



UNIVERSITY OF THE PUNJAB

Part-I A/2018
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: I (Biochemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Question No.	Question	Marks
1a	Differentiate between: a) Enantiomers and diastereomers b) Glycosidic bond and peptide bond c) Cerebrosides and globosides	06
1b	What are homopolysaccharides? Explain their types with reference to structure and function.	09
2a	What are peptides? Explain the role of various types of biologically active peptides and polypeptides in animals.	09
2b	Discuss structure and function of globular proteins with reference to hemoglobin.	06
3a	Define inhibitors. Discuss various types of enzyme inhibitors.	7.5
3b	Explain the relationship between substrate concentration and reaction rate using Michaelis-Menten equation.	7.5
4	Discuss different steps of tricarboxylic acid cycle alongwith its regulation	15
5a	Discuss the biological functions of lipids.	05
5b	How long chain fatty acids are transported into mitochondria? Also discuss the breakdown of polyunsaturated fatty acids.	10
6a	Describe how carbohydrates other than glucose meet their catabolic fates in glycolysis.	7.5
6b	Describe chemical composition of DNA and discuss various forces which are involved in the stability of DNA structure.	7.5
7a	What are lipoproteins? Describe various types and major functions of lipoproteins	7.5
7b	Discuss ATP synthase as the smallest rotatory engine.	7.5
8a	Explain the role of transamination and deamination in amino acid breakdown.	7.5
8b	Role of urea cycle in excretion of nitrogenous wastes.	7.5
9	Write detailed note on any two of the following: a) Hormonal control of glycogen metabolism b) Glucogenic and ketogenic amino acids c) Citrate-malate shuttle	7.5X2=15



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Subject: Zoology
PAPER: II (Cell & Molecular Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

1. What is an ORI point? Explain the process of DNA replication in Prokaryotes. 15
2. How the gene expression is regulated at transcriptional level in Eukaryotes. Explain. 15
3. What are introns and exons. Explain the process of Splicing 15
4. What is A, B and Z DNA. Give a comprehensive account on structure of DNA with special reference to structure of nucleotides. 15
5. Explain the structure and function of Plasma membrane. 15
6. Write an essay on structure and function of Golgi apparatus with reference to its role in synthesis of glycoprotein). 15
7. Mitochondria is semi-autonomous organelle. Give 7 points of Mitochondria similarity with a bacterial cell. 15
8. Define Phagocytosis. Give a comprehensive account on the structure and function of Lysosomes. 15
9. Write notes on the followings 7.5x2=15
 - a. ScRNPs
 - b. Charging of tRNA



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Roll No.

Subject: Zoology
PAPER: III [Genetics and Biostatistics (Weightage 3:1)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any THREE questions from Part I and TWO from Part II.
Simple calculator and statistical tables are allowed.

Q. No.	Parts	PART I	Marks
1	a	Discuss at least five different mechanisms involved in antibody diversity?	10
	b	Draw and compare structure of Kappa and Lambda light chain.	7
2	a	What are transposons? Write a detailed note on the transposable elements in maize. How the <i>DS</i> elements might have evolved.	10
	b	Differentiate between i) Autonomous and non-autonomous transposons ii) Simple and composite transposons iii) Long terminal repeats (LTR) and inverted terminal repeats (ITR).	7
3	a	What are the different processes of recombination in bacteria? Which process of recombination is sensitive to enzyme DNAase and why?	10
	b	What is Hfr? Discuss it in detail.	7
4	a	Describe the Hardy Wienberg Equilibrium, how does migration and selection affect this equilibrium.	11
	b	Please discuss the phenomenon of inbreeding and heterosis.	6
5	a	Briefly discuss the structural changes of chromosomes.	10
	b	Describe genetic control of lactose operon in <i>E. coli</i> .	7
6	a	What are genetic basis of "ABO" blood groups and explain how the knowledge of blood groups is used to solve the cases of disputed paternity?	9
	b	Explain the condition of erythroblastolysis fetalis. Why first child is safe if mother is Rh negative and child has positive blood type.	8
PART B			
7		For the following data find measures of central tendency and dispersion 25, 30, 28, 25, 27, 31, 30, 25, 33, 25,	12

8	<p>The sugar levels of 7 patients were recorded before and after administration of a conventional drug. The data is given below, are given below, find if these is sufficient evidence to conclude that the drug is effective. Use paired t-test.</p> <table border="1"> <thead> <tr> <th>Patient</th> <th>Before treatment</th> <th>After treatment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>180</td> <td>120</td> </tr> <tr> <td>2</td> <td>210</td> <td>130</td> </tr> <tr> <td>3</td> <td>230</td> <td>125</td> </tr> <tr> <td>4</td> <td>215</td> <td>135</td> </tr> <tr> <td>5</td> <td>200</td> <td>125</td> </tr> <tr> <td>6</td> <td>190</td> <td>110</td> </tr> <tr> <td>7</td> <td>195</td> <td>115</td> </tr> </tbody> </table>	Patient	Before treatment	After treatment	1	180	120	2	210	130	3	230	125	4	215	135	5	200	125	6	190	110	7	195	115	12
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9	<p>The following table gives the results of 2 drugs formulated for the control of blood pressure. Find if the 2 drugs have similar activity, write down all steps involved.</p> <table border="1"> <thead> <tr> <th>Drug</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>	Drug	Patients recovered	Patients not recovered	A	100	30	B	80	10	12															
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Roll No.

