



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Annual Exam – 2019

Subject: Zoology

Paper: I (Biochemistry)

Roll No.

Time: 3 Hrs.

Marks: 75

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

Question No.	Questions	Marks
1.	Sketch the formulae of the following compounds a) α -D-Galactose amine b) Xylose c) Phosphatidyl serine d) Phenylalanine e) Sucrose f) Tryptophan	2.5x6=15
2.	How the glucose break down into pyruvate? Describe with stepwise reactions along with its regulation.	15
3a.	Describe tertiary structures of protein in detail. Sketch various forces involved in maintaining the tertiary structure of proteins?	7.5
3b.	Explain in detail proteins are dynamic in their function?	7.5
4a.	What are allosteric enzymes? Describe the two models of allosterism.	10
4b.	What are co-factors? Describe its various types.	5

P.T.O.

5a.	How will you explain the anabolic nature of TCA cycle? Sketch the flow sheet.	7.5
5b.	Describe the biosynthesis of polysaccharides.	7.5
6	Explain the mechanism of Transamination and Deamination for the catabolism of amino acids?	15
7a.	How the ATP synthesis takes place by ATP synthase? Explain the detailed mechanism.	7.5
7b.	What is Q cycle? Explain the transfer of electrons from Ubiquinone (Q) to Cytochrome c oxidase.	7.5
8a.	How Acetyl Co A is transported from mitochondria into cytosol through the Citrate-Malate pyruvate shuttle.	05
8b.	Explain the Biosynthesis of saturated fatty acids.	10
9a.	Describe the formation of urea in liver.	10
9b.	Write notes on any one of the followings. a) Breakdown of Galactose b) Biological nitrogen fixation	5x1=5



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M.A./M.Sc. Part – I Annual Exam – 2019

Roll No.
Time: 3 Hrs. Marks: 75

Subject: Zoology

Paper: II (Cell & Molecular Biology)

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

1. Define a replicon. Enlist enzymes and proteins required for DNA replication. Discuss the replication of telomeres in eukaryotes. 15
2. Describe the structure of a gene in prokaryotes. Explain the process of transcription of mRNA in Prokaryotes 15
3. Define mutation. Enlist different types of mutation that can exist in the DNA. Explain the process of excision repair mechanism to repair DNA. 15
4. Define an operon. Explain the process of regulation of a catabolic (Lac) gene expression in prokaryotes. 15
5. Give a comprehensive account of the transcription of rRNA. 15
6. Define translation. How proteins are synthesized in the cell. Briefly discuss the glycosylation of protein in Golgi complex. 15
7. Enlist different stages of cell cycle? Describe how the cell cycle is regulated. 15
8. What functions cytoskeleton performs? Discuss the structure of microtubules 15
9. Write notes on the followings 7.5x2=15
 - a. Attachment of ribosomes with RER
 - b. UsnRNPs



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M.A./M.Sc. Part – I Annual Exam – 2019

Roll No.

Time: 3 Hrs. Marks: 75

Subject: Zoology

Paper: III [Genetics and Biostatistics]

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

Q. No.	Part	Question	Marks
Part I			
1	a	Draw a labeled diagram of human Y chromosomes.	5
	b	Explain why tortoiseshell cats are almost always female and why they have a patchy distribution of orange and black fur.	5
	c	What is the pseudoautosomal region? How does the inheritance of genes in this region differ from the inheritance of other Y-linked characteristics?	5
2	a	What are tautomeric forms of bases how do they affect base pairing	5
	b	Categorize chemical mutagens, explain their mechanisms of causing mutation	10
3	a	Briefly explain theories put forward to explain the mechanism of antibody diversity. Explain the structure and process of formation of kappa and lambda light chain	10
	b	If the genome of a primate species contain $300V_k$, $5J_k$, $1C_k$, $150V_\lambda$, $5J_\lambda$, $1C_\lambda$, $300V_H$, $50D_H$, $4J_H$ and $10C_H$ gene segments and these can be joined in all possible appropriate combinations during rearrangement that occur in B-cell development, How many different antibodies these primates may produce?	5
4		What are general characteristics of transposons. Write a short note on the structure and mechanism for the evolution of composite Tn-Elements	10
		Differentiate between i) autonomous and nonautonomous transposons ii) simple and composite transposons iii) Long terminal repeats (LTR) and inverted terminal repeats (ITR).	2+2+1
5	a	Define following five terms (a) Merodeploidy, (b). cointegrate, (c). replica plating,	10

P.T.O.

