Name the formation from where early Jurrasic mammalian fossil discovered.
(iv) Give classification of Jurassic System of Kachchh as proposed by Biswas.
(v) In which geological period Archaeopterix evolved from reptiles?
(vi) In which period the Tyrannosaurus rex lived on the earth surface?

Q-3. (A) Write critical note on Indus belt and Indo-Gangetic plains of the India. **14**

OR

(A) (i) Geological formations of the Siwalik group. **07**
(ii) Siwalik flora and fauna. **07**

(B) Answer the following short questions. (Any three out of five) **03**
(i) Mention the age of the Siwalik system.
(ii) Name the palaeontologist who has enlightened the Siwalik flora.
(iii) Mention the name of the series which is homotaxial with middle Siwaliks.
(iv) Name the youngest age of the Holocene epoch.
(v) Name the thrust fault which separates the Siwaliks from the Indo-gangetic plain.

Q-4. (A) Write illustrative note on Precambrian -Cambrian, Permian –Triassic and Cretaceous -Tertiary boundary problems with reference to India and the World. **14**

OR

(A) (i) Geological formations of the Gujarat. **07**
(ii) Upper Gondwana sequence of India. **07**

(B) Short Questions (Any three out of five) **03**
(i) What are Passage Beds?
(ii) Name the charecteristic flora of Upper Gondwana.
(iii) Mention at least two Pleistocene and Recent deposits of India.
(iv) Mention the age of Middle Gondwana.
(v) Name the locality from Gujarat where geniculate coralline algae from the neogene-quaternary sediments have been reported.

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Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

409

Life Science (Ethology, Evolution & Toxicology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Define Behaviour. Explain the level of Natural Selection at Gene Level. **[07]**

ii) Discuss the Genes and their role in Behaviour. **[07]**

OR

i) Explain the Behaviour of Sand Wasp in summer as per How and Why causations. **[07]**

ii) Discuss the Environmental Information in terms of Physical Stimulus. **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) Define: Proximate Causation

ii) Discuss the Selected genes.

iii) Signify the role of Crossing Over.

iv) Discuss the role of Stone particles in Radula in Chiton.

v) Define First School of thought in Behaviourism.

2 (A) Answer in Detail:

i) Discuss Ingestion and Locomotion Behaviour Patterns. **[07]**

ii) Explain Forms of Territoriality. **[07]**

OR

i) Explain Courtship Behaviour with suitable example. **[07]**

ii) Discuss the Animal communication system. **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) Discuss the Paternal Behaviour.

ii) Define Waggle Dance in Bees.

iii) Define: Dominance

iv) Explain: Habituation

v) Define Conditioned Stimulus Vs. Unconditioned Stimulus.

vi) Define: Imprinting

3 (A) Answer in Detail:

i) Explain Hardy-Weinberg Law. **[07]**

ii) Write a note on: Genetic Drift **[07]**

OR

i) Explain Arboreal adaptations. **[07]**

ii) Discuss the concept of Species. **[07]**

3 (B) Answer in Short: (Any Three) **[03]**

i) What are Acquired Characters?

ii) How the effect of Population Bottleneck is long lasting?

iii) What was Gondwana?

iv) What is Panspermia?

v) Define: Population Bottleneck

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4 (A) **Answer in Detail:**

i) Give a detailed classification of proved Human Teratogens and explain their adverse effects on various stages of Embryonic Development. **[07]**

ii) Discuss various factors influencing toxicology in relation to Toxicants and Exposure Situation. **[07]**

OR

i) Outline different Genotoxic Agents and discuss their mode of action in relation to Gene Mutation and Chromosomal Aberrations. **[07]**

ii) Give a detailed account on Toxicants present in various sections of Environment. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) Define: LD_{50}

ii) State the contribution of Paracelsus in field of toxicology.

iii) Explain: NOEL

iv) Differentiate between Synergistic Effect and Antagonistic Effect.

v) Give outline of Toxicity Rating Chart in brief.

vi) Distinguish between Acute and Sub-chronic Toxicity.

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0404M0121 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Environmental Science (Aquatic & Marine Env. Chem.)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Note: Draw the diagram where ever required.

Q.1 (A) Write a note on dissolved organic and inorganic compounds in natural water. **[14]**

OR

Q.1 A (i) Give an account on buffer capacity. **[07]**

Q.1 A (ii) Explain problems faced in extracting drug from sea. **[07]**

Q.1 (B) Answer the following in one or two lines. **(Any Four)** **[04]**

a) What is the difference between fresh and sea water ?
b) Give acronym for HSAB.
c) Give examples of secondary metabolities.
d) Give example of diprotic acid.
e) Explain the term: Acid.
f) Define: speciation.

Q.2 (A) Explain oil pollution in detail. **[14]**

OR

Q.2 A (i) Explain the status of coastal and estuarine pollution in India. **[07]**

Q.2 A (ii) Describe disposal of plastic litter in sea. **[07]**

Q.2 (B) Answer the following in one or two lines. **(Any Four)** **[04]**

a) Name the marine mammals acting as bioindicator to organochlorines .
b) What is the effect of petroleum hydrocarbon on Avifauna ?
c) State the two predominant source point source of marine pollution.
d) Name the major polluted coastal area in Tamil Nadu.
e) Give examples of trace elements present in sea.
f) What are the chronic impacts of oil pollution in sea ?

Q.3 (A) Explain salinity and ionic strength in complex medium called sea water. **[14]**

OR

Q.3 A (i) Describe the diversity of environment found in ocean. **[07]**

Q.3 A (ii) Explain Charlson hypothesis. **[07]**

Q.3 (B) Answer the following in one or two lines. **(Any three)** **[03]**

a) Define: Flux.
b) What is Debye-Huckle equation ?
c) State the fundamental law followed by marine chemistry.
d) State limitation of Davies equation.
e) Give acronym of DMS.

P.T.O

MOR1-2

Q.4 (A) Give the significance of remote sensing in geospheric and cryospheric Studies **[14]**

OR

Q.4 A (i) Explain the importance of remote sensing in hydrospheric studies. **[07]**

Q.4 A (ii) Write a note on GPS. **[07]**

Q.4 (B) Answer the following in one or two lines. **(Any three)** **[03]**

a) Give the full form of: (i) NOAA (ii) SAM.
b) What was the use of IRS ?
c) Enlist current application of GIS.
d) Give the acronym of: (i) SLAR (ii) TM.
e) Name the hardware components of GIS.

0404M0122

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Biochemistry (Advanced Enzymology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

Que. 1 (A) Write the following:

(i) Derive the Michaelis – Menten Equation for unisubstrate enzymatic reaction. [7]

(ii) Briefly describe multi-substrate enzyme reactions with example. [7]

OR

(i) Derive M-M equation for multisubstrate enzymatic reaction. [7]

(ii) Draw and explain the Lineweaver-Burk plot for competitive, non- competitive and uncompetitive enzyme inhibitions. [7]

Que. 1 (B) Answer the following (any four out of six): [4]

(i) Define: maximum velocity for enzymatic reaction.

(ii) What is ping-pong reaction?

(iii) What do you mean by One Katal of enzyme?

(iv) Write the significance of Km.

(v) What is enzyme inhibitor?

(vi) Which are the factors that affect enzyme activity?

Que. 2 (A) Write the following:

(i) What is coupled reaction? How it is significant to identify rate of enzyme activity? Explain with example. [7]

(ii) What is ubiquitination? Write its significance in enzyme turnover. [7]

OR

(i) Discuss spectrophotometric methods to determine rate of enzyme activity with example. [7]

(ii) Briefly explain significance of enzyme turnover. [7]

Que. 2 (B) Answer the following (any four out of six): [4]

(i) What is continuous enzyme assay?

(ii) How proteasome is involved in enzyme turnover?

(iii) Why couple reaction can't track by measuring ADP↔ATP level by spectroscopy?

(iv) Write the name of any two prokaryotic proteases.

(v) Define enzyme turnover.

(vi) Enlist the methods to determine enzyme substrate complex?

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Que. 3 (A) Write the following:

(i) Discuss in details about concerted model and sequential model of Cooperative Binding with suitable diagram. [7]

(ii) Discuss the different methods to immobilize the enzyme. [7]

OR

(i) What is enzyme immobilization? Write the important criteria while selecting carrier for Enzyme immobilization system. [7]

(ii) What is allosteric enzyme? Write the properties of allosteric enzyme. [7]

Que. 3 (B) Answer the following (any three out of five): [3]

(i) What are the limitations of using enzymes directly in the reaction without immobilization?

(ii) Define: Positive and Negative Cooperativity.

(iii) What are the advantages of whole cell immobilization?

(iv) If the value of Hill Coefficient (n_H) < 1, _____types of cooperativity present.

(v) Draw the graph of Rate of reaction *vs* [S] for allosteric enzyme.

Que. 4 (A) Write the following:

(i) Explain different mechanism to regulate enzymatic activity with example. [7]

(ii) Discuss the role of coenzyme and cofactor to regulate enzyme activity with example. [7]

OR

(i) Discuss multienzyme complex with any one example. [7]

(ii) Write difference between feedback inhibition and feed forward stimulation of enzyme regulation with example. [7]

Que. 4 (B) Answer the following (any three out of five): [3]

(i) What is the location of pyruvate dehydrogenase multienzyme complex in the cell?

(ii) What is Metalloenzyme?

(iii) What is allosteric regulation of enzyme activity?

(iv) What are the advantages of multienzyme system?

(v) Write the name of any two coenzymes.

0404M0123

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Biomedical Techology (Clinical Pathology)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	What is inflammation? Describe in detail.	07
		(ii)	Describe disorders of heart.	07
			OR	
		(i)	What is hypertension? Explain giving details.	07
		(ii)	Describe metaplasia and its significance.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Define neoplasia.	
		(ii)	What is apoptosis?	
		(iii)	Give two examples of hyperplasia.	
		(iv)	Define hypoplasia.	
		(v)	Enumerate signs of inflammation.	
		(vi)	What is atrophy?	
Q-2	(A)	Write the following		
		(i)	Describe diarrhoea in detail.	07
		(ii)	Describe hypoxia.	07
			OR	
		(i)	Write a note on gastric ulcer.	07
		(ii)	Explain: Bronchitis and asthma.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	Write symptoms of hypoxia.	
		(ii)	What is Shigella dysentery?	
		(iii)	Name causes of UTI.	
		(iv)	What are bronchioles?	
		(v)	pH of stomach is _____.	
		(vi)	Nephritis is caused by_____.	
Q-3	(A)	Write the following		
		(i)	Discuss the impact and etiology of Alzheimer's disease.	07
		(ii)	Give an account of Multiple sclerosis.	07
			OR	
		(i)	Explain the condition of 'depression'.	07
		(ii)	Write in detail about Parkinson's disease.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Name types of Schizophrenia.	
		(ii)	What is epilepsy?	
		(iii)	Define neurosis.	
		(iv)	Give any two cognitive symptoms in mental disorders.	
		(v)	Define: Migraine.	
Q-4	(A)	Write the following		
		(i)	Discuss anatomical causes of male infertility.	07
		(ii)	Explain infection related bone disorders.	07
			OR	
		(i)	Explain uterine or ovarian anomalies causing infertility.	07
		(ii)	Describe briefly disorders of cartilage.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Explain briefly: Achondroplasia.	
		(ii)	Define: Unexplained Infertility.	
		(iii)	List the congenital disorders of bone	
		(iv)	Discuss in brief environmental factors leading to infertility.	
		(v)	Explain briefly: Osteoporosis.	

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0404M0124

Candidate's Seat No : _____

M.Sc. (Sem.-II) Examination

BT - 409 Biotechnology

Tools & Techniques in Synthetic Biology

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions : (1) Figures to the right indicate Full Marks.

1 (a) Discuss imaging techniwues involved in studying ananoparticles with their advantages. 14

OR

(a) Discuss the role of nanotechnology in health care. 7

(b) Discuss structure and applications of carbon nonotubes. 7

(b) Answer nay four : 4

(i) Dynamic light scattering

(ii) Boffom up approaches

(iii) Nanochip

(iv) Quantum dots

(v) Advantages of Biocatalytic Nano composites

(vi) Nanosensors.

2 (a) Explain the principles and working of gas liquid chromatography with suitable diagrams. 14

OR

(a) Discuss the principles and applications of FTIR. 7

(b) Discuss the working of Mass Spectrometer 7

(b) Answer any four in two lines only : 4

(i) NMR

(ii) HPLC

(iii) How can liquid samples be injected in to gas chromatography

(iv) What is Dwell volume?

(v) Name the carrier gas used in GC

(iv) What is shielding gas used in NMR

3 (a) Briefy describe the role of Bioinformatics in the field of proteomics and genomics. 14

OR

(a) Describe Gen Bank and its various divisions. 7

(b) What are the steps involved in rational drug design? 7

(b) Answer any three : 3

(i) What is computational biology?

(ii) Define CPU

(iii) What is ROM

(iv) What is database?

(v) Define comparative genomics.

4 (a) What are the steps involves in developing multiple sequence alignment? 14

OR

(a) What is a BLAST? Discuss its applications 7

(b) What is upGMA? Explain with suitable example. 7

(b) Answer any three : 3

(i) What is character based phylogeny?

(ii) Define protein sequence motif

(iii) What is dendrogram?

(iv) What are the two types of sequence aliguments?

(v) Define Clade.

0404M0125 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Int. Biotechology (Plant Biotechnology)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

Que-1 (A) Explain the techniques of protoplast culture and regeneration in detail. [14]

(OR)

1. Describe types of recombinant products obtained from plants and give its uses [7]
2. Discuss improvements in insect- and drought-resistance traits among plants [7]

(B) Answer any Four of the following in brief [4]

1. Which chemical fusogen is widely used for protoplast fusion?
2. What are Synthetic seeds?
3. Select the hormone involved in ripening of fruit.
   (a) Ethylene (b) IAA (c) Auxins (d) Gibberellins
4. What colour does Anthocyanin give to fruits?
5. Write the importance of germplasm conservation.
6. Name the recombinant antibodies produced from Soybean.

Que-2 (A) Define transgenic plants and describe two important transgenic varieties. [14]

(OR)

1. Explain the mode of action of Bt gene after manipulation in plants [7]
2. Explain the applications of transgenesis techniques in plants. [7]

(B) Answer any Four of the following in brief [4]

1. Golden rice is GM crop having incorporated genes meant for biosynthesis of:
   (a) Vitamin A (b) Vitamin C (c) Vitamin B (d) Vitamin D
2. Names of two cloning vectors used in transgenesis.
3. In transgenesis, only cloned genes are introduced into the donor (True/False)
4. Give an example of Bt cotton variety in market.
5. The first-ever transgenic plant is .....
6. Which disease is protected in Bt Maize?

Que-3 (A) Describe structure and steps of *Agrobacterium* mediated gene transformation. [14]

(OR)

1. Write the important properties to select genetic markers and its applications. [7]
2. Discuss manipulation of Chloroplast genome in plants. [7]

(B) Answer any Three of the following [3]

1. Which of the following would die upon *Ti* plasmid infection?
   (a) Rice (b) Corn (c) Sorghum (d) All of the above
2. Name the bacteria regarded 'natural genetic engineer'
3. Chloroplast can be transferred through pollen in all crops (True/False)
4. What is Cybrid?
5. List two mechanism to introduce DNA into bacteria

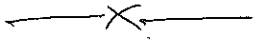
Que-4 (A) Discuss media components and culture conditions for plant tissue culture. [14]

(OR)

1. Discuss technique and advantages of suspended plant culture. [7]
2. Discuss Soma-clonal variation. [7]

(B) Answer any Three of the following in brief [3]

1. Hormone pair required for callus to differentiate are
   (a) Auxin, Cytokinin (b) Auxin, Ethylene (c) Auxin, Absiccic acid (d) Cytokinin, Gibberellin
2. Who is the father of tissue culture technique?
3. Totipotency means development of organ from cell in the culture medium (True/False)
4. Part of the plant used for culturing is called .....
5. What is hardening?



0404M0126

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

409

Human Genetics (Immunology & Immunotech.)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	**(A)**	**Write the following**		
		(i)	Explain endocytosis and phagocytosis in detail adding differences.	**07**
		(ii)	Describe enrichment of haemopoietic stem cells.	**07**
			OR	
		(i)	Mention structure and function of Lymph node.	**07**
		(ii)	Give factors affecting immunogenicity.	**07**
	(B)	**MCQ / SQ (Any Four out of Six)**		**04**
		(i)	What is opsonisation?	
		(ii)	Mention ratio of T_H and T_C cells.	
		(iii)	What are Nude mice?	
		(iv)	What are MG-CSF?	
		(v)	ADCC means_____.	
		(vi)	What is hapten?	
Q-2	**(A)**	**Write the following**		
		(i)	Discuss antibody mediated immune response.	**07**
		(ii)	Write a note on classical complement pathway.	**07**
			OR	
		(i)	Give an account on "HLA".	**07**
		(ii)	What are precipitation reactions? Explain double immunodiffusion.	**07**
	(B)	**MCQ / SQ (Any Four out of Six)**		**04**
		(i)	What is mean by epitope?	
		(ii)	Explain agglutination.	
		(iii)	Define "APC"	
		(iv)	Mention immunitas.	
		(v)	What is heteroantigent?	
		(vi)	Add a note on serology.	
Q-3	**(A)**	**Write the following**		
		(i)	Give a detailed account on "allergy"	**07**
		(ii)	Write a note on specific autoimmune disorders in brief.	**07**
			OR	
		(i)	Discuss on Hypersensitivity type III in detail.	**07**
		(ii)	Give an account on secondary immune-deficiencies.	**07**
	(B)	**MCQ / SQ (Any Three out of Five)**		**03**
		(i)	Define hapten.	
		(ii)	Give a brief idea of "Mantoux test".	
		(iii)	Define Epipen.	
		(iv)	Define Cross-Reactivity	
		(v)	Mention Gout.	
Q-4	**(A)**	**Write the following**		
		(i)	Give the attributes of cytokines with examples.	**07**
		(ii)	Write notes on vaccine types.	**07**
			OR	
		(i)	Describe immune response to parasitic diseases.	**07**
		(ii)	Mention cytokine related diseases.	**07**
	(B)	**MCQ / SQ (Any Three out of Five)**		**03**
		(i)	What is co-stimulation.	
		(ii)	What are JAKs?	
		(iii)	Function of NK cells is _____.	
		(iv)	Microbacterium leprae causes _____.	
		(v)	What is hybrid cell with an example?	

0404M0127

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Bioinformatics (Database Mgmt System)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

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Qu 1 (A) Draw an E-R Diagram for the following: 14 Marks

A University contains Schools. The schools offers numerous programs and each program contains many courses. Lecturers can teach many different courses and even the same course numerous times. Courses can also be taught by many lecturers. A student is enrolled in only one program but a program can contain many students. Students can be enrolled in many courses at the same time and the courses have many students enrolled.

OR

Qu 1 (A) Answer the Following 7 + 7 = 14 Marks

a. Explain the features of a Database Management System.
b. Explain what the cardinality of a Relation is.

Qu 1 (B) Answer any Four: 04 Marks

1. A tree like structure is used in a _____ database.
2. A network database is has _____relationship
3. Give the cardinality of the diagram below.
4. A _____ is a row in RDBMS.
5. A table is in the 1st normal form is it is _____.
6. The _____is a row based Model

Qu 2 (A) : Answer the following : 14 Marks

a. Explain what is SQL and its types. Give appropriate examples.
b. Explain Joins in SQL with examples

OR

Qu 2 (A) : Write the sql statements for the following schema: 14 Marks

Given the Schema Worker(Workerid, Name, salary, joindate, dept) and
Bonus (Workerid, Bonusdt, BonusAmt)

- Write a select statement to list all the workers whose department is Account
- Write a select statement to list all the worker names whose salary is from 10000 to 50000
- Write a select statement to list all the workers working in department Admin or HR
- Write a select statement to list all the Workers whose joindate is before 1 Feb 2016
- Write the select statement to list all the Worker names whose BonusAmt is larger than 5000
- Write the select statement to list all the Worker name whose salary is more than 10000 and department is HR
- Show all workers whose department is null.

Qu 2 (B): Answer any four 04 Marks

1. Give the update command to change the city field to Ahmedabad for the table cities for Region Gujarat.
2. Give the insert command to add a row to the Book table
3. Give the insert command to insert multiple rows to the Books table

P. T.O.

4. Give the delete command to delete the rows from the Books table whose type is Fiction
5. DML stands for _____.
6. What is primary key?

Qu 3 (A) : Give brief note on NCBI and related tools. 14 Marks

OR

Qu 3 (A) : Write short note on KEGG. 7 + 7 = 14 Marks

(A) Name and explain primary protein sequence databases.

Qu 3 (B) : Answer any three 03 Marks

1. Each record in a database is called an
   a) entry b) file
   c) record d) ticket
2. Literature databases include
   a) MEDLINE and PubMED b) MEDLINE and PDB
   c) PubMED and PDB d) MEDLINE and PDS
3. Which of the following is a protein sequence database
   a) DDBJ
   b) EMBL
   c) GenBank
   d) PIR
4. GenBnak, the nucleic acid sequence database is maintained by
   a) Brookhaven laboratory
   b) DNA database of Japan (DDBJ)
   c) European Molecular Biology laboratory (EMBL)
   d) National Centre for Biotechnology Information (NCBI)
5. What does PDB include?

Qu 4 (A) : Answer the following : 14 Marks

a. Explain Data Mining and the steps involved briefly.
b. Explain what Big Data and its applications.

OR

Qu 4 (A) Write the sql statement to create a table Book as below : 14 Marks

BookID integer of 2 digits, automatically generated, Primary key
BookName upto 25 characters should not be null.
Author name can be upto 40 characters should not be null
NoofPages integer can be null
Price decimal type default value should be 10
PublisherDate date type

Qu 4 (B) : Answer any four 03 Marks

1. What are the 5 Vs of Big Data
2. _____process filters the required data before data mining
3. The steps for deploying Big Data are _____
4. KDD stands for _____
5. Hadoop is _____based technology

X ——— X

0404M0128 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Electronics (Microcontroller-1)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

1 (A) Write the following

(i) Draw the programing model of 8051 and discuss in brief. 07

(ii) Draw the Timer Control Special Function Register block and mention the function of each bit of TCON. 07

OR

(i) Discuss the function of Push and Pop Opcodes drawing movement of stack pointer. Give suitable example using the Push and Pop Opcodes. 07

(ii) Discuss the working of microcontroller 8051 in timer Mode-0 and Mode-2 operation, drawing suitable block diagram. 07

(B) Answer the following (Any Four out of Six): 04

1 SBUF is physically two registers, in which one is ..... and other is .....

2 Renasas M34501 is an example of ..... bit microcontroller, whereas, Motorola 68HC16Z3 is an example of ..... bit microcontroller.

3 In microcontroller 8051, the register B is used with accumulator A for ..... and ..... operations.

4 When data is to be placed on the stack, the stack pointer ..... before storing data on the stack so that the stack grows up as data is stored.

5 If the crystal frequency is 6.0 MHz, then the timer clock of 8051 has a frequency of ..... Hz.

6 Which four addressing modes are used to access data in 8051?

2 (A) Write the following

(i) Discuss the multiplication and division operations in 8051 giving suitable examples. 07

(ii) Discuss the function of each Rotate and Swap Operations giving suitable examples and diagrams. 07

OR

(i) Discuss the multiple-byte signed arithmatic operations in 8051 giving suitable examples. 07

(ii) Discuss the unconditional jump operations in 8051 giving suitable examples. 07

(B) Answer the following (Any Four out of Six) 04

1 The function of mnemonic DA A is .....

2 The three arithmetic flags are ....., ... and .....

3 Jumps and Calls are also referred to as ....., which represents that two divergent paths are made possible by this type of instruction.

P.T.O.

4 The function of mnemonic JZ radd is .....

5 The function of mnemonic JBC b,radd is .....

6 Addresses that can access the entire program space from 0000h to FFFFh use ..... range addressing.

3 (A) Write the following:

(i) Explain six-phase star half-wave rectifier with the help of circuit and waveforms. 07

(ii) With waveforms explain m-phase rectifier circuit. Find rms value and % ripple in load current. 07

OR

(i) Write a short note of transformer utility factor. 07

(ii) Explain three-phase half-wave delta-wye rectifier. Find rectifier efficiency, ripple factor and PIV. 07

(B) Answer the following (Any Three out of Five) 03

1 Define: Utility factor

2 Peak inverse voltage of three-phase half-wave delta-wye rectifier is _____ V_{dc}.

3 Write the equation of total power Pt delivered to a dielectric piece.

4 Name one application of poly-phase rectifier.

5 Rectifier efficiency of six-phase star half-wave rectifier is _____%.

4 (A) Write the following:

(i) Write a short note on voltage sensitive relay. 07

(ii) With equations explain induction heating. Name & explain applications of induction heating. 07

OR

(i) Discuss about LCD Displays in detail. 07

(ii) Explain electrical problems and thermal losses in dielectric heating. 07

(B) Answer the following (Any Three out of Five) 03

1 For induction heating of cylindrical bars, surface power density is given by P =_____.

2 Name one type of Resistance welding.

3 Viewing angle in LCD is _____°.

4 In dielectric heating, the power dissipated in the cube is given by P =_____.

5 Electronic Sewing is the application of _____ heating.

X ——— X

0404M0129

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Food Science (Food Production)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary

1 (A) **Answer in Detail:**

i) What is Product life cycle? Discuss different stages of product life cycle. **[07]**

ii) Write in detail about difference test for sensory evaluation in new product development. **[07]**

OR

i) Write down the SWOT analysis in new product development. **[07]**

ii) Write down the different tools used for primary research method in brief. **[07]**

1 (B) **Answer in Short: (Any Three)** **[03]**

i) Define Creativity and Innovation.

ii) Define idea screening in NPD.

iii) What is 4 P's?

iv) What do you understand by Analytical Sensory Evaluation test?

v) What is Brain storming session?

2 (A) **Answer in Detail:**

i) Give a brief account on recent trends observed in marketing strategies. **[07]**

ii) What is consumer behavior? Explain the key psychological process of consumer behavior. **[07]**

OR

i) Explain the advantages of SFE in food processing and also discuss its process in brief. **[07]**

ii) Write the application of air classification in food industry also discuss its type in detail. **[07]**

2 (B) **Answer in Short: (Any Four)** **[04]**

i) Give two commercial benefits of agglomeration.

ii) What is agitation?

iii) Write the application of membrane technology.

iv) What is selective distortion?

v) What is Herzberg"s theory?

vi) Give example of Indian beliefs influencing buying behaviour.

3 (A) **Answer in Detail:**

i) Discuss in detail the principle for food packaging. **[07]**

ii) Discuss the objectives and principles of food fortification. **[07]**

OR

i) What are food additives? Describe the technological aspect of any two. **[07]**

ii) What is the role of food flavor as flavoring constituents in spices? **[07]**

P.T.O.

3 (B)		**Answer in Short: (Any Three)**	[03]
	i)	Where the head office of Indian institute of packaging is located.	
	ii)	Enlist two food fortification programme run by government.	
	iii)	Write down the form of iodine used for food fortification.	
	iv)	Give examples of class I preservative.	
	v)	Give classification of natural sweetener.	
4 (A)		**Answer in Detail:**	
	i)	What are the major types of food service system? Describe any one in detail.	[07]
	ii)	What are the measures to manage energy with respect to food service management discuss in detail?	[07]
		OR	
	i)	Write down the functions of menu and also describe the cyclic menu in detail.	[07]
	ii)	Explain the ways to manage money with respect to food service system?	[07]
4 (B)		**Answer in Short: (Any Four)**	[04]
	i)	Write down the different steps of management.	
	ii)	Define combination menu.	
	iii)	What are the places where waiter services are provided?	
	iv)	What is the 'Table d'hôte menu?	
	v)	Give definition of time plan.	
	vi)	Write down any two significance of work simplification.	

0404M0130

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

409

Forensic Science

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Ques.1 (a) Answer the following questions:

i. Discuss chemistry, pharmacology, mode of use, analysis and other details of Heroine. 7 Marks

ii. Discuss in detail about drugs of abuse in sports. 7 Marks

OR

i. Write a short note: "Hooch poisoning" 7 Marks

ii. Give classification of illicit drugs as per their major physical effects. 7 Marks

Ques.1 (b) Answer the following questions: (Any Four) **4 Marks**

i. LSD is derived from _____.

ii. What is marijuana?

iii. Who is liable to pay excise duty?

iv. Which test is used to distinguish methylamphetamine from primary amines?

v. Sec. _____ of IPC deals with the punishment of bribery.

vi. Cross-sensory perception is the characteristic symptom of _____.

