UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – I Annual Examination – 2020

Roll No. .....

Subject: Zoology Paper: I (Biochemistry) Time: 3 Hrs. Marks: 75

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

Q.1.	Define the following terms: i. Holoenzyme and apoenzyme ii. Ground state and transition state of a chemical reaction iii. Enantiomers and epimers iv. Ketogenic and glucogenic amino acids v. Cis and trans fatty acids	3X5=15
Q.2a.	Describe the classification of amino acids on the basis of their R groups.	75
b.	What are biologically active peptides? Explain the role of some important biologically active peptides.	7.5
Q. 3a.	Describe the quantitative relationship of reaction rate with substrate concentration, pH and temperature.	7.5
b.	Describe the allosteric control and covalent modification with reference to the regulation of glycogen metabolism.	7.5
Q.4.	What are carbohydrates? Explain different classes of carbohydrates in detail.	15
Q.5a.	Discuss different complexes of electron transport chain with focus on the movement of electrons through these complexes.	10
b.	Sketch citric acid cycle showing different intermediates and byproducts.	05
Q.6a.	Describe the process of glycolysis. Also explain the fate of pyruvic acid under anaerobic conditions.	10
b.	What are different reactions involved in glycogen biosynthesis.	05
Q.7.	Discuss the bypass reactions of gluconeogenesis. Also explain the reciprocal regulation of gluconeogenesis and glycolysis.	15
Q.8a.	Describe the structure and function of triacylglycerol.	05
b.	What are phospholipids? Explain various types of phospholipids with the help of examples.	10
Q.9.	Write note on any two of the followings: a) Citrate malate shuttle b) Biological Nitrogen fixation by nitrogenase complex c) Mechanism of transamination	7.5x2=15

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M.A./M.Sc. Part – I Annual Examination – 2020

Time: 3 Hrs. Marks: 75

Subject: Zoology **Paper: II (Cell & Molecular Biology)**

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

Q.1. Define ORI point? Enlist the proteins and enzymes involved in Prokaryotic DNA replication. Diagrammatically explain the process of DNA replication in Prokaryotes. (15)

Q.2. Explain the process of transcription in Eukaryotes. Briefly discuss capping and tiling of mRNA in eukaryotes. (15)

Q.3. Define mutagens and carcinogen. Write a note on different types of Micro and Macro mutations. (15)

Q.4. What is translation? Explain the process of protein translation with the help of diagrams where required. (15)

Q.5. What are ddNTPs? Explain the process of Sanger's method of DNA sequencing. (15)

Q.6. Mitochondria are power house of the cell. Explain the Bioenergetics of mitochondria and how the ATPS are produced by oxidative phosphorylation. (15)

Q.7. What is GERL. Write a note on structure and function of the Endoplasmic Reticulum with special reference to their role in protein synthesis and drug metabolism. (15)

Q.8. What is the difference between DNA, Chromatin and chromosomes? Describe the structure of chromosome with reference to coiling and nucleosome. (15)

Q.9. Write notes on the followings (2x7.5=15)

a) tRNA
b) Restriction Endonucleases

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Subject: Zoology Paper: III (Genetics and Biostatistics) 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	Compare the structure of X and Y Chromosome in mammals	5
	b	Explain the process of sex determination in drosophila, write function of *tra, dsx* and *sxl* gene	10
	c	What will be the sex of mammal if they have following sex chromosome composition? XXY, XXXY and XXXXY	2
Q.2.	a	Define Auxotroph, prototroph and chemoauxotroph and antibiotic resistant bacteria. How can you identify and separate the antibiotic resistant microbes from a broth culture.	12
	b	What is meant by horizontal and vertical gene transfer? How does antibiotic resistance spread among bacteria?	5
Q.3.	a	Define and explain Hardy Weinberg Equilibrium. How can you determine gene frequency if you know the genotypic frequency.	9
	b	What do you mean by Dispersive pressure? Explain	8
Q.4.	a	Define transposons and enlist their basic characteristics, explain structure of composite transposons.	10
	b	What are the effects of transposons	7
Q.5.	a	Define mutagens; explain the role of Alkylating agents.	7
	b	How gene expression is regulated in Prokaryotes? Explain with the help of suitable examples.	10
Q.6.	a	Frequency of dominant gene in certain population is 0.3. What proportion of the population would you expect to show the dominant and recessive trait?	7
	b	Write brief notes on the following. i. Inbreeding and heterosis. ii. Vectors used in Genetic engineering iii.. DNA repair mechanism	4,3,3

		PART II	
Q.7.		From the following data calculate MEAN, RANGE, VARIANCE, SYTANDARD DEVIATION AND COEFFICIENT OF VARIATION	12

Observation	8	10	15	22	25
Frequency	5	8	10	7	4

Q.8.		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.	12

Drug	Patients recovered	Patients not recovered
A	150	45
B	80	10

Q.9.		Hind limb length (cm) was measured for 2 groups of mammals, and data is given below. Is there enough evidence to support the hypothesis that they have similar means	12

Gorup 1	30	40	50	60	70
Group 2	26	30	20	24	22

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Roll No. .....