		(d). prototroph and (e). episome																							
	b	Briefly describe the process of transformation in bacteria	5																						
6		State HARDY-WEINBERG EQUILIBRIUM, how the frequency of recessive gene could be calculated in case of complete selection of homozygous recessive.	10																						
		Calculate the inbreeding coefficient of second cousins.	5																						
		BIOSTATISTICS																							
7		<p>Following is data of body weight (g) mice grown on high protein diet calculate all measures of central tendency and dispersion. (mean, median, mode, variance, standard deviation, standard error and coefficient of variation)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Class</td> <td>22-25</td> <td>25-30</td> <td>30-35</td> <td>35-40</td> <td>40-45</td> </tr> <tr> <td>Frequency</td> <td>5</td> <td>8</td> <td>12</td> <td>3</td> <td>2</td> </tr> </table>	Class	22-25	25-30	30-35	35-40	40-45	Frequency	5	8	12	3	2	15										
Class	22-25	25-30	30-35	35-40	40-45																				
Frequency	5	8	12	3	2																				
8		<p>In an effort to improve the mathematical skills of 10 students, a teacher provides a weekly 1-hour tutoring session for the students. A pretest is given before the sessions, and a posttest is given after. The results are shown here. Data is given below. can it be concluded that the sessions help to affect mathematical skills?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Pre-test</td> <td>82</td> <td>76</td> <td>91</td> <td>62</td> <td>81</td> <td>67</td> <td>71</td> <td>69</td> <td>80</td> <td>85</td> </tr> <tr> <td>Post test</td> <td>88</td> <td>80</td> <td>98</td> <td>80</td> <td>80</td> <td>73</td> <td>74</td> <td>78</td> <td>85</td> <td>93</td> </tr> </table>	Pre-test	82	76	91	62	81	67	71	69	80	85	Post test	88	80	98	80	80	73	74	78	85	93	15
Pre-test	82	76	91	62	81	67	71	69	80	85															
Post test	88	80	98	80	80	73	74	78	85	93															
9		<p>A study was conducted with vegetarians to see whether the number of grams of protein each ate per day was related to diastolic blood pressure. The data are given here. If there is a significant relationship, predict the diastolic pressure of a vegetarian who consumes 8 grams of protein per day.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Protein (g)</td> <td>4</td> <td>6.5</td> <td>5</td> <td>5.5</td> <td>8</td> <td>10</td> <td>9</td> <td>8.2</td> </tr> <tr> <td>Pressure</td> <td>73</td> <td>79</td> <td>83</td> <td>82</td> <td>84</td> <td>92</td> <td>88</td> <td>86</td> </tr> </table>	Protein (g)	4	6.5	5	5.5	8	10	9	8.2	Pressure	73	79	83	82	84	92	88	86	15				
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Pressure	73	79	83	82	84	92	88	86																	



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Annual Exam – 2019

Roll No.
Time: 3 Hrs. Marks: 75

Subject: Zoology

Paper: IV (Physiology)

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 biosynthesis of a steroid 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. Give a detailed account of rhodopsin-retinal visual cycle and excitation of the rod when rhodopsin is activated. How does photopotential differ in ion channel characteristic from other types of sensory potentials? 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

P.T.O.

- Q. 6. Give a detailed account of the mechanism and theories regarding the local control of blood flow. 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 respiratory center, discuss the nervous regulation of respiration. 15
- Q. 9. a) Describe the various steps in the absorption of carbohydrates and proteins in gastrointestinal tract. 08
- b) Elaborate the mechanism of hypo-tonic urine formation in vertebrates 07