Ques.2 (a) Answer the following questions:

i. Discuss the difference between paraffins, olefins, aromatics and naphthenes. 7 Marks

ii. Write a note on forensic examination of diesel to detect adulteration. 7 Marks

OR

i. Write a short note on Forensic Investigation in arson cases. 7 Marks

ii. Write a short note: Fractional distillation and refining process for crude oil. 7 Marks

Ques.2 (b) Answer the following questions: (Any Four) **4 Marks**

i. What is "Smoke point"?

ii. Name the two types of diesel.

iii. What is the "pour point" for diesel?

iv. Naphthenes are also known as _____.

v. The density of Standard petrol at 15° C is _____.

vi. _____ dye is used to give blue colour to kerosene.

Ques.3 (a) Answer the following questions:

i. Describe in brief about Organo Phosphorous (OP) compounds. 7 Marks

ii. Write a brief note on Forensic analysis of industrial waste. 7 Marks

OR

i. Write a note on "Paraquat poisoning". 7 Marks

ii. Write a note on analysis of Gold in cheating cases. 7 Marks

P.T.O.

Ques.3 (b) Answer the following questions: (Any three) **3 Marks**

i. Give full form of BOD.
ii. What are various physical parameters considered for analysis of Industrial waste?
iii. Name any two tests used for identification of Nicotine.
iv. Write fatal dose and period for endrin.
v. Name any two tests used for identification of Gold.

Ques.4 (a) Answer the following questions:

i. What are the differences between Low and High Explosives on the basis of properties? Explain. 7 Marks
ii. Write note on : (i) RDX (ii) ANFO (iii) Primers 7 Marks

OR

i. Write a detailed note on: Crime scene management of Explosion site. 7 Marks
ii. Explain different type of Improvised explosive devices with diagrams. 7 Marks

Ques.4 (b) Answer the following questions: (Any three) **3 Marks**

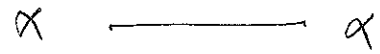
i. HMX is a type of
(a) Low explosive (b) Primary high explosive
(c) Secondary high explosives (d) None

ii. Low explosive is also known as –
(a) Deflagrating explosives (b) Detonating explosives
(c) Combusting explosive (d) All of the above

iii. Tetryl is the abbreviation for-
(a) Tri-nitropheylmethylnitramine (b) Pentaerythrol tetra nitrate
(c) Cyclotetra methylene tatramine (d) None of the above

iv. Explosion is a very rapid combustion in the absence of –
(a) Atmospheric oxygen (b) Gaseous product
(c) Both (a)& (b) (d) None of the above

v. Principle constituents of Dynamite is-
(a) Black powder (b) Nitro-glycerine (c) TNT (d) RDX



0404M0131

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

409

Toxicology (Carcinogens)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

Que. 1 (A) Write the following:

(i) How air pollution occurs? Discuss about the different types of Air pollutants. [7]

(ii) Describe water pollution, its causes and control [7]

OR

(i) Discuss Harmful effects of soil pollution. How to control soil Pollution? [7]

(ii) Define Xenobiotics and its various sources. Discuss the methods of degradation of Xenobiotic. [7]

Que. 1 (B) Answer the following (any four out of six): [4]

(i) What is a PUC certificate?

(ii) Define ED50

(iii) Full form of DDT and its half life

(iv) How many times an individual breathe pre day?

(v) List our four major air pollutants

(vi) Define Eutrophication

Que. 2 (A) Write the following:

(i) Write a note on a different type of mutations. [7]

(ii) Define carcinogens, explain the mechanism of action on tumor suppressor gene. [7]

OR

(i) Write down the promotion step in carcinogenesis. [7]

(ii) Describe the initiation steps of carcinogenesis. [7]

Que. 2 (B) Answer the following (any four out of six): [4]

(i) What are the types of double strand break DNA repair?

(ii) Define mitogenic agent.

(iii) Write down the two examples of endocrine disruptors.

(iv) Which two oncogenes most frequently are mutated in smoking related lung cancer?

(v) Give two examples of progressive agents in carcinogenesis.

(vi) Explain the term metastasis.

P. T. O.

Que. 3 (A) Write the following:

(i) Briefly illustrate the "two hit" model for multiple organ failure? What are the main therapies used to control and manage MODS? [7]

(ii) What are the mechanisms responsible for causing male reproductive toxicity? Name three toxicants which cause male reproductive toxicity? [7]

OR

(i) What are the molecular mechanisms responsible for teratogenesis? Briefly illustrate the principles of teratogenesis? [7]

(ii) What do you understand by MODS? How MODS is triggered? Explain briefly the cascade of events leading to the pathogenesis of multiple organ failure? [7]

Que. 3 (B) Answer the following (any three out of five): [3]

(i) What is endocrine disruption?

(ii) Define developmental toxicity.

(iii) What is the importance of clinical toxicology?

(iv) Expand MODS and SIRS.

(v) What is vasopressin therapy?

Que. 4 (A) Write the following:

(i) Discuss various factors affecting the actions of poison in the body. [7]

(ii) Discuss about: route of administration, pharmacokinetics and excretion of poisons. [7]

OR

(i) Write a note on preservation of viscera in fatal cases of suspected poisoning. [7]

(ii) What is Antidote? Discuss various types of antidote. [7]

Que. 4 (B) Answer the following (any three out of five): [3]

(i) Define chronic poisoning.

(ii) Write characteristics of homicidal poisoning.

(iii) What is synergism? How does it affect the action of a poison?

(iv) Which preservative should be used for blood in case of suspected alcohol poisoning?

(v) What is chelating agent?

0404M0132

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Cancer Biology (Stem Cell & Regen. Medicine)

April 2019

Time : 2-30 Hours] [Max. Marks : 70

Instructions:

All Questions are compulsory

Draw neat and labeled diagram wherever necessary

Q-1	A		14
	(i)	Explain embryonic stem cells and embryonic germ cells and discuss their differences.	7
	(ii)	Describe the method of isolation and cryopreservation of MSCs from warton jelly with its application in different diseases.	7
		OR	
	A		
	(i)	Write a note on embryogenesis.	7
	(ii)	Write a note on Chondrocyte, Myocyte, Adipocyte and Fibroblast stem cell markers.	7

Q-1 B **Multiple choice questions (Any four out of six)** 4

1 **The process of germ layer differentiation is known as _____.**

a Proliferation b Condensation

c Placentation d Gastrulation

2 **The trophectoderm will be formed from morula having_____ cells.**

a 32 b 8

c 16 d 64

3 **Which gene specifies anterior – posterior polarity?**

a Hox b Nestin

c Pit d Oct-4

4 **Supercooling of cell involves_____.**

a Uptake of water in the cell while cooling b Dehydration of cell while cooling

c Water retention in the cell while cooling d Shrinkage of cells

5 **Negative markers present on BM-MSCs are _____.**

a CD14,CD34,CD45 b CD14,CD34,CD79a

c CD14,CD34,CD19 d CD44,CD54,CD90

6 **Which is not single cell isolation technique _____?**

a FACs b IHC/ICC

P - To 1

c MACs d LOC

M0132-2

Q-2 A 14

(i) **Explain** 7

1. Bone marrow stem cells.

2. DNA methylation as epigenetic modifier in embryogenesis.

(ii) **Write down CFU assay, Side population assay and ALDH assay for stem cells.** 7

OR

A

(i) **Write a note on genes involved in embryogenesis.** 7

(ii) **What are CD antigen and its role in different cancer stem cell characterization and application?** 7

Q-2 B **Multiple choice questions (Any four out of six)** 4

1 **Which gene specifies left-right asymmetry?**

a Hox b Nestin

c Nodal d Pit

2 **The human chorionic gonadotropin (hCG) hormone is secreted by _____.**

a Blastocyst b Corpus luteum

c Morulla d Trophoblast cells

3 **The embryonic germ cells are derived from _____.**

a Primordial germ cells b Inner cell mass

c Yolk sac d Placenta

4 **The effect of cell medium / solution on the cells is through _____.**

a Rate of cooling b Concentration of solutes

c Concentration of solvent d Formation of ice crystals

5 **Which of the following enzyme is not used in the enzymatic disaggregation of stem cells?**

a Trypsin b Collagenase

c Hyaluronidase d Amylase

6 **Negative markers present on adipose tissue MSCs is _____.**

a CD14,CD34,CD45 b CD133,CD11B,CD19,HLA-DR

c CD17,CD34,CD19 d CD44,CD54,CD90

Q-3 A 14

(i) **Write a short note on microenvironment as CSC target.** 7

(ii) **What is reprogramming? Explain various strategies of reprogramming non pluripotent cells in to pluripotent cells in detail.** 7

OR

A

(i) **Describe the role of EMT inducing transcription factors in maintenance of stemness property of cancer cell.** 7

(ii) **Write a note on hematopoietic stem cell transplantation.** 7

Q-3 B **Multiple choice questions (Any three out of five)** 3

1 **A CGH array is used to study_____.**

a SNPs
b DNA copy number
c RNA content
d Protein content

2 **Type 2 epithelial mesenchymal transition is associated with _____.**

a Tissue regeneration
b Embryogenesis
c Wound healing
d Cancer metastasis

3 **Leukemic Stem Cells specifically displays the following cell surface marker expression_____.**

a CD38+34-
b CD44+24-
c CD24+44-
d CD34+38-

4 **Which is a marker for pluripotent human stem cells that is expressed in ES cells and embryonic germ cells?**

a Oct-4
b c-Myc
c Sox-2
d KLF-4

5 **Reprograming of mature cells to become pluripotent is discovered by _____.**

a Shinaya Yamanaka and John Burton
b John Gurdon and Shinaya Yamanaka
c John Gurdon and Suzuki Yamanaka
d John Burton and Suzuki Yamanaka

Q-4 A 14

(i) **Define tumor heterogeneity. Describe various types of heterogeneity.** 7

(ii) **Define pluripotent stem cells and explain alternative methods of developing pluripotent stem cells from embryonic or fetal tissue.** 7

OR

A

(i) **Illustrate the different approaches for the cancer stem cell characterization.** 7

(ii) **Write a note on stem cell banking.** 7

Q-4 B **Multiple choice questions (Any three out of five)** 3

1 **Major inducer of EMT is_____.**

a EGF
b TGF-β
c HGF
d FGF

2 **Which of the following pathway is not involved in stem cell maintenance?**

a PI3K/AKT
b Wnt/B-catenine
c VEGF
d mTOR

3 **Which genes along with Oct-4 and Sox-2 were used by Thomson and his colleagues to generate iPS cells?**

a Klf-4 and Gli2
b Gli1 and c-MYC
c C-Myc, Gli2 and Klf4
d LIN 28 and Nanog

M0132-4

4 **Stem cell transplantation in cancer is generally done _____.**

a Before chemotherapy/ Radiotherapy

b During chemotherapy/ Radiotherapy

c After chemotherapy/ Radiotherapy

d At the time of diagnosis

5 **NAC-SCRT is run by _____.**

a Department of Health Research

b Department of Science and technology

c Department of Biotechnology

d Indian Council of Medical Research

0404M0133 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Polymer Science (Analysis & Characterisation)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Question 1 (A) Write the following.

(1)Explain Gel permeation Chromatography. [7]

(2)What is polymer? Explain number average molecular weight and weight average molecular weight with their equations. [7]

OR

(1)Explain measurement of Colligative properties, Ebulliometry and Cryoscopy with their equations. [7]

(2)Explain membrane osmometry with equations and its working principle. [7]

Question 1 (B) MCQs (Any four out of six) [4]

(1) MWD can be determine by which method

(A) Ultracentrifugation (C) Cryoscopy

(B) Ebulliometry (D) Osmometry

(2) If the arrangements of side groups are in alternating fashion, it is called

(A) Atactic (C) Syndiotcctic

(B) Isotactic (D) Asymetric

(3)Write down functionality of pthalic acid

(A) 1 (C) 3

(B) 2 (D) 4

(4)High molecular weight polymer does not crystallize so easily as lower molecular weight material.

(A)True

(B)False

(5)Specific viscosity of polymeric solution is expressed by

(A) $\dot{\eta} / \dot{\eta}_0$ (C) $\dot{\eta} - \dot{\eta}_0 / \dot{\eta}$

(B) $\dot{\eta} - \dot{\eta}_0 / \dot{\eta}_0$ (D) $\dot{\eta}_0 / \dot{\eta}$

(6)Find out molecular weight of polymer when degree of polymerization is 2 and number of monomer is 250.

(A) 500 (C) 525

(B) 520 (D) 510

Question 2 (A) Write the following.

(1)Explain basic principle of DSC and draw is graph with proper explanation. [7]

(2)Explain methodology of TMA with schematic diagram of mechanical arrangement of instrument [7]

OR

(1)Derive principle, methodology, applications and working environment of TGA. [7]

(2)Explain tension and compression takes place in DMA .Derive graph of temperature verses modulus generates by DMA. [7]

Question 2(B) MCQs (Any four out of six) [4]

(1)Which of the following is useful for determination of volatilities of plasticizers and other additives?

(A) Thermo gravimetric analysis (C) Scanning electron microscopy

(B) Differential scanning calorimetry (D) Atomic force microscopy

(2)Which of the following is used as a criterion in quality control?

