UNIVERSITY OF THE PUNJAB

Part-I A/2016
Examination:- M.A./M.Sc.

Roll No. .....

Subject: Zoology **TIME ALLOWED: 3 hrs.**
PAPER: I (Biochemistry) **MAX. MARKS: 75**

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

1	A	Discuss how Lactose Intolerance develops in human population with its sympotoms. How its product, galactose, develop trouble in children when not utilized properly.	06
	B	How will you show that pentoses are produced from hexoses? Explain the utilization of pentoses in proliferating and non-proliferating tissues along with its regulation.	09
2	A	Explain the role of Transamination and Deamination in amino acid break down. Also show the entry points of amino acids in the TCA cycle for further degradation.	07
	B	What are major techniques used for protein separation. Discuss electrophoresis in some detail giving role of "Two-dimensional Electrophoresis".	08
3	A	Give brief account of Enzyme Kinetics with reference to substrate concentration, pH and temperature with neat diagrams.	10
	B	Write down the major classes of enzymes with numbering. How Hexokinase can be numbered as "2.7.1.1".	05
4	A	Give an account of TCA cycle with complete reactions, enzymes and cofactors	09
	B	Discuss "Fate of Pyruvate".	06
5	A	Discuss developments in the structure of glucose from Fischer to Haworth formula with its final conformation.	05
	B	Give brief account about the structure, role and other important characteristics of monosaccharide's and other derivatives.	10
6	A	Giving various classes of lipids, Explain Sphingolipids with reference to their structure and biological role in animals.	7.5
	B	Explain the degradation of saturated fatty acids through β-oxidation.	7.5
7	A	Discuss briefly how glycogen is synthesized in vertebrate tissues. Explain giving the role of sugar nucleotide in the process.	10
	B	Draw a flow sheet and show how drop of blood glucose level works in a cascade way to trigger the break down of glycogen	5
8	A	Define tertiary structure of protein. What are the forces which stabilize the tertiary structure?	09
	B	What are Purines and Pyrimidines and what role these molecules play in living system?	06
9		Write notes on any two of the following? o) Ketone bodies p) Urea cycle and its role in excretion of nitrogen q) Pyruvate dehydrogenase complex	7.5 x 2

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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
Q.No.1	Define an ORI point and Replicon. Explain the process of DNA replication in prokaryotes	15
Q.No.2	Discuss the structure of Plasma membrane. Give a comprehensive account of various mechanisms of transport across the cell membrane in detail.	15
Q.No.3	What are post-transcriptional modifications? Explain the process of splicing of mRNA.	15
Q.No.4	Describe the structure of Nuclear pore. Explain the process of transport of the materials across the nuclear envelope.	15
Q.No.5	Define the term Operon and explain the regulation of Lac operon in prokaryotes in detail.	15
Q.No.6	Mitochondria are power house of the cell. Give a comprehensive note on its structure and function.	15
Q.No.7	What is Genetic Engineering? Discuss its various applications for economic development briefly.	15
Q.No.8	Describe the structure and functions of Lysosomes.	15
Q.No.9	Write brief notes on the followings	
a	Genetic code & its properties	$7^{1/2}$
b	Salivary gland chromosomes	$7^{1/2}$

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Subject: Zoology **TIME ALLOWED: 3 hrs.**
PAPER: III [Genetics and Biostatistics (Weightage 3:1)] **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 (Genetics)

Q. 1	a.	How is the GENE EXPRESSION controlled in prokaryotes? Explain using *TRP* OPERON as a model.	9
	b.	Discuss the GENIC BALANCE THEORY of SEX DETERMINATION in DROSOPHILA.	8
Q. 2	a.	What is F-MEDIATED SEXDUCTION? Explain its role in CHROMOSOMAL MAPPING IN BACTERIA.	8
	b.	Define EPISTASIS, and list six BROAD TYPES OF EPISTATIC INTERACTIONS found in living organisms. Explain any three of these.	9
Q. 3	a.	Develop a detailed account of LAC OPERON as it is working in *E. coli.*	10
	b.	Define and explain TRANSLOCATION. How does it causes sterility in an organism..	7
Q. 4	a.	How does COMPLETE SELECTION against a RECESSIVE ALLELE change the ALLELIC FREQUENCIES in a population? Develop mathematical model.	10
	b.	Define INBREEDING COEFFICIENT. Draw diagrammes for FIRST COUSIN and SECOND COUSIN marriages and calculate INBREEDING COEFFICIENT for each of these.	7
Q. 5	a.	Describe the CLASSICAL GENE CONCEPT. How is it different from MODERN GENE CONCEPT?	7
	b.	What is a TRANSPOSON? Briefly discuss different modes of transposition. Draw the structure of IS TRANSPOSON.	10
Q. 6.	a.	What are the different tools used in RECOMBINANT DNA TECHNOLOGY. Briefly discuss different types of ENDONUCLEASES.	8
	b.	Write short notes on. i. BOMBAY PHENOTYPE ii. MOSAIC and GYNANDROMORPH iii. LINKAGE and SEX LINKAGE	9

PART II (Biostatistics)

Q. 7 (12)

Body weights were recorded in a population and data organized into different frequency distribution classes of variable having different mid class values. Calculate MEAN, VARIANCE, STANDARD DEVITION, STANDARD ERROR OF MEAN, and COEFFICIENT OF VARIATION.

Mid Class Values (cm)	15	20	25	30	35
Frequency	8	7	15	12	4

Q. 8 (12)

Two drugs was tested on a populations of patients suffering from high blood pressure and the data obtained was organized as:

Drug	Recovered	Not Recovered
Hypertencol	1873	184
Hypersens	1246	107

Is there a significant association between the drug and the recovery of the patients?

Q. 9 (12)

A newly developed drug was tested for its antidiabetic effects of 5 different persons and the blood glucose levels (mg/dl) determined before and after treatment with drug with the following results:

Patient No.	1	2	3	4	5
Before Treatment	274	224	194	234	184
After Treatment	205	174	163	154	105

Do you think that the drug has significant effective on lowering blood glucose levels?

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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.	a) Describe in detail the mechanism of elicitation of an action potential. b) Describe the mechanism of presynaptic inhibition in synaptic transmission.	11 04
Q. 2.	Describe, in detail, the mechanism of action of a steroid hormone.	15
Q. 3.	a) Discuss the role of Ca^{2+} in attachment of cross bridges during muscle contraction. b) Briefly account the structure of glomerular capillaries membrane.	10 05
Q. 4.	Give a detailed account of gustatory and olfactory chemoreception with their mechanism of transduction.	15
Q. 5.	a) Elaborate the transmission of nerve impulse with special reference to neuro-muscular junction. b) Discuss the exchange of oxygen at both pulmonary and tissue levels.	09 06
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. b) Name the cellular source and the target glands/organs of each of the following hormones. Prolactin, Calcitonin, Oxytocin, Aldosterone, Estrogen, Testosterone	09 06
Q. 8.	a) Briefly describe the various transportation pathways of carbon dioxide from microenvironment to external environment. b) Tabulate various types of secretions in gastrointestinal tract.	08 07
Q. 9.	a) