



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Supply – 2020 & Annual – 2021

Roll No.

Subject: Zoology

Paper: I (Biochemistry)

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. All question carry equal marks.

- Q.1. a) Define the following with examples. 06
i) Diastereomers
ii) Epimers
iii) Enantiomers
- b) Discuss the role of phosphate pathway for the generation of two important precursors. What is the importance of non-oxidative pathway under oxidizing stress? 09
- Q.2. a) What are peptides? Describe biologically important peptides. 7½
- b) What are fibrous proteins? Explain their structure by using the example of α keratin. 7½
- Q.3. Discuss transport of electrons down the respirator chain in detail. 15
- Q.4. a) Describe and be the kinetics of multi substrate reaction. Also discuss Ordered and Ping pong mechanisms. 09
- b) Describe sequential and concerted model to explain the allosteric behavior of the enzyme. 06
- Q.5. a) What are phospholipid and sphingolipids? Explain their structure and function with the help of example. 06
- b) How long chain fatty acids get their entry into mitochondria? Also explain the breakdown of saturated fatty acids along with bioenergetics. 09
- Q.6. Describe the reactions of glycolysis and discuss its anabolic role in various processes. 15
- Q.7. a) Discuss *de novo* synthesis of IMP (purine). 09
- b) Sketch urea cycle with its different intermediates and enzymes. 06
- Q.8. Discuss different steps of tricarboxylic acid cycle along with its regulations. 15
- Q.9. Write a note on any TWO of the followings: 7½x2=15
i. Feeder pathways for glycolysis.
ii. Glycogen synthesis and its control.
iii. Ketone bodies synthesis and their impact on human health.



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Subject: Zoology

Paper: II (Cell & Molecular Biology)

Roll No.

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. All question carry equal marks.

1. What are the fundamental differences between Prokaryotic and Eukaryotic cells? Give a comprehensive account of structure of function of Nucleotides. 15
2. What is a replisome? Enlist the contents of replisome. Diagrammatically explain the process of DNA replication in Prokaryotes. 15
3. What are mutagens and carcinogens. Explain the process of pyrimidine dimer formation and nucleotide excision repair. 15
4. Describe the structure of Eukaryotic gene. How mRNA transcription occurs in Eukaryotes. Briefly discuss capping and tiling of mRNA in eukaryotes. 15
5. What is translation? Explain the process of protein synthesis in prokaryotes with the help of diagrams where required. 15
6. Mitochondria are powerhouse of the cell. Explain the Bioenergetics of mitochondria and how the ATPs are produced by oxidative phosphorylation. 15
7. Give a comprehensive account of DNA Sequencing according to the Sanger's Method. 15
8. What is GERL. Describe structure and function of the Endoplasmic Reticulum with special reference to their role in protein synthesis and drug metabolism). 15
9. Write notes on the followings 7.5x2=15
 - a. Peroxisomes
 - b. Salivary gland chromosomes



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Subject: Zoology

Paper: III (Genetics and Biostatistics)

Roll No.

Time: 3 Hrs. Marks: 75

NOTE: Attempt any THREE Questions from Part - I and TWO Questions from Part - II. Simple calculators and Statistical Tables are allowed.

PART-I		
Q. 1	a) What is H-antigen? Describe the genetic basis of H-antigen and ABO blood group antigens.	10
	b) Mr Ali and Mrs Ali both have blood Group B. They have 16 children. $\frac{3}{4}$ have blood group B while $\frac{1}{4}$ have blood group O. What is the genotype of parents?	7
Q. 2	a) What is testicular feminization syndrome? Describe genetic basis of testicular feminization syndrome.	10
	b) Explain haplo-diploid sex determination system?	7
Q. 3	What is Hypoploidy and Hyperploidy? Describe the causes and major genetic disorders associated with Hypoploidy and Hyperploidy.	17
Q. 4	a) What are Transposable elements? Describe the structure and mechanism of DNA transposons and retrotransposons.	10
	b) Describe characteristic features of a vector. Describes advantages and disadvantages of using Plasmid, λ -phage, and cosmid vectors in genetic engineering	7
Q. 5	a) What is Genetic drift? Explain Founder effect and Bottleneck effect with example	8
	b) What is transformation? Describe molecular mechanism and role of various competence proteins involved in transformation.	9
Q.6	Write a note on the following 1. Crossing over, 2. Gene Mapping, 3. Genetic Drift	