(A) X-ray diffraction (C) Wetting Properties

(B) Mechanical testing (D) Spectral analysis

(3) Which of the thermal procedures we learned so far is not destructive in nature

(A)DSC (C) DMA

(B)TGA (D) None of above

(4) What is tan δ

(A)G'/G" (C) G'+G"/G'

(B)G"/G' (D) G'+G"/G"

P.T.O

(5) For nylon-6 ΔHm is 37.8 j/g and ΔHc 15.7 j/g , then find out the % crystallinity of Nylon-66.
(A) 8.01 (C) 7.63
(B) 8.63 (D) 7.35
(6)The glass transition temperature of raw natural rubber is
(A) -70°C (C) -20°C
(B) 0°C (D)70°C
(6)The glass transition temperature of PET
(A) -50°C (C) 145°C
(B) 67 °C (D) 80°C

Question 3(A) Write the following.
(1)Explain experimental method of X-ray diffraction analysis and applications. [7]
(2)Derive law of UV-Visible spectrometer and brief about its working methodology. [7]
OR
(1)Derive molecular vibrations and rotation due to IR radiation and its application. [7]
(2)Which kind of samples can be done by GC and which kind of atmosphere is needed to get accurate results? [7]

Question 3(B) MCQs (Any three out of five) [3]
(1)Which of the following technique is used to measure the number of conjugated double bonds and aromatic conjugation within the various molecules?
(A) Fourier transform infrared (C) U/V Visible spectroscopy
(B) Differential scanning calorimetry (D) Thermo gravimetric analysis
(2)Atomic force microscopy comes under the category of
(A) Spectral analysis (C)) Mechanical testing
(B) Thermal analysis (D) Morphological analysis
(3) An index of crystallinity can be obtained from the ratio of the integrated intensity of the crystalline peaks to the total area under the XRD curve.
(A) True
(B) False
(4) NMR is the study of absorption of _____ by nuclei in a magnetic field?
(A) Radioactive radiation (C) Radio frequency radiation
(B) IR radiation (D)Microwaves
(5) NMR spectroscopy indicates the chemical nature of the _____ and spatial positions of
a) Electrons, Protons (C) Nuclei, electrons
b) Neutrons, electrons (D) Nuclei, neighboring nuclei

Question 4(A) Write the following.
(1)Explain money viscometer and its application. [7]
(2)Explain Plasticity Retention Index and Its Measurement and Significance. [7]
OR
(1)Write procedure to find out acid value of resin. [7]
(2)Derive Epoxy Equivalent and its reaction. [7]

Question 3(B) MCQs (Any three out of five) [3]
(1)Select unit of viscosity
(A) Pascal (C) Pascal/second
(B) Poise (D) poise/second
(2)Chemicals used to find Acid Value
(A)KOH (C) NaOH
(B)KCl (D) NaCl
(3)Epoxy Value is useful to determine
(A)Functional Group (C) Molecular Weight
(B)Di isocyanine content (D) Acid Equivalent
(4) Which substance is added to the dilute latex to prevent darkening of latex?
(A) sodium bisulfate (C)Sodium Sulfate
(B) potassium sulfite (D) potassium sulfate
(5) Which of the following represents natural rubber chemically?
(A) cis 1,4-polyisoprene (C)Cis 1,3 polyisoprene
(B) trans 1,4-polyisoprene (D) trans 1,3-polyisoprene

X ——— X

0404M0134 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Computer Science (Information Security)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Q-1 A Write the following.

(i) What is threat and attack?Explain the types of attack in detail also explain the confidentiality policy in detail **(14)**

OR

(i) What is Firewall?Explain in detail with it's types,limitation and implementation **(14)**

Q-1 B. Short questions(Any four out of six) **(4)**

1.VIRUS stands for…

2.List out the types of malicious software

3.Give the difference between asymmetric and symmetric encryption.

4.IPS stands for…

5.VPN stands for…

6.Define information Security

Q-2 A Write the following.

(i) Explain web threat and attacks and database threat and attacks in detail **(14)**

OR

(i) Explain conventional encryption model in detail also explain what is steganography? **(14)**

Q-2 B. Short questions(Any four out of six) **(4)**

1.RSA stands for…

P. T.O.

2.DES stands for…

3.SHA stands for…

4.List out the concerns of computer security

5.UDP stands for…

6.What is breach?

Q-3 A **Write the following.**

(i) What is encryption?List out various encryption technics and explain any one technic with example and programming implementation **(14)**

OR

(i) Explain hash algorithm in detail. **(14)**

Q-3 B. Short questions(Any three out of five) **(3)**

1. SSL stands for…
2. What is cryptography?
3. AES stands for…
4. What is countermeasures?
5. IDS stands for…

Q-4 A **Write the following.**

(i) Explain pretty good privacy,s/mime and types in detail **(14)**

OR

(i) What is IP security?Explain with architecture in detail.Also explain the firewall design principles in brief. **(14)**

Q-4 B. Short questions(Any three out of five) **(3)**

1.What is digital signature?

2.What is e-commerce?

3.What is malicious logic?

4.TLS stands for…

5.What is trapdoor?

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0404M0135

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

409

Horticulture Science (Floriculture)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1.A. Explain the factors that affect production of flowers. 14

OR

Q.1 A. Write brief notes on: 14

i. Weed Management ii. Flower forcing

Q.1 B. Explain in one line any four: 04

Pinching, Disbudding, Varietal wealth, Diversity of flowers, Training, Pruning

Q.2. A. Explain Extraction and value addition of essential oils from flowers in detail. 14

OR

Q.2.A. Write Short notes on : 14

i. Pigments from flowers ii. Dry flowers

Q.2. B. Explain in one line any four: 04

Baskets, Fillers, Bouquets, Value added products, flower arrangements, Foliage used in bouquets.

Q.3. A. Explain varietal wealth of Rose. 14

OR

Q.3.A. Describe: 14

i. Gerbera as a cut flower ii. Orchid as a cut flower

Q.3. B. Explain in one line any three: 03

Cultivars of Heliconia, varieties of Gladioli, Types of Anthuriums, Varieties of Lilium, Cultivars of carnations

Q.4. A. Justify the use of Marigold as a loose flower . 14

OR

Q.4. A. Explain: 14

i. Chrysanthemum as a loose flower ii. Rose as a loose flower

Q.4. B. Explain in one line any three: 03

Varieties of Jasminum, Cultivars of Tuberose, Use of spider lily as cut flower, use of Plumeria as cut flower, Tabernaemontana as a loose flower

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M.Sc. (Sem.-2) Examination

409

Clinical Research (Operation Management)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Que. 1 (A) Write the following

(i) Elements of Investigator's Brochure **07**

(ii) Criteria and Procedure for investigator selection **07**

OR

(i) Single Centre/Multi Centre Trial **07**

(ii) Roles and Responsibilities of Sponsor **07**

Que.1 (B) Answer the following (Any four) **04**

(i) Give full form of TMF

(ii) Who signs a tripartite CTA?

(iii) Enlist any 5 screening parameters.

(iv)Heart rate is one of the demographic data. True/False?

(v) A standard CRF should contain more of closed ended questions. True/False?

(vi) What is the function of CRF review team?

Que. 2 (A) Write the following

(i) Subject Recruitment and Retention **07**

(ii) Elements of Clinical Trial Protocol **07**

OR

(i) Roles and Responsibilities of CRC **07**

(ii) Site Selection Criteria **07**

Que.2 (B) Answer the following (Any four) **04**

(i) _____ contains clinical as well as non-clinical information about IP.

(ii) In case of an SAE, investigator needs to report to which three authorities?

(iii) In a single blinded trials _____- are blinded about the treatment given.

(iv) Is it mandatory to inform the subject's primary care physician about the subject's participation in the trial?

(v) Give full form of CPU

P.T.O.

Module VI Clinical Research Operations Management

(vi) According to protocol the blood sample was to be collected at 08:05, but actually it was collected at 08:08. Is it a protocol deviation or protocol violation?

Que. 3 (A) Write the following

a) Define SOP. Discuss guidelines for designing a SOP & Give detail about Types of SOP **07**

b) Clinical Study Report **07**

OR

(i) Post Study Essential Documents **07**

(ii) Types and Significance of Monitoring in Clinical Trial **07**

(B) Answer the following (Any three) **03**

(i) All the ADRs are AE. True/False?

(ii) What is the main objective of SOP?

(iii) Give full form of SWOT

(iv) Who is responsible for the medical care of the subjects?

(v) What is the purpose of source document?

Que. 4 (A) Write the following

a) QA/QC in Clinical Research **07**

b) Guidelines for designing a Case Record Form & Draw CRF for SAE page **07**

OR

c) Role & Responsibilities of Business Development in Clinical Research **07**

d) Study Drug Management **07**

(B) Answer the following (Any Three) **03**

(i) Responsibility for IMP accountability at the trial site rests with _____

(ii) Give full form of COA

(iii) Under which circumstances the investigator is allowed to do unblinding?

(iv) Subject's responsibilities must be mentioned in the ICF. True/False?

(v) Define: Essential Documents

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Candidate's Seat No :_____

M.Sc. (Sem.-II) Examination

409

Special Analysis & Statistical Methods

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions : (1) Figures to the right indicate Full Marks.

1 (a) The values of x and their corresponding values of y are shown in the following table. 14

x :	0	1	2	3	4
y :	2	3	5	4	6

(i) Find least square regeession line 7

(ii) Eastimate the value of y when x = 0 2

(iii) Plot all the points and regression line in the same rectangular system of axes. 5

OR

(a) (i) What are continuous and diserete data? Give three examples of each. 7

(ii) Which graphic representation is suitable for desrete and continuous data? Give examples with diagram.

(b) Answer any four : 4

(i) Which one of the following statement is true regarding residuals in regression analysis?
(1) Mean of residual is always zero.
(2) Mean of residual is always less than zero
(3) Mean of residual is always greater than zero.
(4) None of the above.

(ii) Which of the following indicates a fairly strong relationship between x and y?
(1) Correlation co-efficient = 0.9
(2) The p-value for the null hypothesis Beta co-efficient equal to zero is 0.0001.
(3) The t-statistic for the null hypothesis Bela co-efficient = 0 is 30.
(4) None of the above.

(iii) Generally which of the following method(s) is used for predecting continuous dependent variable?
(1) Linear regaession (2) Logistic Regression
Options : (a) 1 & 2 (b) Only 1 (c) only 2 (d) None of the above.

(iv) A correlation between agbe and health of a person found to be -1.09;
Give your comment on the statement.

(v) How many variables do you need to estimate in a linear regression model?

(vi) Corolated variables can have zero correlation co-efficient. True or False?

2 (a) How will you find a suitable site for a manicipality garbage damp yard? 14

OR

(a) (i) A shape file containing all the words of Ahmedabad city is given to you. How will you get the quter boundary of four adjacent wards using GIS techniques? 7

(ii) Explain Map algebra operations with example. 7

[P.T.O.

(b) Answer any four : 4

(i) In the world of GIS, another term for the property of connectivity is :
(1) Proximety (2) Neighbourhood (3) Topology (4) Location.

(ii) Which tool is used to perform map algebra in Arc GIS?

(iii) What is the difference between shortest path and optimum path?

(iv) Give two examples of polygon in polygon.

(v) What is the difference between feature selection and feature extraction.

(vi) Dissolve operation is used for .....

3 (a) What is linear referencing an segmentation? How will you use this on road network of Ahmedabad? 14

OR

(a) (i) What is shortest path analysis? How will you find a best rroute between two locations? 7

(ii) What is IDW? Write the IDW equation and explain. 7

(b) Answer any three : 3

(i) Write any two applications of network analysis.

(ii) What is the difference between directed and undirected network?

(iii) Draw a sample cost matrix with one origin and two destinations.

(iv) What is closest facility in network analysis?

(v) What is the difference between location and location allocation?

4 (a) Explain explanative, predictive and normative models. Give an illustrative example of normative model on. Land surface temperature. 14

OR

(i) Illustrate one example of predictive model on rainfall. 7

(ii) Illustrate one example of explanative model on data display. 7

(b) Answer any three : 3

(i) Linking of data and method is an important base for data model. True or False?

(ii) What type of data is required in modeling in GIS?

(iii) What is a prototype?

(iv) What do you mean by scale in modeling?

(v) Give an example of regression analysis.

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

409

Climate Change (Policy & Legislation)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1 A. Write a note on United Nations Conference on the Human Environment. 14

OR

Q.1 A (i) State the decisions taken by MOP. 07

Q.1 A (ii) Explain Gothenburg Protocol to abate acidification. 07

Q.1 B. Answer the following in one or two lines. (Any Four) 04

a) What is CBD?

b) In which year Montreal Protocol came into existence ?

c) Define: Eutrophication.

d) State what is ground level ozone ?

e) What is the fullform of CDM?

f) Give the objectives of Cartagena Protocol.

Q.2. A. Explain Kyoto protocol in detail. 14

OR

Q.2.A. Write Short notes on : 14

i.Political Barriers to Kyoto Protocol ii.Amendments to the Kyoto Protocol

Q.2. B. Explain in one line any four: 04

CDM, JI, ET, sustainable development, Status of ratification,economics of market.

Q.3. A. Explain the National action plan on climate change . 14

OR

Q.3.A.Describe: 14

i. Solar mission of India ii. Climate reporting

Q.3. B. Explain in one line any three: 03

Clean energy, GHG, renewable energy, Energy efficiency, forestry regulations

Q.4. A Give a comparative account of climate change policies of various countries. 14

OR

Q.4 A Explain: 14

i. Energy regulations ii. Mitigation of GHG emissions

Q.4. B. Explain in one line any three: 03

Cost benefit analysis, uncertainties of climate change policies,climate change policy of Gujarat, case of successful implementation of climate change policy, climate change policy.

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

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Botany (Plant Breeding)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1.A. Explain the process of hybridization. 14

OR

Q.1 A. Write brief notes on: 14

i. Objectives of Plant breeding ii NBPGR

Q.1 B. Explain in one line any four: 04

Clonal crops, Marker assisted selection, Hybrid vigour, pure line, Mass selection, progeny test.

Q.2. A. Explain any one method of plant propagation in detail. 14

OR

Q.2.A.Write Short notes on : 14

i. Ornamental trees ii. Rooting Hormone

Q.2. B. Explain in one line any four: 04

Scarification, Chimera, Graft incompatibility, Budding, Dormancy, pretreatments.

Q.3. A. Explain types of Gardens & outline the various features of a Garden. 14

OR

Q.3.A.Describe: 14

i. Green house ii. Landscaping

Q.3. B. Explain in one line any three: 03

NABARD, ICAR, topiary, Xeriscaping, IPM

Q.4. A Justify the need to practice energy efficient growing techniques. 14

OR

Q.4 A Explain: 14

i. Biogas ii. Low carbon landscape

Q.4. B. Explain in one line any three: 03

Zero waste, green building, Water use, Carbon credits, Solar energy

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Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

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Zoology (Animal Behaviour & Evolution)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	Explain Kinesis with suitable examples.	07
		(ii)	Explain reflexes with suitable examples.	07
			OR	
		(i)	Describe briefly operant and classical conditioning.	07
		(ii)	Briefly describe short-trm and long-term memory.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is proximate causation of a behaviour? Give an example.	
		(ii)	What is agonistic behaviour?	
		(iii)	What is mnemotaxis?	
		(iv)	What is consummatory act?	
		(v)	What is S-R system?	
		(vi)	What is sensory memory? Give an example.	
Q-2	(A)	Write the following		
		(i)	Describe briefly reproductive behaviour. Add a note on parental care.	07
		(ii)	Explain the various communication mechanisms in animals.	07
			OR	
		(i)	Explain social behaviour in animals giving one suitable example.	07
		(ii)	Explain the process of migration in animals.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is navigation?	
		(ii)	What is Waggle dance?	
		(iii)	Which are the areas in the brain associated with phonological loop?	
		(iv)	What is olfactory imprinting? Give an example.	
		(v)	What is beackoning?	
		(vi)	Write down the social organization of baboons.	
Q-3	(A)	Write the following		
		(i)	Write a note on genetic drift.	07
		(ii)	Explain the concept of species.	07
			OR	
		(i)	Write a note on Hardy-Weinberg's law.	07
		(ii)	Write a note on variation and evolution.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is the contribution of Wallace?	
		(ii)	What is Founder's effect?	
		(iii)	What is transposition of genes?	
		(iv)	What is panspermia?	
		(v)	What were ice age megafauna?	