Subject: Zoology Paper: IV (Physiology) Time: 3 Hrs. Marks: 75

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

Q. 1.	Describing the mechanisms involved in the mechano-electrical transduction of hair cell, explain the detailed mechanism of transduction of sound waves in human ear.	15
Q. 2.	a) Explain the details of humoral regulation of circulation b) How baroreceptor system acts in acute control of mean arterial Pressure.	09 06
Q. 3.	a) Explain in detail the specific differences in mechanism of synaptic transmission at an electrical and a chemical synapse. b) Give an account of biosynthesis of the following neurotransmitters in their presynaptic terminal: i) Acetylcholine ii) Norepinephrine	07 08
Q. 4.	a) Explain how hypotonic (dilute) urine is produced in the vertebrates b) What are various types of membrane potentials in smooth muscles of GIT which contribute to gastrointestinal movements.	08 07
Q. 5.	Elaborate the details of exchange of O_2 and CO_2 at: i) Pulmonary level ii) Tissue level	15
Q. 6.	Discuss the role of calcium and calcium pump during muscle contraction, highlighting the ultrastructure of various muscle proteins.	15
Q. 7.	How resting membrane potential (RMP) is maintained?	15
Q. 8.	Describe the general mechanism of a protein (or peptide) hormone synthesis?	15
Q. 9.	a) How thyroid hormones are biosynthesized and released in thyroid follicles? b) Enlist the cellular source, chemical composition, and target glands/organs of the followinghormones. Aldosterone, Glucagon, Vasopressin, Cortisol, Estradiol, Follicle stimulating hormone	09 06

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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. DISCUSS **CLEAVAGE** AND **GASTRULATION** IN **BIRDS**

Q. 2. DESCRIBE **TERATOGENS** DISCUSSING **INFECTIOUS OR CHEMO-TERATOGENESIS** IN DETAIL

Q. 3. EXPLAIN **GASTRULATION** AND **LARVAL FORMS** IN **SEA URCHINS**

Q. 4. DESCRIBE **MAMMALIAN SPERMATOGENESIS** IN DETAIL

Q. 5. DESCRIBE **EGG TYPES** AND **PATTERNS** OF **CLEAVAGE** IN VARIOUS GROUPS OF ANIMALS

Q. 6. WRITE AN ESSAY ON **MAMMALIAN SPERM TRANSPORT, CAPACITATION** AND **FERTILIZATION**

Q. 7. HOW **POLYSPERMY** IS BLOCKED PERMANENTLY DISCUSS WITH ONE EXAMPLE EACH FROM THE VERTEBRATES AND INVERTEBRATES.

Q. 8. DISCUSS ROLE OF **ADHESION MOLECULES** IN **CELL SORTING** AND **DIFFERENTIATION**

Q. 9. WRITE NOTES ON **ANY TWO** OF THE FOLLOWINGS;

A. **FATE MAPS**
B. **METAMORPHOSIS**
C. **MEIOSIS** AND **OOGENESIS**

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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:

Parapatric Species, Morbidity, Passerine, Phototaxis, Phylogeny, Unimorphic, Poikilothermic, Biotope, Stochastic Habitat, Taxidermy, Zoonotic Disease, Hawking, Endemic Species, Hibernate, Territory

SECTION I

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

Question 3. A). Write down the diagnostic features and classification of class Amphibia.

B) Describe various adaptations in animals for terrestrial mode of life.

Question 4. Discuss in detail the phylogenetic relationship between Platyhelminthes, Nematodes and Molluscs.

Question 5. Write down salient features of phylum Chordata. Also describe briefly their evolutionary ties with the hemichordates and echinoderms.

SECTION II

Question 6. 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 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 abiotic and biotic components of any three national parks of Pakistan.

Question 8. A). Define protected area and various IUCN categories of protected areas.

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

Question 9. What are the rules which are followed for zoo management?