

UNIVERSITY OF THE PUNJAB



Part-I A/2017
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.

1a	Define the following with examples.	06
	d) Geometrical isomers	
	e) Enantiomers	
	f) Reducing sugars	
1b	Give an account of pentose phosphate pathway for the generation of two important precursors for anabolic pathways.	09
2a	Describe the tertiary structure of proteins in detail.	7.5
2b	What is peptide bond? Explain primary structure of peptide bond.	7.5
3	What is enzyme inhibition? Describe various types of enzyme inhibition with the help of Line-Weaver-Burk plot for each type.	15
4a	What is gluconeogenesis? Discuss the bypass reactions for the generation of glucose in reverse phase of glycolysis and give its regulation	10
4b	How glycogen metabolism is controlled by covalent modification?	05
5a	What are lipoproteins? Explain various types of lipoproteins in our body.	06
5b	Describe the biosynthesis of saturated fatty acids.	09
6a	Describe the mechanism of oxidative phosphorylation.	7.5
6b	Explain ATP synthase as a smallest rotatory engine.	7.5
7a	How nitrogen fixation occurs by Nitrogenase complex?	7.5
7b	Describe the urea cycle.	7.5
8a	Describe the breakdown of unsaturated fatty acids	7.5
8b	Discuss the biosynthesis of pyrimidine.	7.5
9	Write a note on any two of the followings.	7.5X2=15
	d) Formation creatine phosphate	
	e) Biologically active peptides	
	f) Citrate-Malate shuttle	

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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.

Sr#	Questions	Marks
1	Define replicon. Explain the process of DNA replication in Eukaryotes with special reference to DNA polymerases, proteins and role of telomerase in telomere replication.	15
2	Describe the structure of nucleolus. Explain the process of rRNA transcription.	15
3	Differentiate between monocistronic and polycistronic mRNA. Explain the process of regulation of an anabolic (Trp operon) gene expression in prokaryotes.	15
4	How you define melting temperature (TM). Explain the process of PCR (polymerase chain reaction).	15
5	What is Cytoskeleton? Give a comprehensive account on the structure and function of Microtubules.	15
6	Write an essay on structure and function of Golgi apparatus with reference to its role in synthesis of glycoprotein.	15
7	Give a comprehensive account on the process of Sanger's method of DNA Sequencing	15
8	What are Giant chromosomes? Describe the structure of salivary gland and Lampbrush chromosomes.	15
9	Write notes on the followings: a. Transcription of 5sRNA b. Peroxisomes	7.5 7.5



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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.
Scientific calculators are not allowed. Statistical tables allowed.

Part I																					
1	a	Write a note on multiple allele. Explain it with reference to ABO Blood group system.	10																		
	b	What are mutagens? Explain the effects of base analogues and UV radiations?	7																		
2	a	Briefly discuss conjugation in bacteria, how can it be used for mapping of genes?	10																		
	b	Compare the structure of X and Y chromosome of human, what is the scientific evidence that in human Y chromosome is responsible for maleness	7																		
3	a	Explain what is meant by antibody diversity? Give details of at least 3 different mechanisms of antibody diversity.	10																		
	b	Draw and compare structure of Kappa and lambda light chain.	7																		
4	a	What are the forces that affect gene frequency in a population in H. W. equilibrium, how can we predict gene and genotypic frequency in case of inbreeding and migration?	10																		
	b	In a large randomly mating population, the frequency of dominant gene is 0.3. What proportion of the population would you expect to show the dominant and recessive phenotypes?	7																		
5	a	Write a detailed note on regulation in gene expression in prokaryotes explain <i>lac operon</i> .	10																		
	b	Give detail of experiment that shows that recombination takes place in viruses?	7																		
6	a	What are different modes of inheritance, give characteristics of each.	7																		
	b	Write notes on any three of the following. i. Bombay phenotype 3 ii. Reverse transcription 3 iii. Nonsense Mutations 3 iv. Mutable and mutator gene 3 v. Humoral and cell mediated immunity 3 vi. Mosaic and Gynandromorphs 2	10																		
PART B																					
7	a	Compute the coefficient of correlation between height (cm) and weight of seven adults <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Height</td> <td style="padding: 2px;">170</td> <td style="padding: 2px;">175</td> <td style="padding: 2px;">176</td> <td style="padding: 2px;">178</td> <td style="padding: 2px;">183</td> <td style="padding: 2px;">184</td> <td style="padding: 2px;">185</td> </tr> <tr> <td style="padding: 2px;">Weight</td> <td style="padding: 2px;">57</td> <td style="padding: 2px;">64</td> <td style="padding: 2px;">70</td> <td style="padding: 2px;">76</td> <td style="padding: 2px;">71</td> <td style="padding: 2px;">82</td> <td style="padding: 2px;">83</td> </tr> </table>	Height	170	175	176	178	183	184	185	Weight	57	64	70	76	71	82	83	12		
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8		If four coins are tossed together, find probability of the following events a. Four heads b. Four tails c. Three heads and one tail d. Three tails and one head e. Two heads and two tails	12																		
9		Following is the data of 5 subjects before and after treatment with antidiabetic drug. Does it indicate that drug can reduce blood glucose level? <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Patient</th> <th style="padding: 2px;">Before exercise</th> <th style="padding: 2px;">One month After exercise</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">1</td> <td style="padding: 2px;">267</td> <td style="padding: 2px;">205</td> </tr> <tr> <td style="padding: 2px;">2</td> <td style="padding: 2px;">223</td> <td style="padding: 2px;">173</td> </tr> <tr> <td style="padding: 2px;">3</td> <td style="padding: 2px;">194</td> <td style="padding: 2px;">163</td> </tr> <tr> <td style="padding: 2px;">4</td> <td style="padding: 2px;">234</td> <td style="padding: 2px;">154</td> </tr> <tr> <td style="padding: 2px;">5</td> <td style="padding: 2px;">184</td> <td style="padding: 2px;">105</td> </tr> </tbody> </table>	Patient	Before exercise	One month After exercise	1	267	205	2	223	173	3	194	163	4	234	154	5	184	105	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.