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Q-4	(A)	Write the following		
		(i)	Explain geological time scale.	07
		(ii)	Write a note on skull and human evolution.	07
			OR	
		(i)	Write a note on arboreal adaptations.	07
		(ii)	Write a note on Neanderthals.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is the contribution of LUCY in human evolution?	
		(ii)	What were the characters of *Homo erectus*?	
		(iii)	Enlist any two adaptations found in cursorial birds.	
		(iv)	What are Bhimbetka cave paintings? How old are they?	
		(v)	What is Meghalayan age?	

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M.Sc. (Sem.-2) Examination

410

Geology (RS & GIS, Geomorphology)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

1. Discuss: (A) Aerial verses satellite remote sensing and physics of remote sensing. (14)

OR

(A) Energy interaction with earth surface features. (07)

(B) Energy interaction with atmosphere. (07)

(C) Write short answers (any four): (04)

(1). What is active sensor?
(2). Define SAR.
(3). What is Mie scatter?
(4). Give full form of GCP.
(5). What is remote sensing?
(6). Provide wave length of infra red in EMR spectrum.

2. Describe: (A) Meaning, application and organisational context of GIS. (14)

OR

(A) Different types of entering spatial and non-spatial data. (07)

(B) Data structure in GIS. (07)

(C) Write brief answers (any four): (04)

(1). How many minimum satellites are required for GPS system?
(2). Provide hardware requirements for GIS analysis.
(3). Give the brands of GPS.
(4). Name two soft wares of GIS.
(5). What is DGPS?
(6). Define topology.

3. Write notes: (A) Theories of landscape evolution, weathering and soils. (14)

OR

(A) Role of sea level change and climate in geomorphic development. (07)

(B) Use of soils in interpreting palaeoclimates. (07)

(C) Write in brief (any three): (03)

(1). What is landscape?
(2). Provide few erosional features produced by glaciers.
(3). What is palaeoenvironment?
(4). What is soil?
(5). What is overlay?

4. Explain: (A) Concept of morphostratigraphy and different types of drainage patterns. (14)

OR

(A) Role of geomorphology in civil engineering. (07)

(B) Drainage patterns and their structural control. (07)

(C) Write in short (any three): (03)

(1). What is morphostratigraphy?
(2). What is drainage pattern?
(3). Define sea level fluctuation.
(4). Define land use planning.
(5). Define slope segment production.

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0504M0145

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Life Science (Food Science & Microbial)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) **Answer in Detail:**

i) What is RDA and what are the factors that affect RDA? **[07]**

ii) Explain "Balanced Diet". Describe ICMR food groups in detail. **[07]**

OR

i) Describe the nutritional content of Cereals and Vegetables in detail. **[07]**

ii) What Lipids play major role in body? Mention sources of lipids in foods. **[07]**

1 (B) **Answer in Short: (Any Three)** **[03]**

i) Give full forms of ICMR and FAO.

ii) Name the major Protein present in milk.

iii) What are the criteria for RDA Reference Woman?

iv) Name the Amino Acid which is Essential in infants.

v) How much Calorie is provided by 1 gram of Fat in diet?

2 (A) **Answer in Detail:**

i) Describe principles of HACCP concept by taking any suitable example. **[07]**

ii) What is "Quality Assurance"? Discuss role of raw materials and packaging materials in food industry. **[07]**

OR

i) Describe the microbial Quality Criteria with their significance. **[07]**

ii) Discuss the problems involved in Plan Stringency and Microbial Analysis of food. **[07]**

2 (B) **Answer in Short: (Any Four)** **[04]**

i) What do you mean by two-level ICMSF Sampling Plan?

ii) Mention any two factors influencing Production Control in food industry.

iii) Enlist the required properties of Packaging Materials used in food industry.

iv) Which verification test is used for checking efficiency of Pasteurization?

v) What do you mean by "Quality Control" in reference to food industry?

vi) Explain "Risk" in reference to quality and safety of foods.

3 (A) **Answer in Detail:**

i) Discuss Sources of microorganisms in food. **[07]**

ii) Explain microbial spoilage of Milk and Milk products. **[07]**

OR

i) Discuss Intrinsic Factors affecting microbial growth in food. **[07]**

ii) Explain manufacturing of Cheese as an example of fermented food. **[07]**

3 (B) **Answer in Short: (Any Three)** **[03]**

i) Mention principle and significance of MBRT.

ii) What is Putrefaction?

iii) Name any two bacteria responsible for microbial spoilage of Canned foods.

iv) What do you mean by Starter Cultures?

v) Define: Probiotics and Prebiotics.

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4 (A) **Answer in Detail:**

i) Discuss food preservation methods based on Low Temperature. **[07]**

ii) Give a detailed account on "Canning technique" and its advantages. **[07]**

OR

i) Write a note on "Use of irradiation for preservation of food". **[07]**

ii) Discuss Hurdle Concept by taking a suitable example. **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) Define: Pasteurization

ii) Name any two antimicrobial Chemical Preservatives.

iii) What is MAP technology?

iv) Explain use of Salting for preserving foods.

v) Explain: UHT

vi) Give two examples of Chemical food preservatives.

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0504M0146

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Environmental Science (Air Pollution)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Note: Draw diagram where ever required.

Q.1 (A) Write a note on: photochemical smog. **14**

OR

(A-i) Classify Air Pollutants & Write down factors affecting to Air pollution? **07**

(A-ii) Write note on: Air (Prevention and Control of Pollution) Act1981. **07**

Q.1 (B) Answer in one or two lines (any four out of six) **04**

(i) What is Ozone?

(ii) Explain washout mechanism.

(iii) Enlist Air pollutants emerging out of thermal Plants.

(iv) Explain term 'Byssinosis'.

(v) Explain the interaction of SO2 at the Ocean Surface.

(vi) Expand: (i) GEMS (ii) UNEP

Q.2 (A) What are the techniques used for collection of particulate pollutants? **14**

OR

(A-i) Write a note on collection of gaseous air pollutants. **07**

(A-ii) Explain the theory and principle for estimating air pollutants like NOx and hydrocarbons. **07**

Q.2 (B) Answer in one or two lines (any four out of six) **04**

(i) Explain term 'Hopcalite'.

(ii) Draw a general arrangement of sampling train.

(iii) In Spectrophotometer at which wavelength (λmax) Nitrogen Oxides is measured?

(iv) Give full forms of: i) AAS ii) FID

(v) What is Necrosis?

(vi) What is air quality monitoring?

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Q.3 (A) Describe the control methods of gaseous air pollutants. **14**

OR

(A-i) Give a difference between Electrostatic precipitator and Wet scrubbers. **07**

(A-ii) What are mobile sources of air pollutant? Give a detail of their control technique. **07**

Q.3 (B) Answer in one or two lines (any three out of five) **03**

(i) Explain term 'Source correction method'. Write down basic mechanism of removing particulate matter from gas streams.

(ii) Which method is useful for cleaning of fabric filters?

(iii) Sketch: Packed bed scrubber.

(iv) At which temperature fuel oil gasification process is performed?

(v) What is Gravimetric efficiency?

Q.4 (A) Write down outdoor air pollutants sources and their toxicity to indoor environment. **14**

OR

(A-i) Discuss building factors affecting indoor air quality. **07**

(A-ii) Which mitigation steps used for control of indoor air pollutants. **07**

Q.4 (B) Answer in one or two lines (any three out of five) **03**

(i) Write down potential sources of formaldehyde into the indoor environment.

(ii) What are the effects of SO_2 and NO_2 on vegetation?

(iii) Expand: (i) NAAQS (ii) VOCs.

(iv) What is COPD?

(v) What is Dilution Ventilation?

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Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Biochemistry (Nutritional & Clinical Biochem.)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary

1 (A) Answer in Detail:

i) Explain in detail the Wald's visual cycle and role of vitamin A in vision. **[07]**

ii) What are the components of TEE? Explain any one component in detail. **[07]**

OR

i) Describe four compartment model of body composition analysis. **[07]**

ii) Differentiate between Dry, Wet and Infantile *Beri – Beri*. **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) Define respiratory quotient.

ii) What is the role of Vitamin K in blood clotting?

iii) Write down RDA for vitamin D and Calcium.

iv) Enlist the sources of Vitamin B12.

v) What is total iron binding capacity?

2 (A) Answer in Detail:

i) Distinguish the clinical and biochemical features of marasmus and kwashiorkor. **[07]**

ii) Discuss the reason of Lesch-Nyhan syndrome and mention its specific symptoms. **[07]**

OR

i) Discuss Minnesota starvation technique in detail and mention its psychological effects. **[07]**

ii) What are the clinical tests required for renal functioning? Discuss in detail. **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) Differentiate between starvation and fasting.

ii) Write expanded form of PSMF.

iii) Write the defect which leads to condition Orotic Aciduria.

iv) How much calorie is suggested per day for a low-calorie diet?

v) Name the site from where amino acid is degraded in prolong fasting.

vi) Which enzyme is deficient in *Tyrosinemia* type II disorder?

3 (A) Answer in Detail:

i) What is lipoprotein? Give the detailed classification of lipoprotein. **[07]**

ii) Discuss dietary modification needed for the prevention of atherosclerosis. **[07]**

OR

i) What is Uristix Benedict's test? Discuss in detail about it with its interpretation. **[07]**

ii) What are Apolipoproteins? Give detailed discussion on defective synthesis of Apolipoproteins. **[07]**

3 (B) **Answer in Short: (Any Three)** [03]

i) Write down the desirable level of total cholesterol.
ii) Which protein is used as a potential marker in a cardiac arrest?
iii) Write down the normal level of blood glucose level.
iv) What is VLDL?
v) What is glycosylated hemoglobin?

4 (A) **Answer in Detail:**

i) Discuss the reason for following a healthy diet and give the national guidelines to reduce the burden of lifestyle related disease. [07]

ii) What is phenylketonuria? Discuss the dietary guidelines and modification needed for it. [07]

OR

i) Differentiate between diabetes mellitus and Diabetes insipidus and write down the classification of Diabetes insipidus in detail. [07]

ii) What is fluorosis describe its type in detail. [07]

4 (B) **Answer in Short: (Any Four)** [04]

i) Write the role of lactic acid bacteria in causing dental carries.
ii) Name the food items belong to red list in Fructosemia.
iii) What is chronic gout?
iv) What is chronic renal failure?
v) Write the role of vitamin B12 in Homosysteine Metabolism.
vi) Mention any two roles of soluble fibre in prevention CVD.

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0504M0148 Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Biomedical Techology (General Microbiology)

Time : 2-30 Hours| **April 2019** **|Max. Marks : 70**

NB: All questions are compulsory. Illustrate your answers with neat diagram wherever necessary.

Q.1 (A) Write the following **07**

(i) Discuss contribution of Louis Pasteur in the field of microbiology.

(ii) Enlist various methods of bacterial classification and discuss oxygen based classification. **07**

OR

(i) Write nutritional classification of bacteria and give example of each. **07**

(ii) Give an account on structure and general properties of bacteria. **07**

(B) Write short answers to **any four** of the following **04**

(i) What are auxotrophs?

(ii) Who discovered streptomycin antibiotic?

(iii) Who gave the use of cotton plug in microbiology?

(iv) Write example of bacteria having peritrichous flagella

(v) Define – 'numerical taxonomy'

(vi) Define – chemoorganotrophs

Q.2 (A) Write the following **07**

(i) Discuss chemical agents used for sterilization with examples.

(ii) Explain structure and function of endospore and the method used for its staining. **07**

OR

(i) Explain the terms: sterilization, pasteurization, disinfectant, antisepsis, fumigation and tyndalization. **07**

(ii) Discuss types of stains used in microbiology and write general steps of bacterial staining. **07**

(B) Write short answers to **any four** of the following **04**

(i) Write principle of dry heat as sterilizing agent.

(ii) What is 'phenol coefficient'?

(iii) What is the function of decolorizer in bacterial staining?

(iv) What is bacterial capsule?

(v) Write composition of chromic acid.

(vi) What are the components of nutrient agar?

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Q.3	**(A)**	Write the following		**07**
		(i)	Describe various growth phases of bacteria and write its significance.	
		(ii)	Discuss biochemical tests used for bacterial identification and write its limitations.	**07**
			OR	
		(i)	Enlist factors affecting microbial growth and write influence of temperature in detail.	**07**
		(ii)	Discuss methods used for isolation of bacteria with its pros and cons.	**07**
	(B)		Write short answers to **any three** of the following	**03**
		(i)	What is synchronous growth?	
		(ii)	What is called 'growth rate'?	
		(iii)	Define – 'differential medium'.	
		(iv)	What are thermophiles?	
		(v)	Draw labelled diagram of bacterial growth patterns formed in liquid medium	
Q.4	**(A)**	Write the following		**07**
		(i)	Describe various diseases caused by viruses with example.	
		(ii)	Explain 'conjugation' in detail and write its importance.	**07**
			OR	
		(i)	Describe antibiotic sensitivity test and give its important	**07**
		(ii)	Discuss transformation in detail and write its significance.	**07**
	(B)		Write short answers to **any three** of the following	**03**
		(i)	Which is the causative agent of typhoid?	
		(ii)	Write name of two fungal diseases along with its causative agent.	
		(iii)	Define – transduction	
		(iv)	Write the difference between F^+ and F^- cells.	
		(v)	Which part of the body is affected in hepatitis?	