PART-II											
Q. 7	A researcher wishes to test the claim that the average cost of tuition and fees at a four- year public college is greater than \$5700. She selects a random sample of 36 four-year public colleges and finds the mean to be \$5950. The population standard deviation is \$659. Is there evidence to support the claim at $\alpha = 0.05$? Use the <i>P</i> -value method.	12									
Q. 8	The Medical Rehabilitation Education Foundation reports that the average cost of rehabilitation for stroke victims is \$24,672. To see if the average cost of rehabilitation is different at a particular hospital, a researcher selects a random sample of 35 stroke victims at the hospital and finds that the average cost of their rehabilitation is \$26,343. The standard deviation of the population is \$3251. At $\alpha = 0.01$, can it be concluded that the average cost of stroke rehabilitation at a particular hospital is different from \$24,672?	12									
Q. 9	The following table gives the results of 2 drugs formulated for the control of blood pressure. Find out if the 2 drugs have similar activity?	12									
	<table border="1"> <thead> <tr> <th>Drugs</th> <th>Patients recovered</th> <th>Patients not recovered</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>100</td> <td>30</td> </tr> <tr> <td>B</td> <td>80</td> <td>10</td> </tr> </tbody> </table>	Drugs	Patients recovered	Patients not recovered	A	100	30	B	80	10	
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A	100	30									
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Subject: Zoology

Paper: IV (Physiology)

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FOUR questions. All questions carry equal marks. Elaborate your answer with labelled diagrams and flow charts.

Q. 1.	How absorption of carbohydrates and lipids occur in the mammalian gastrointestinal tract? Explain the steps involved.	18.75
Q. 2.	a) Explain the structure of neuromuscular junction, how nerve impulse is transmitted through it? b) How synaptic transmission differs at an electrical and chemical synapse?	10.75 08
Q. 3.	Explain in detail how parathyroid hormone, calcitonin and vitamin D interact in the regulation of calcium and phosphorus in the body.	18.75
Q. 4.	Elaborate in detail how an action potential is initiated. Discuss its various properties as well.	18.75
Q. 5.	a) Write an essay on gustatory chemoreceptors. b) Give generalized scheme of transduction by sketching labelled diagrams.	10.75 08
Q. 6.	Using cAMP 2 nd messenger system, how a peptide hormone performs its physiological action?	18.75
Q. 7.	a) Give a detailed account of thyroid follicles, explain their role in the synthesizing and releasing the thyroid hormones in the body. b) Give an account of physiological functions of Testosterone.	10.75 08



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Subject: Zoology

Paper: V (Developmental Biology)

Roll No.

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q. 1. DESCRIBE SPERMIOGENESIS AND ULTRA-MICROSCOPIC STRUCTURE OF MAMMALIAN SPERM.
- Q. 2. WHAT ARE DIFFERENTIAL CELL AFFINITIES, DISCUSS THE ROLE OF CELL ADHESION MOLECULES IN MORPHOGENESIS
- Q. 3. GIVE A DETAILED ACCOUNT ON OOGENESIS IN AMPHIBIANS
- Q. 4. GIVE A COMPREHENSIVE REVIEW ON VARIOUS EGG TYPES WITH RESPECT TO YOLK AND RESPECTIVE PATTERNS OF CLEAVAGES
- Q. 5. EXPLAIN BLOCKAGE TO POLYSPERMY IN SEA URCHIN
- Q. 6. DISCUSS FERTILIZATION AND THE METABOLIC RESPONSES OF THE ZYGOTE IN MAMMALS
- Q. 7. DISCUSS METAMORPHOSIS IN AMPHIBIANS OR INSECTS
- Q. 8. DISCUSS CLEAVAGE AND GASTRULATION IN CHICK EMBRYO
- Q. 9. WRITE NOTES ON THE FOLLOWING;
 - a. SEA URCHIN LARVAE
 - b. SPERM CAPACITATION
 - c. MONOZYGOTIC TWINING



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M.A./M.Sc. Part – I Supply – 2020 & Annual – 2021

Roll No.

Subject: Zoology

Paper: VI [Animal Diversity and Wild Life]

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. Question # One (1) is compulsory. Select any TWO from each Section. All questions carry equal marks.

Question 1. Define the following:

Antler, Bergmann Rule, Carrying Capacity, Circadian, Cursing Ability, Diurnal, Ecotone, Passerine, Edge Species, Endemic Species, Zoological Garden, Estivation, Fecundity, Feral Animals, Flagship Species,

SECTION I

Question 2. A). Describe body plans in animal kingdom and types of symmetry present in the animal kingdom.

B) Describe various adaptations in animals for desert ecosystems

Question 3. A). Write down Evolutionary perspective of

- i. Annelida
- ii. Arthropoda

Question 4. Discuss in detail the phylogenetic relationship between Reptiles and Birds.

Question 5. Write down salient features of Proteostomes and Deutrosomes.

SECTION II

Question 6. What are the rules which are followed for zoo management?

Question 7. A). Define wetlands and Ramsar site. Write down the criteria on the basis of which a wetland can be classified as Ramsar site?

B. Describe ecology of any three National Parks of Pakistan.

Question 8. A). Define biodiversity and wildlife. Write a detailed note on philosophy and significance of wildlife.

B). Write down various IUCN categories of threatened species.

Question 9. A). Define protected area and various IUCN categories of protected areas.

B). Write note on distribution and biology of snow leopard and Indus Dolphin.