Subject: Zoology
PAPER: IV (Physiology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

- Q. 1. Describe in detail the mechanism of action of a protein/peptide hormone through cAMP second messenger system. 15
- Q. 2. Accounting the ultrastructure of muscle protein molecules, elaborate their interaction in muscle contraction. Discuss also the role of calcium and calcium pump in muscle contraction. 15
- Q. 3. a) Give a detailed account of gustation by gustatory chemoreceptors. 10
b) With the help of labeled figure/s only, give the generalized scheme of transduction. 05
- Q. 4. Discuss the various important mechanisms contributing to the maintenance of resting membrane potentials. 15
- Q. 5. a) Differentiate an electrical synapse from a chemical synapse. 07
b) Give an account of biosynthesis of neurotransmitters acetylcholine and norepinephrine in their presynaptic terminals. 08
- Q. 6. Account, in detail, the mechanisms in self excitation and automatic rhythmicity of a myogenic heart. 15
- Q. 7. a) Describe, in detail, the biosynthesis and release of thyroid hormones, in thyroid follicles. 10
b) Account, very briefly, five major functions of growth hormone. 05
- Q. 8. Discuss in detail the exchange of respiratory gases at both pulmonary and tissue levels. 15
- Q. 9. a) Elaborate the mechanism of autoregulation of glomerular filtration rate. 08
b) Describe the various steps in the absorption of carbohydrates and proteins in gastrointestinal tract. 07

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Subject: Zoology
PAPER: V (Developmental Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks. Make labeled sketches to support your answers where ever necessary.

- Q. 1. GIVE A DETAILED ACCOUNT ON SPERMATOGENESIS IN MAMMALS WITH SPECIAL EMPHASIS ON SPERMIOGENESIS.
- Q. 2. EXPLAIN FERTILIZATION IN SEA URCHIN IN DETAIL. EMPHASIZING ON ACTIVATION OF EGG WITH CALCIUM IONS.
- Q. 3. GIVE A DETAILED ACCOUNT ON AMPHIBIAN OOGENESIS SHOWING THE REGULATION OF MEIOTIC CELL DIVISION AND VITELLOGENESIS.
- Q. 4. WHAT ARE METANEPHRIC KIDNEYS? GIVE DETAILED ACCOUNT ON RECIPROCAL INTERACTION OF METANEPHROGENIC MESENCHYME AND URETERIC BUD DURING KIDNEY DEVELOPMENT
- Q. 5. DISCUSS IN DETAIL BLOCKAGE TO POLYSPERMY IN BOTH THE EXTERNAL AND INTERNAL FERTILIZATION
- Q. 6. DISCUSS MORPHOGENESIS WITH REFERENCE TO THE DIFFERENTIAL CELL AFFINITY AND CELL ADHESION MOLECULES.
- Q. 7. WRITE A COMPREHENSIVE NOTE ON CLEAVAGE AND GASTRULATION IN MAMMALS.
- Q. 8. DEFINE METAMORPHOSIS AND DISCUSS THIS PROCESS IN INSECTS WITH REFERENCE TO THE HORMONE(S) INVOLVED.
- Q. 9. WRITE NOTES ON THE FOLLOWING
 - I. COMPACTION
 - II. SPERM TRANSLOCATION AND CAPACITATION
 - III. TWINING



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Roll No.

Subject: Zoology

TIME ALLOWED: 3 hrs.

PAPER: VI [Animal Diversity and Wild Life (Weightage 50:50)]

MAX. MARKS: 75

NOTE: Attempt any FIVE (5) questions. Select minimum TWO (2) from each Section. All questions carry equal marks.

SECTION I

- Question 1. Define biodiversity and differentiate between alpha, beta and gamma diversity. Write down the diversity of aquatic ecosystems. 15
- Question 2. a. Describe body plans in animal kingdom and types of symmetry present in the animal kingdom. 10
b. Write note on hierarchical organization of animal complexity. 5
- Question 3. a. Write down the diagnostic features and classification of class Amphibia. 8
b. Describe various adaptations in animals for terrestrial mode of life. 7
- Question 4. Discuss in details the phylogenetic relationship between platyhelminthes, nematodes and molluscs. 15
- Question 5. Write down salient features of Phylum Chordata. Also describe briefly their evolutionary ties with the hemichordates and echinoderms. 15

SECTION II

- Question 6. a. Define biodiversity and wildlife. Write a detailed note on philosophy and significance of wildlife. 8
b. Write down various IUCN categories of threatened species. 7
- Question 7. a. Define wetlands and Ramsar site. Write down the criteria on the basis of which a wetland can be classified as a Ramsar site? 7
b) Describe abiotic and biotic components of any three national parks of Pakistan. 8
- Question 8. a. Define protected area and various IUCN categories of protected areas. 8
b) Write note on distribution and biology of snow leopard and Indus dolphin. 7
- Question 9. What are the rules which are followed for zoo management? 15