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0504M0149

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Biotechology (Advances in Microbial Biotech.)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 79**

Q1.(A) Discuss the microbial production of ethanol using natural substrates (14)

OR

Q.1A(i). Write in brief the microbial production of acetic acid. (07)

Q.1 (A)(ii) Write a short note on 'wort preparation'. (07)

Q.1 (B) Answer any 4 in 1-2 lines only (out of 6) (04)

a. Applications of citric acid

b. Vinegar

c. Types of wine

d. Microbes producing acetone butanol

e .Hops

f .Two spoilages of beer

Q.2 (A) Discuss the new B lactam technology for production of 7- aminocephalosporanic acid.(7-ACA). (14)

OR

Q.2 A(i) Name different types of vaccines and their mode of action with examples.(07)

Q.2.A (ii) What are ergot alkaloids. How are they produced and what is their application. (07)

Q.2 (B) Answer any 4 in 1-2 lines only (out of 6) (04)

a. Define Chimeric Vaccine

b.Describe two examples of hydroxamate type of siderophore

c.Write advantage of attenuated vaccines

PTO

d. Types of anti cancer agents

e. Microbes producing streptomycin

f. Applications of siderophores

Q.3 (A) Describe the methods used for development of strain for over production of amino acids with suitable example of each . (14)

OR

Q.3A(i)Discuss the commercial production of Vitamin B_{12} ? (07)

Q.3A(ii)Give a detailed account of solid state fermentation for production of Amylase. (07)

Q.3 (B) Answer any 3 in 1-2 lines only (out of 5) (03)

a. What are the different types proteases?

b. Define submerged fermentation.

c. What are the applications of lipases?

d. Define Double Auxotrophs

e. Name Glutamic acid bacteria

Q.4 (A) Write an essay on microbial production of polysaccharides and its applications. (14)

OR

Q.4A(i) Write a note on Steroid transformation citing any one example (07)

Q.4A(ii) Discuss the production and uses of PHB. (07)

Q.4 (B) Answer any 3 in 1-2 lines only (out of 5) (03)

a. What is PHBV

b. Define Biosurfactant

c. What are biodegradable polymers

d. Structure of Xanthan.

e. Producers of PHA

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0504M0150

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Human Genetics (Genetic Counselling & Mgmt.)

Time : 2-30 Hours] April 2019 [Max. Marks : 70

NB: All questions are compulsory. Illustrate your answers with neat diagrams wherever necessary.

Q-1	(A)	Write the following		
		(i)	What are the exceptions to the general rules of Mendelian inheritance pattern? Explain.	07
		(ii)	Explain: Variable expressivity, Reduced penetrance, Value of extended negative history.	07
			OR	
		(i)	Mention the components of genetic counselling and explain briefly each one of them.	07
		(ii)	What are the philosophy & ethos of Genetic counselling? Explain them.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	How will you show a divorced marriage in a pedigree?	
		(ii)	Define the term "Obligate carrier"	
		(iii)	Write two characteristics of X-linked inheritance.	
		(iv)	Draw the symbol for adoption in a family.	
		(v)	Define the sibship line.	
		(vi)	Write any two red flags in a pedigree suggestive of a genetic disorder.	
Q-2	(A)	Write the following		
		(i)	Explain medical documentation. Why medical documentation is important for a Genetic Counsellor?	07
		(ii)	Explain the core qualities important for a successful counselling session.	07
			OR	
		(i)	Mention the principles of ethics and briefly explain them.	07
		(ii)	What are psychological challenges while discussing difficult issues? Explain.	07
	(B)	MCQ / SQ (Any Four out of Six)		04
		(i)	What is the difference between sympathy and empathy?	
		(ii)	What is the importance of genuineness in genetic counselling?	
		(iii)	What are open ended questions?	
		(iv)	What is non verbal communication?	
		(v)	How can silence be used effectively in counselling?	
		(vi)	What is meant by patient autonomy?	
Q-3	(A)	Write the following		
		(i)	Name any 5 birth defects. Explain about each briefly.	07
		(ii)	How will you manage a genetic disorder? Explain briefly.	07
			OR	
		(i)	Give an account on "Euphenics".	07
		(ii)	Discuss Baye's theorem with example.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	What is ataluren?	
		(ii)	Define OMIM.	
		(iii)	Add a note on reading frame.	
		(iv)	What is the purpose of euthenics?	
		(v)	Mention non-invasive.	
Q-4	(A)	Write the following		
		(i)	Name the techniques used in non-invasive pre-natal diagnosis and their importance.	07
		(ii)	Write a detailed account on Chorion Villus sampling.	07
			OR	
		(i)	When was the abortion law of India passed? What are the conditions of legal abortion in India?	07
		(ii)	Write a detailed account on PGD.	07
	(B)	MCQ / SQ (Any Three out of Five)		03
		(i)	Define: PC PNDT	
		(ii)	Define: AFP	
		(iii)	What is meant by pseudomosaicism in prenatal diagnosis?	
		(iv)	For prenatal diagnosis of thalassemia, ideally whose sample should be collected?	
		(v)	Which techniques can be used for confirmation of Down syndrome prenatally?	

3/23 **0504M0151** Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Bioinformatics (Java & Adv. Java)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Qu 1 (A) Explain in detail the String type in Java. Explain at least 6 functions of the String Class with examples. 14 Marks

OR

Qu 1 (A) Answer the Following. 7 + 7 = 14 Marks

a. Explain in detail the data types in Java.

b. Explain how to use the Scanner class. Write a program to input 2 nos and print the larger number using ternary operator.

Qu 1 (B) Answer any Four : 04 Marks

1. The size of int type in Java is :

   a. 8 bits b. 16 bits c. 32 bits d. 64 bits

2. Which of the following will be automatically converted

   a. int to short b. int to byte c. long to int d. int to long

3. What is the output :

```
if(1 + 2 + 3 + 4 + 5 == 15)
        System.out.println("True");
else
        System.out.println("False");
```

4. Which of the following expression results in true if x is between 1 – 100 or x is lesser than 0 :

   a. 1 < x < 100 || x < 0 b. ((x < 100) && (x > 1)) || (x < 0)

   c. ((x < 100) && (x > 1)) && (x < 0) d. (1 > x > 100) || (x < 0)

5. What will be the output

```
public class Examples {
  public static void main(String[] args) {
    int a=42;
    double b=42.0;
    System.out.println((a%10) + " " + (b%10));
  } }
```

6. Write the syntax of Scanner to input a String.

Qu 2 (A) :Answer the Following 7 + 7 = 14 Marks

a. Explain single dimension arrays in Java. Write a program to input data in an array and print it in reverse order.

b. Explain the access specifiers in Java.

OR

Qu 2 (A) :Explain Constructors in Java with appropriate examples. Explain the importance of Garbage Collection. 14 Marks

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M0157-2

Qu 2 (B) :Answer any Four : 04 Marks

1. Write the syntax to create a 2 dimensional String array of 4 rows and 3 columns and initialized with alphabets.
2. Define the default constructor for class Box which is accessible to all.
3. Give the access modifier accessible to the derived class only when the package is different.
4. Given the code

```
Class A {
        Public int a;
}
Class B
{
        public static void main(String args[])
        {
                A obj=new A();
                System.out.println(obj.a);
        }
}
```

   Will print _____.
5. The _____ access specifier gives accessibility to all in the same package.
6. All _____ are allocated on the heap.

Qu 3 (A) : Answer the Following : 7 + 7 = 14 Marks

a. Write anote on wrapper classes

b. Write a class Vehicle as
Data :
Type : String
Methods :
Getter Setter Methods
Move method that shows the kind of movement
Write a class Scooter which is derived from class vehicle

OR

Qu 3 (A) : Explain what is inheritance. Explain Dynamic Method Invocation with an example. 14 Marks

Qu 3 (B) : Answer any Three : 03 Marks

1. Give the output :

```
class Base {
        public void Print() {
                System.out.println("Base");
        }
}

class Derived extends Base {
        public void Print() {
```

```
                System.out.println("Derived");
            }
        }
        class Main{

            public static void main(String[] args) {
                Base y = new Derived();
                    y.Print();
            }
        }
```

2. Give the output :

```
class Test1 {
  Test1(int x) {
    System.out.println("Constructor called " + x);
  }
}

// This class contains an instance of Test1
class Test2 {
  Test1 t1 = new Test1(10);

  Test2(int i) { t1 = new Test1(i); }

  public static void main(String[] args) {
     Test2 t2 = new Test2(5);
  }
}
```

3. An abstract method must be in an _____ class
4. Overloading a method is _____.
5. Constructors are inherited (True / False)

Qu 4 (A) : Answer the Following : 7 + 7 = 14 Marks

a. Explain what is an ArrayList. How is it different from an array
b. Explain the Exception Hierarchy in Java

OR

Qu 4 (A) :Explain Abstraction in Java using an Example. 14 Marks

Qu 4 (B) : Answer any Three : 03 Marks

1. The base class of Exception and Error class is _____
2. A static variable can be accessed as Class.Variabe (True / False)
3. There is a static block in class for every static variable.
4. The Finalize() method is executed by the Garbage Collector
5. Every try block should have a catch block or a finally block (True / False)

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0504M0152

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Electronics (Optoelectronics & DSP-1)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions: **[1] Symbols have their usual meanings.**

Q.1(A) **(i)** Write types of excitation and discuss radiative transition in detail. **[07]**

(ii) What do you mean by stimulated emission and discuss optical and external quantum efficiencies in detail. **[07]**

OR

Q.1(A) **(i)** Explain semiconductor laser structure in detail. **[07]**

(ii) What are the difference between conventional laser and semiconductor laser? Explain stimulated emission and population inversion. **[07]**

Q.1(B) Write short answers: (ANY FOUR) **[04]**

1. Write full form of MASER.
2. What do you mean by spontaneous emission?
3. If the photon energy is _____to band gap of semiconductor then radiative transition is predominant to direct band gap material.
4. State the photonic devices are divided into groups like____,____,____.
5. For LEDs, the spectral line width is _____nm.
6. What is the other names of semiconductor laser?

Q.2(A) **(i)** State the types of photodetectors and explain qualitative information about photoconductor. **[07]**

(ii) Discuss quantum efficiency and response speed of photodiode in detail. **[07]**

OR

Q.2(A) **(i)** Write short note on phototransistor. **[07]**

(ii) Discuss Avalanche Photodiode and Avalanche gain in detail. **[07]**

Q.2(B) Write short answers: (ANY FOUR) **[04]**

1. State the principle of photodetector.
2. Photodetectors are important in optical fiber communication system operated in the ____region. [UV, VIS, NIR, FIR]
3. What is the gain and response time of Metal – Semiconductor photodiode?
4. State the advantage of photoconductor.
5. State the family names of photodiode.
6. Draw the schematic diagram of phototransistor.

PTO

M0152-2

Q.3(A) **(i)** Determine response of the following systems to the input signal **[07]**

$x(n) = cosn$ where, $0 \leq n \leq \frac{\pi}{2}$ for n=25°, 50°

Calculate: (1) $y(n) = x(n - 45^{\circ})$

(2) $y(n) = \frac{1}{4}[x(n + 10^{\circ}) + x(n - 20^{\circ}) + 2x(n + 15^{\circ})]$

(3) $y(n) = \max [x(n - 20^{\circ}); x(n + 20^{\circ}); x(n + 37^{\circ})]$

(ii) Determine output $y(n)$ of the relaxed system which is linear time invariant with impulse response with, $h(n) = a^n u(n)$, $|a| < 1$ When the input is Unit step sequence. **[07]**

OR

Q.3(A) **(i)** Find out convolution sum of the following sequences **[07]**

$x(n) = \{4,5,6,7\}$ $h(n) = \{1,2,3\}$

(ii) Discuss: Application of Digital signal processing in case of RADAR. **[07]**

Q.3(B) Write short answers: (ANY THREE) **[03]**

1. What will be z-transform of Unit step function?
2. Plot function $\delta(n - 3) - 4\delta(n + 4)$.
3. What will be energy of unit step sequence?
4. Write frequency of resonance for a first quarter wave?
5. How redundancy in a voice signal can be reduced?

Q.4(A) **(i)** Explain 4-point and 8-point method with necessary equations. **[07]**

(ii) Find X(5) and X(6) for the sequence $x(n) = (1,2,0,1,-1,1,0,2)$ using 8-point method. **[07]**

OR

Q.4(A) **(i)** Discuss periodicity and symmetry of Discrete Fourier Transform (DFT). Show that X(-K)=X*(K). Where, X*(K) is a complex conjugate of X(K). **[07]**

(ii) Compute the values of DTFT and DFT for a sequence $x(n) = \{0,1,2,3\}$ **[07]**

Q.4(B) Write short answers: (ANY THREE) **[03]**

1. State properties of DFT.
2. Define twiddle point.
3. What will be N for 16 point method?
4. Write an equation for inverse discrete Fourier transform (IDFT) X(K)?
5. $X(K = \frac{N}{3}) = (-1)^n x(n)$. This mathematical statement is True or False.

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0504M0153

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Food Science (Food Science & Microbiology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

1 (A) Answer in Detail:

i) Explain HACCP Concept by taking an example of packaged milk. **[07]**

ii) Discuss ICMSF Sampling Plans with suitable examples. **[07]**

OR

i) Discuss any two aspects which affect Quality Assurance and Production Control in food industry. **[07]**

ii) Discuss Food Quality Criteria with their significance. **[07]**

1 (B) Answer in Short: (Any Three) **[03]**

i) Mention any two problems involved in Plan Stringency.

ii) In which year ICMSF was set up?

iii) Name any two examples of pathogens which cause Food Poisoning?

iv) Define "Quality Control" in reference to food industry.

v) What do you mean by Critical Control Points?

2 (A) Answer in Detail:

i) Describe Intrinsic Factors affecting microbial growth in food. **[07]**

ii) Explain SPC and MPN methods for enumeration of bacteria in food samples. **[07]**

OR

i) Write in detail production of Yoghurt as an example of fermented food. **[07]**

ii) Write a detailed account on "Probiotics". **[07]**

2 (B) Answer in Short: (Any Four) **[04]**

i) Explain principle of MBRT.

ii) What are Prebiotics? Give one example.

iii) Name Starter Culture added in production of fermented sausages.

iv) Name two examples of Lactic acid bacteria present in curd.

v) Enlist any two Sources of Microorganisms in food.

vi) Mention any two benefits of Fermented Foods.

3 (A) Answer in Detail:

i) Discuss the microbial spoilage of Vegetables and Fruits and their control. **[07]**

ii) Discuss the role of microbes and factors affecting Food Spoilage. **[07]**

OR

i) Discuss the types of spoilages occurring in Canned food. **[07]**

ii) Explain contamination and spoilage of Cereals and Pulses. **[07]**

3 (B) Answer in Short: (Any Three) **[03]**

i) Explain: Ropiness.

ii) Explain role of Lipase in spoilage of Butter and Ghee.

iii) Give two examples of Perishable foods.

iv) Mention any two types of food spoilages occurring in Canned foods.

v) Name any two microbes responsible for spoilage of Milk Products.

4 (A) **Answer in Detail:**

i) Discuss principles of Canning used for preservation of foods. **[07]**

ii) Discuss use of Chemical Preservatives in food preservation. **[07]**

OR

i) Discuss use of Low Temperature in food preservation. **[07]**

ii) Write a detailed account on "Pasteurization". **[07]**

4 (B) **Answer in Short: (Any Four)** **[04]**

i) Explain importance of Sanitation for preservation of food.

ii) What types of Radiations are used for preservation of foods?

iii) What is Food Dehydration? Explain its importance.

iv) Mention any two examples of Gases which are used as food preservatives.

v) Explain: Hurdle Concept

vi) What is Microwave heating?