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

- Q. 1. DISCUSS **SPERMIOGENESIS**, AND THE **ULTRASTRUCTURAL** DETAILS OF HUMAN SPERMATOZOON.
- Q. 2. DESCRIBE **CLEAVAGE, GASTRULATION** AND **LARVAL FORMS** IN SEA URCHINS
- Q. 3. EXPLAIN **AMPHIBIAN OOGENESIS**. ALSO DISCUSS DEPOSITION OF NUTRIENTS IN THE CYTOPLASM
- Q. 4. WHAT ARE **METANEPHRIC KIDNEYS**? GIVE DETAILED ACCOUNT ON RECIPROCAL INTERACTION OF METANEPHROGENIC MESENCHYME AND URETERIC BUD DURING KIDNEY DEVELOPMENT.
- Q. 5. HOW **POLYSPERMY** IS **PREVENTED** DURING EXTERNAL AND INTERNAL FERTILIZATIONS.
- Q. 6. DISCUSS **MORPHOGENESIS** IN TERM OF DIFFERENTIAL CELL AFFINITY AND CELL ADHESION MOLECULES.
- Q. 7. WRITE A COMPREHENSIVE NOTE ON **CLEAVAGE AND GASTRULATION** IN **MAMMALS**.
- Q. 8. DISCUSS **METAMORPHOSIS** FOCUSING ON ROLE OF HORMONES AS MEDIATOR OF METAMORPHOSIS.
- Q. 9. WRITE NOTES ON ANY TWO OF THE FOLLOWING;
 - I. **SPEMAN'S PRIMARY ORGANIZER**
 - II. **SPERM TRANSLOCATION AND CAPACITATION**
 - III. **TWINING**



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Annual Exam – 2019 (Clash)

Subject: Zoology

Paper: VI [Animal Diversity and Wild Life]

Roll No.

Time: 3 Hrs. Marks: 75

**NOTE: Attempt any FIVE questions. Select minimum TWO from each Section.
All questions carry equal marks.**

SECTION I

- Question 1. How do animal diversity adapted in following ecosystems? 5x3
- i- Grasslands
 - ii- Polar Animals
 - iii- Desert Animals
- Question 2. Describe the hierarchical organization of animal diversity, complexity and body size, animal body plan and animal symmetry. 15
- Question 3. Discuss in detail the phylogenetic relationship between Arthropods and Mollusca. 15
- Question 4. How evolutionary trends progressed among Chordata. Also describe briefly their evolutionary ties with the hemichordates and echinoderms. 15
- Question 5. a. Explain structural diversity and adaptation of different modes of different phyla of zoology. 10
- b. Differentiate between Deuterostomes and Protostomes 5

P.T.O.

SECTION II

- Question 6. Define the following terms; 1x15
Biome, Sustainable use, Indicator species, Biodiversity hotspots, Threatened species, Territory, Biodiversity, Native species, Endemic species, Carrying Capacity, Feral animals, Predator Zoological Parks, Zoological Museums, Habitat
- Question 7. a) Define biodiversity types, patterns and its importance. 7
b) What is TRAFFIC and define the role of CITES in conservation of endangered species. 8
- Question 8. a) What are the criteria on the basis of which a wetland can be classified as a Ramsar site? 7
b) What are IUCN Red List Categories and how IUCN define species status? 8
- Question 9. Write short notes on following threatened animals of Pakistan 5x3
Indus Dolphin, Urial, Houbara Bustard



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Annual Exam – 2019

Roll No.

Subject: Zoology

Paper: VI [Animal Diversity and Wild Life (Weightage 4:1)]

Time: 3 Hrs.

Marks: 75

**NOTE: Attempt any FIVE questions. Select minimum TWO from each Section.
All questions carry equal marks.**

SECTION I:

- Question. 1: a) Discuss the types of symmetry present in the animal kingdom. 8
B) Body plans found in the animal kingdom? 7
- Question. 2: Describe structural diversity and adaptation of different modes of different phyla of Animal Kingdom. 15
- Question. 3: Discuss in detail 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 animal diversity survive in following ecosystems? 5x3
- i- Desert animals
 - ii- Grassland animals
 - iii- Polar Animals

P.T.O.

SECTION II:

Question 6: a) Describe any five national and international organizations working for the conservation of wildlife in Pakistan. Discuss any two in detail. 8

b) Write a note on the rules and laws regarding the protected areas for wildlife in Punjab. 7

Question 7: a) Write a note on Zoonosis. 7

b). Write short notes on following threatened animals of Pakistan: 8

Brown Bear, Black Buck, Indus Dolphin

Question 8: a) Describe the major threats that are responsible for damaging wetlands? 7

b). What are Zoos? Write down a note on types of zoo. 8

Question 9: Define Followings: 1x15

Endemic species, Carrying Capacity, Feral animals, Predator Zoological Parks, Zoological Museums, Habitat, Home Range, Safari Parks, Endangered species, Extinct species, Pinch period, Flagship species, Keystone species