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|-------|--|----|
| Q. 1. | Describe, in detail, the biosynthesis of a protein/peptide hormone. | 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. | Describing the mechanisms in mechano-electrical transduction of hair cell, discuss, in detail, the mechanism of transduction of sound waves with special reference to human ear. | 15 |
| Q. 4. | Describe in detail the mechanism of elicitation of an action potential. Highlight its specific properties as well. | 15 |
| Q. 5. | Give an account of the mechanisms in Excitatory as well as Inhibitory Post-synaptic Potentials (EPSP & IPSP). Mention the inhibition of presynaptic terminal also, before the signal ever reaches the synapse. | 15 |
| Q. 6. | Account, in detail, the mechanisms in self excitation and automatic rhythmicity of a myogenic heart. | 15 |
| Q. 7. | Describe the source of origin, chemical nature and principal biological actions of insulin, glucagon and cortisol. | 15 |
| Q. 8. | Describing the special features of chemosensitive area, discuss the chemical regulation of respiration. | 15 |
| Q. 9. | a) Describe the various steps in the absorption of lipids. | 08 |
| | b) Briefly account the structure of glomerular capillaries membrane. | 07 |

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Part-I A/2017
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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 Amphibian Oogenesis. Showing the regulation of meiotic cell division by progesterone
- Q. 2. Describe the fate map, cleavage and gastrulation in MAMMALS
- Q. 3. What is bi-potential gonad? Give a comprehensive account on development of gonads and various genetic and paracrine factors involved during this development.
- Q. 4. What are Fate maps? Give various methods of fate map construction
- Q. 5. Describe the implantation and formation of extra embryonic membranes in mammalian embryo
- Q. 6. Discuss Morphogenesis in term of differential cell affinity and cell adhesion molecules
- Q. 7. Write a comprehensive note on Cleavage Gastrulation and larval forms of sea urchin
- Q. 8. Write an essay on Metamorphosis
- Q. 9. Write Notes on the following;
 - a. Spermiogenesis
 - b. Molecular changes of sperm Capacitation
 - c. Organ Twining

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Part-I A/2017
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: VI [Animal Diversity and Wild Life (Weightage 4:1)]

TIME ALLOWED: 3 hrs.
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. Write comprehensively about hierarchical organization of animal diversity, complexity and body size, animal body plan and symmetry 15
- Question 2. Define biodiversity and differentiate between alpha, beta and gamma diversity. Write down the diversity of deserts, polar region, grasslands forest biomes. 15
- Question 3. Discuss in details the phylogenetic relationship between Echinoderms, Hemichordates and Chordates. 15
- Question 4. What are the evolutionary affinities between Annelids and Arthropods? 15
- Question 5. How do animals survive in desert, tundra and marine habitats? 15

SECTION II

- Question 6. a. Write a note on Zoonosis. 6
- b). Write short note on biology and distribution of following animals in Pakistan 9
Brown Bear, Black Buck, Houbara Bustard
- Question 7. a. Describe major threats to wetlands? 7
- b). Define zoo and write a note on zoo legislations. 8
- Question 8. Differentiate between: 3x5
- Zoological park and safari park
 - Wetland and Ramsar site
 - Feral and endemic species
 - Biome and ecotone
 - Latitude and longitude
- Question 9. a) Describe any five national and international organizations working for the conservation of wildlife in Pakistan. Discuss any two in detail. 8
- b) Write down legislations regarding protection of wildlife in Punjab province. 7