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0504M0154

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Forensic Science (Toxicology & Pharmacology

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Ques.1 (a) Answer the following questions:

i. Explain collection of viscera in fatal cases of suspected poisoning. 7 Marks
ii. Give classification of poisons according to mode of action. 7 Marks

OR

i. Discuss various factors affecting the actions of poison in the body. 7 Marks
ii. Write a note on preservation of viscera in fatal cases of suspected poisoning. 7 Marks

Ques.1 (b) Answer the following questions: (Any Four) **4 Marks**

i. What is chelating agent?
ii. Define: Fulminant poisoning
iii. What is idiosyncrasy?
iv. What is hepatotoxic poison?
v. Give two examples of commonly used cattle poisons.
vi. Which preservative should be used for urine in case of suspected poisoning?

Ques.2 (a) Answer the following questions:

i. Discuss any three methods for the extraction of non-metallic poisons. 7 Marks
ii. Explain solid phase microextraction with its advantages and disadvantages. 7 Marks

OR

i. Describe the Marsh-Berzelius test for the quantification of arsenic. 7 Marks
ii. A sample of blood is obtained of a victim suspected to have died of monocrotophos poisoning. Suggest and describe a method for extraction, clean up, identification and quantification of the pesticide. 7 Marks

Ques.2 (b) Answer the following questions: (Any Four) **4 Marks**

i. The method used for the extraction of mercury is called _____.
ii. The Gutzeit test is used for the identification of _____.
iii. Give any one test for the identification of the metallic poison lead.
iv. State any one symptom of antimony poisoning.
v. Give an example of a poison that can be collected by sublimation.
vi. Name any two methods for the extraction of organic volatile poisons.

Ques.3 (a) Answer the following questions:

i. Write a brief note on Digitalis poisoning 7 Marks
ii. Write in detail about Oleander poisoning, extraction procedure and forensic analysis. 7 Marks

OR

i. Write a short note on Calotropis. 7 Marks
ii. Discuss in detail about sign-symptoms, postmortem findings and medicolegal aspects of strychnine poisoning. 7 Marks

P.T.O

Ques.3 (b) Answer the following questions: (Any three) **3 Marks**

i. What is the fatal dose of acute arsenic poisoning?
ii. Write examples of irritant poisons.
iii. What are the active principles of yellow oleander?
iv. Write any two examples of non-metallic poisons.
v. What is the active principle of aconite?

Ques.4 (a) Answer the following questions:

i. Which forensic interferences can be drawn from pharmacological analysis of various exhibits? 7 Marks
ii. Discuss different routes of drug administration. 7 Marks

OR

i. Write a short note on drug metabolism. 7 Marks
ii. Discuss in detail "Mechanism of excretion of drug from the body". 7 Marks

Ques.4 (b) Answer the following questions: (Any three) **3 Marks**

i. What is an ion trapping phenomenon in drug metabolism?
ii. Define: Hepatic recirculation of drug
iii. Write only types of absorption of drug.
iv. Administration of drug in cerebrospinal fluid is known as _____.
v. What is maintenance dose?

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M.Sc. (Sem.-2) Examination

410

Toxicology (Biostatistics)

Time : 2-30 Hours] **April 2019** **[Max. Marks : 70**

Instructions: **Scientific Calculator may be allowed for Que. 4(A)**
All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary.

Que. 1 (A) Write the following:

(i) What is bioinformatics? Write about the goals, scope and applications. [7]

(ii) Describe GenBank database and its various divisions. [7]

OR

(i) What is BLAST? Discuss its flavours and its applications. [7]

(ii) Write about UniprotKB database and its sub-divisions. [7]

Que. 1 (B) Answer the following (any four out of six): [4]

(i) What are the differences between bioinformatics and computational biology?

(ii) What is a database? Write down its types.

(iii) Expand EST and define.

(iv) What is Entrez?

(v) What is an *E*-value of BLAST program?

(vi) Expand and define GSS.

Que. 2 (A) Write the following:

(i) Describe PDB and its file format. [7]

(ii) Elaborate the classes of protein structure. [7]

OR

(i) What is homology modeling? What are the steps involved in homology modeling? [7]

(ii) What is molecular docking? Explain the steps involved in protein-ligand docking? [7]

Que. 2 (B) Answer the following (any four out of six): [4]

(i) Define domain of protein structure.

(ii) What is protein folding?

(iii) What is a template for homology modeling?

(iv) What are the types of molecular docking?

(v) What is molecular dynamics simulations?

(vi) What is docking score?

P.T.O

Que. 3 (A) Write the following:

(i) Give a note on QSAR? [7]

(ii) What is toxicity prediction? Explain with a suitable example. [7]

OR

(i) What are the statistical models used in QSAR modeling? [7]

(ii) Give a note on 2D-QSAR. [7]

Que. 3 (B) Answer the following (any three out of five): [3]

(i) Give a list of 2D descriptors.

(ii) Give a list of 3D descriptors.

(iii) What is ADMET?

(iv) What is chemical toxicity?

(v) Expand and define QSAR.

Que. 4 (A) Write the following:

(i) What is descriptive statistics? Discuss various measures of descriptive statistics. [7]

(ii) Let A = {serum cholesterol = 250–299},
B = {serum cholesterol $\geq$ 300},
C = {serum cholesterol $\leq$ 280}.
(i) Are the events A and B mutually exclusive? [7]
(ii) Are the events A and C mutually exclusive?
(iii) Suppose $Pr(A) = .2$, $Pr(B) = .1$. What is Pr(serum cholesterol $\geq$ 250)?

OR

(i) Write a short note on normal distribution. [7]

(ii) A 1979 study investigated the relationship between cigarette smoking and subsequent mortality in men with a prior history of coronary disease [2]. It was found that 264 out of 1731 nonsmokers and 208 out of 1058 smokers had died in the 5-year period after the study began. [7]
Assuming that the age distributions of the two groups are comparable, compare the mortality rates in the two groups using chi-square test.

Que. 4 (B) Answer the following (any three out of five): [3]

(i) Define Null Hypothesis

(ii) Define type I error

(iii) Define SD

(iv) Skewness

(v) Define mode

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0504M0156

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Cancer Biology (Basic Immunology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All Questions are compulsory
Draw neat and labeled diagram wherever necessary

Q-1 A

(i) Which are the primary organs of immune system? Describe B-lymphocytes. 14

(ii) Which cells are involved in innate and adaptive immunity? 7

OR

A

(i) Describe structure and function of lymph node. 7

(ii) Which type of microenvironment is provided by bone marrow for developing B cells? How bone marrow stromal cells nurture the developing B cells? 7

Q-1 B Multiple Choice Questions (Any four out of six) 4

1 Mast cells express _____ receptor.

a EGF b VEGF
c Kit d PDGF

2 Azurophilic granules of neutrophils appear during their development in _____.

a Blood b Bone marrow
c Tissue d Stroma

3 _____ of T cells express the α-β heterodimer.

a 5% b 65%
c 65% d 95%

4 T-cells respond to pathogens by producing_____.

a Killer T cells b Helper T cells
c Suppressor T cells and Memory cells d Killer T cells, Helper T cells and Suppressor T cells

5 The phenomenon of selective proliferation of B cells in response to their interaction with antigen is called_____.

a Clonal expansion b Monoclonal selection
c Clonal proliferation d Clonal selection

6 Which of the following acts as a co-receptor for B-cell activation?

PTO

a CD28 b IL2
c IgA d CD19

Q-2 A

(i) **What is complement system? How classical pathway eliminates the pathogen?** 14 7

(ii) **Write a note on Antigen – definition, types and structure.** 7

OR

A

(i) **What is the role of neutrophils in innate immunity?** 7

(ii) **Which factors affects the immunogenicity of antigens?** 7

Q-2 B **Multiple Choice Questions (Any four out of six)** 4

1 **Dendritic cells are positive for _____.**

a CD80+CD86+CD11a+ b CD80+CD86-CD11a+
c CD80+CD86-CD11c+ d CD80-CD86+CD11c+

2 **Which of the following is the central molecule in complement pathway?**

a C1 b C2
c C3b d C5

3 **Alternate pathway of complement system is activated by _____.**

a Antibody-antigen complexes b Antigen
c Microorganisms or its toxins d Antigen bound to MHC

4 **What is the meaning of Thymus independent B cell activation?**

a Without the participation of T-cell b Do not mature in the thymus
c Thymus would not take part in its activation d Affinity maturation takes place in the thymus

5 **The antigen binding site of antibody is found in_____.**

a Variable region of light chain b Variable region of heavy chain
c Variable region of both heavy and light chains d Constant region of light chain

6 **The cells active in production of antibodies are_____.**

a Kupffer cells b Plasma cells
c Mast cells d Macrophages

Q-3 A

(i) **Write on: a. MHC as an Alloantigenic system** 14 7
b. Haplotype
c. Linkage disequilibrium

(ii) **Describe the functions of different types of T- lymphocytes.** 7

OR

A

(i) **Describe structure of class I molecules of major histocompatibility complex.** 7

(ii) **Write a note on Interleukins. Describe their sources and major functions.** 7

M0156-3

Q-3 B **Multiple Choice Questions (Any three out of five)** 3

1 **Highly polymorphic region in MHC class I molecule is _____.**

a Peptide binding region
b B2 microglobulin region
c Trans-membrane region
d Cytoplasmic region

2 **HLA proteins are present on _____.**

a Membrane of the cells
b Cytoplasm of the cells
c Nucleus of the cells
d Cytoplasm and nucleus

3 **In absence of B2 microglobulin_____.**

a Beta chain does not fold properly
b Peptide does not remain stable
c Alpha chain does not fold properly
d Beta chain not remain stable

4 **Combined effect of two cytokines on cellular activity is greater than the additive effects of individual cytokines is called _____ effect.**

a Synergize
b Pleiotropic
c Redunt
d Cascade

5 **T-cell independent antigens are mostly _____.**

a Polyvalent
b Bivalent
c Monovalent
d Tetravalent

Q-4 A

(i) **Write a note on MHC class II molecules. Explain how it differs from class I molecules of MHC?** 14 7

(ii) **Short note on Natural Killer cells.** 7

OR

A

(i) **What is self-MHC interaction? Explain mechanism of MHC interaction with peptide in process of antigen presentation.** 7

(ii) **Describe the T-cell development.** 7

Q-4 B **MCQs (Any three out of five)** 3

1 **In human genome, MHC is represent in _____.**

a 0.9%
b 0.3%
c 0.1%
d 0.01%

2 **For human, the term MHC refers to _____.**

a Human Leukocyte Antigen
b Human Lymphocyte Antigen
c Human Lymphocyte Antibody
d Human Leukocyte Antibody

3 **Very Late Activation molecule 1 (VLA-1) contains _____mixture of antibodies**

a CD49a CD29
b CD49 CD29a
c CD49a CD21
d CD49 CD21a

4 **α interferon (INF) is produced by _____.**

a Leukocytes
b Leukocytes Fibroblast
c T-cell
d B- cell

P.T.O.

M0156-4

5 **How many days are required for primary response for B-cell activation?**

a 1 to 2 days
b 5 to 10 days
c 10 to 15 days
d More than 15 days

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0504M0157

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Polymer Science (Inorg. & Org. Polymers)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q-1(A) Write The Following

(i) What is an Inorganic Polymer? Give Classification of Inorganic Polymer as per connectivity. 07

(ii) What is Polymeric Sulfur? Give its example with uses. 07

Or

(i) Describe Chemical Structure, Synthesis and Uses of Boron Nitride and Boron Carbide. 07

(ii) What is the constitution of Portland Cement? Provide manufacturing process of Portland Cement. 07

Q-1(B) Any Four Out Of Six 04

1. "We do not live in a risk-free society." Discuss this statement in terms of Asbestos.
2. Why Inorganic materials employed rather than Organic dyes to color or stain Glass?
3. Which material is used in glass making?
4. What are Carboranes?
5. Give structure of Metallocenes.
6. What are disadvantage of Coordination polymers.

Q-2(A) Write The Following

(i) Compare: - Organic Polymers with Inorganic Polymers. 07

(ii) Discuss the Structure, Properties and Applications of Sand and Clay. 07

Or

(i) Describe Synthesis, Important Properties and Applications of Diamond & graphite. 07

(ii) What are Isopoly and Heteropoly acids and their salts? Give their uses. 07

Q-2(B) Any Four Out Of Six 04

1. Name any two inorganicAbrasive
2. Give example of Fluoropolymers with its uses.
3. Give its uses of Thiokol polymer.
4. Enlist any four biopolymers.
5. Give common chemical formula of Zeolite.
6. Give name of any one mineral for Quartz.

Q-3(A) Write The Following

(i) Describe applications of Polyphosphazenes as Elastomers and Electrolytes. 07

(ii) Explain synthesis of Phosphazenes. 07

Or

(i) Define the term Phthalocyanine. Give its structure and uses. 07

(ii) Explain Surface (substitution) reactions of Polyphosphazenes. 07

P.T.O

M0157-2

Q-3(B)		Any Three Out Of Five	03
		1. Why Polyphosphazenes can be used as Flame retarding material? 2. Enlist at least four Phosphorous containing Polymers and its uses. 3. Compare Window Glass with Organic Thermoplastics. 4. What is Glass fiber? Give its uses. 5. What is Annealing? How it effect Glass-Silicates?	
Q-4(A)		Write The Following	
	(i)	Provide Classification of Polysiloxane according to their Physical form and their uses	07
	(ii)	Explain Synthesis of Polysilanes by Wurtz-type Coupling Reactions.	07
		Or	
	(i)	Which is best Elastomer, Organic Elastomer or Silicon Rubber? Why?	07
	(ii)	Explain Ring-Opening Polymerization of Cyclosiloxanes by Ionic Initiators.	07
Q-4(B)		Any Three Out Of Five	03
		1. "Sand is abrasive but Polysiloxanes are lubricants" justify this sentence. 2. What is the full form of PDMS? Give its uses. 3. Why Inorganic polymers are widely employed in the construction and building businesses? 4. What is Borazenes? 5. Give bond energy of Si-Si Bond.	

— X —

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0504M0158

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Computer Science (Smart Device Computing)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q-1 A Write The Following.

(I) What is Intent? Explain types of Intent with example. **(14)**

Or

(I) What is Activity in Android? Explain Android architecture with a diagram. **(14)**

Q-1 B. Short Questions(Attempt Four) **(4)**

1.Full form of AVD?

2. Full form of SDK?

3. What is JSON.

4. What is MIME types?.

5. What is Material Design.

6. What is Shared preference.

Q-2 A Write The Following.

(I) Explain Activity lifecycle with a diagram and an example. **(14)**

Or

(I) Explain Android Activity states with diagram. **(14)**

PTO

Q-2 B. Short Questions(Attempt Four) (4)

(1) What is Content providers.

(2) What is Notification.

(3) What is AsyncTask.

(4) What is Activity.

(5) What is Animation.

(6) What is Broadcast.

Q-3 A **Write The Following.**

(I) Explain Layout Manager (with types) and SDK Manager in Android. **(14)**

Or

(I) What are various types of data storage in Android? Explain them all in brief. (Any Seven) **(14)**

Q-3 B. Short Questions(Attempt Any three) (3)

1) One of application component, that manages application's background services is called
   A. Activities B. Broadcast Receivers C. Services D. Content Providers
2) Tab that can be used to do any task that can be done from DOS window is
   A.TODO B. message C. terminal D. comments
3) Android component that controls external elements of file is called
   A.Intent B. resource C. view D. manifest
4) What method you should override to use android menu system?
   A. onCreateOptionsMenu() B.onCreateMenu()
   C. onMenuCreated() D. onCreateContextMenu

5) Broadcast that includes information about battery state, level, etc. is

A. android.intent.action.BATTERY_CHANGED
B. android.intent.action.BATTERY_LOW
C. android.intent.action.BATTERY_OKAY
D. android.intent.action.CALL_BUTTON

Q-4 A Write The Following.

(i) What is Background Task? Explain the difference between Synchronous and Asynchronous Tasks **(14)**

Or

(I) What is Manifest file in Android? Explain its common settings with example. **(14)**

Q-4 B. Short Questions(Attempt Three) **(3)**

1.What is Hash tables.

2. What is Mutability.

3.What is Modules

4.What is Iteration.

5. What is Debugging.

—X—

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0504M0159

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

410

Horticulture Science (Plant Protection)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1.A. Explain the Biochemical Host defense in detail. 14

OR

Q.1 A. Write brief notes on: 14

i. Disease cycle ii. Disease Symptoms

Q.1 B. Explain in one line any four: 04

Appresorium, Disease triangle, Pathogen, Chemical weapons, structural defense, Haustorium.

Q.2. A. Explain various Regulatory methods used for plant disease management. 14

OR

Q.2.A.Write Short notes on : 14

i.Cultural methods ii.Biological methods

Q.2. B. Explain in one line any four: 04

Crop rotation, quarantine, trap plants, antagonistic soils, roguing,Field sanitation

Q.3. A. Explain types of Chemicals used to protect plants . 14

OR

Q.3.A.Describe: 14

i.Plant parasites ii. Fungicides

Q.3. B. Explain in one line any three: 03

Pesticides, herbicides, Bactericides, control of plant parasites, Weeds

Q.4. A Justify the use of Gardening tools. 14

OR

Q.4 A Explain: 14

i. Sowing tools ii.Harvesting tools

Q.4. B. Explain in one line any three: 03

Knife, rake, pump, pruning tool, harvesting tools

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0504M0160

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Geoinformatics (Research Methodology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1A Write notes on following (2*7) 14

1. Meaning and Definition of Research in Geoinformatics
2. Process of Research

OR

1. Approaches of Geoinformatics Research
2. Types of Research

Q1B MCQs (Any Four out of Six) 04

1. Science is broadly divided into .....

a) Natural and Social b) Natural and Physical c) Physical and Mental d) Social and Physical

2. The method by which a sample is chosen

a) Unit b) design c) Random d) Census

3. Research undertaken for knowledge sake is

a) Pure Research b) Action Research c) Pilot study d) Survey

4. Example for fact finding study is

a) Pure Research b) Survey c) Action Research d) Long term Research

5. Research conducted to find solution for an immediate problem is .....

a) Fundamental Research b) Analytical Research c) Survey d) Action Research

6. Fundamental Research is otherwise called

a) Action Research b) Survey c) Pilot study d) Pure Research

P.T.O.

Q.2A Write detailed note on any one of the following 14

1. Techniques of Primary data Collection
2. Sampling Techniques

Q2B MCQs (Any Four out of Six) 04

1. Probability sampling is otherwise called

a) Multiple choice b) Uni-variate Analysis c) Random Sampling d) Bi-variate Analysis

2. Sampling which provides for a known non zero chance of selection is

a) Probability sampling b) Non probability sampling c) multiple Choice d) analysis

3. An example of probability sampling is

a) Quota Sampling b) Snow-ball sampling c) Purposive sampling d) Lottery method

4. ..... are used for Random Sample when the population is very large

a) Calculator b) Telescope c) Computer d) Typewriter

5. In which sample population is divided into different strata and sample is taken from different strata?

a) Quota Sampling b) Snow ball sampling c) Stratified sampling d)Purposive Sampling

6. Drawing a sample from each stratum in the proportion to latter's share in the total population is called

a) Stratified sampling b) Proportioned stratified sampling c) Disproportionate sampling d) Quota sampling

Q.3A Explain model of GIS or remote Sensing project in detail. 14

OR

Q.3A Resource Planning is important for Project Management. Justify the statement with suitable examples.

Q3B MCQs (Any Three out of Five) 03

1. A project is _____endeavour to produce a unique product

a) Permanent b) Temporary c) Random d) None of the Above

2. The output of a project is _____

a) Unique b) General c) Relevant d) None of the Above

3. _____is the important part of the project management process.

a) Externalities b) Executing c) Resources d) None of the Above

4. ..... can be the result of project failure

a) Use of Benchmark b) Estimation c) Clear Objective d) Inadequate Budget

5. Mind Mapping Techniques was popularised by

a) Tony Buzan b) Vedal-de-Blash c) Dale Smith d) None of the Above

Q.4A Detail out the SWOT Analysis for GIS Project to reduce the crime in Ahmedabad 14

OR

Q.4A Prepare PERT Diagram for any GIS Project you would like to develop for Urban Planning

Q4B MCQs (Any Three out of Five) 03

1. _____method is also known as Estimate-Talk-Estimate (ETE)

a) Doppler b) Delphi c) Dale d) None of the Above

2. PERT was developed by _____

a) U K Navy b) U S Navy c) Indian Navy d) None of the Above

3. Optimistic Time means _____possible time required to accomplish an activity.

a) Minimum b) Maximum c) Expected d) None of the Above

4. ..... is a measure of excess time and resources available to complete a task

a) Slack b) Path c) Lead d) Fast Tracking

5. Shortening duration of critical activities is known as

a) Fast Tracking b) Leading c) Crashing Critical Path d) None of the Above

— X —

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0504M0161

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

410

Climate Change (Future Climate Scenarios)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions : All questions are compulsory and carry equal marks

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Q.1.A. Explain Integrated Assessment modelling. 14

OR

Q.1 A. Write brief notes on: 14

i.Advantages of IAM ii. Limitations of IAM

Q.1 B. State whether True or False any four: 04

1) An interesting discussion about the usefulness of IAMs in policy making is provided in the paper Global Comprehensive Models in Politics and Policymaking by Paul Edwards.
2) The complexity of natural and social systems cannot be captured by IAMs.
3) North American Maple is dying due to the loss of calcium and other nutrients from soils.
4) An integrated assessment model is used to estimate SO2 emission effects on volcanic eruption in two regions of North America.
5) Multi-criteria decision analysis takes account of multiple objectives through the criteria it uses. and the weight each criterion is given.
6) The IAMC provides a point of contact with institutions and organizations that use the scientific results of the IAM community, such as the IPCC.

Q.2. A. Explain concept of load sharing with reference to climate change. 14

OR

Q.2.A. Write Short notes on : 14

i.Developed countries ii.Developing countries

Q.2. B. Explain in one line any four: 04

Coal to clean, sandbag, EU-ETS, OECD members, MEDC, LMIC.

Q.3. A. Explain concept of ethics with reference to climate change. 14

OR

Q.3.A.Describe: 14

i. Climate Justice ii.Environmental risks

Q.3. B. Explain in one line any three: 03

Climate change, ethics, collaborative program, future emissions,impacts.

Q.4. A Justify need of sustainable development. 14

OR

Q.4 A Explain: 14

i.Stake holder ii.Ecological footprint

Q.4. B. Explain in one line any three: 03

Indicators of sustainable development, pillars of sustainability, population dynamics, sectorial perspective, integrative perspective.

0804M0162

Candidate's Seat No :_____

M.Sc. (Sem.-2) Examination

411

Polymer Science (Latex & Foam Technology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1 (A) Write the following.

I Write the notes on Natural rubber with its origin and extraction. 07

ii Discuss in detail the vulcanization of latex. 07

OR

i Explain the Thiokol rubber with properties and manufacturing process. 07

ii Describe the Nitrile rubber with its properties and application. 07

Q.1 (B) Any Four out of six (Answer in one or two lines only)

i What is the role ofTapping? 01

ii Write the application of Reclaimed rubber. 01

iii Why silicone rubber shows excellent low temperature flexibility. 01

iv Write the factors affect the latex quality. 01

v EPDM and TPR stands for 01

vi Discuss the Elasticity and Plasticity. 01

Q.2 (A) Write the following.

i Discuss the different types of machines used for compounding of Rubber. 07

ii Explain in brief the ingredients used for rubber compounding. 07

OR

i Discussthe Dispersing Agents and its types and significance for rubbers. 07

ii Define Micro and Nano fillers used in rubber for different application. 07

Q.2 (B) Any Four out of six (Answer in one or two lines only)

i List at least three vulcanizing agents? 01

ii The function of sulphur in the vulcanization of rubber is.....elasticity. **(Decrease/Increase)** 01

iii Repeating unit present in neoprene rubber is..... 01

iv IUPAC name of chloroprene is..... 01

v Which rubber has excellent ozone resistance and why? 01

vi Which rubber can hold organic solvent? 01

Q.3 (A) Write the following.

i Discuss in detail the mechanical stability testing for latex. 07

ii Discuss the application and manufacturing of Urethane Foam. 07

OR

i Define Integral Skin Foam and concept of micro- cellular structure of foam. 07

ii Give the testing method to evaluate DRC. 07

P-T-O.

Q.3 (B) Any Three out of five (Answer in one or two lines only)

i	Write the percentage of water in Latex.	01
ii	Rheology of rubber determine by	01
iii	Give the importance of Mooney viscosity.	01
iv	What is the importance of integral skin foam?	01
v	List out the application of closed and open cell structure.	01

Q.4 (A) Write the following.

i	Explain the production process of latex foam.	07
ii	Give detailed review on manufacturing the Dipped goods.	07

OR

i	Describe the Latex cement and Latex thread.	07
ii	What isElectro deposition of latex and its application.	07

Q.4 (B) Any Three out of five(Answer in one or two lines only)

i	What is the name of rubber based adhesive?	01
ii	Give the significance of Micro Porous Ebonite.	01
iii	List out application of Latex foam.	01
iv	What is the importance of Emulsion Paints?	01
v	Explain the application of Latex coated fabrics & cords.	01

X ——— X

0804M0163

Candidate's Seat No : _____

M.Sc. (Sem.-2) Examination

411

Computer Science (Adv. Computing Technology)

April 2019

Time : 2-30 Hours] **[Max. Marks : 70**

Q-1(A) Write the following:

(i) What is cluster computing? Explain cluster computing architecture using suitable diagram. [14]

OR

(ii) Explain the security policies in cluster and cluster system monitoring in brief. [14]

Q-1(B) Write the following (Any Four out of Six) [4]

(i) What is resource management and scheduling (RMS)?

(ii) _____ is known as shared everything architecture?

(a) Cluster System (b) SMP (c) CC-NUMA (d) Cluster

(iii) _____ provide network services to the cluster?

(a) Server (b) Hubs (c) Gateways (d) Routers

(iv) A cluster is:

(a) A group of hard disks (b) A collection of CPUs
(c) A collection of keyboards (d) None of them

(v) Select the characteristics of FTP.

(a) Transfer encrypted data (b) Transfers data in unencrypted form
(c) Transfers data security (d) None of them

(vi) List down various commodity components of cluster.

Q-2(A) Write the following:

(i) Explain the FLS (Flexible Load Sharing) algorithm with its analysis. [14]

OR

(ii) Explain the applications of Grid Computing. [14]

Q-2(B) Write the following (Any Four out of Six) [4]

(i) The ability of the algorithm to prevent poor resource allocation is known as:

(a) Transparency (b) Scalability (c) Heterogeneity (d) Stability

(ii) How many states FLS define for the nodes of the system?

(a) One (b) Two (c) Three (d) Four

(iii) The process of linking different supercomputing websites called _____.

P.T.O.

(a) Meta Computing (b) Super Computing
(c) Grid Computing (d) Parallel Computing

(iv) If Which of the following is not the building block of the grid?

(a) Network (b) Computing nodes (c) Common infrastructure (d) none

(v) What is Grid Computing?

(vi) List down the main building blocks of the Grid.

Q-3(A) Write the following:

(i) What do you understand by cross site trust management? Explain with examples. [14]

OR

(ii) What is Virtual Organizations(VOs)? Explain GridArchitecture with Layered Architectural Description. [14]

Q-3(B) Write the following (Any Three out of Five) [3]

(i) _____ is no single software, rather a collection of interoperating software packages.

(a) Supercomputer (b) Domain (c) File (d) Grid

(ii) _____ provides audio sharing and videoconferencing facilities within the groups of human or systems.

(a) Access Grid (b) GIS (c) GSI (d) Certificate Authorities

(iii) Which of the following is not a sharable network resource?

(a) Physical machines (b) VOs (c) Services (d) Data Sets

(iv) What is GSI?

(v) Full form of WSRF?

Q-4(A) Write the following:

(i) What is Cloud Computing? Explain cloud computing architecture with diagram. [14]

OR

(i) Explain Traditional data center and Cloud data center. [14]

Q-4(B) Write the following (Any Three out of Five) [3]

(i) The word cloud is a representation for the _____

(a) Internet (b) Network (c) Computation (d) Router

(ii) Which of the following is not a cloud component?

(a) Clients (b) Distributed server (c) Data center (d) Routers

(iii) Which of the following framework supports large-scale distributed computing?

(a) SimpleDB (b) Bigtable (c) Cloud-based SQL (d) MapReduce

(iv) List down cloud service models.

(v) What is virtual private network (VPN)?

X ——— X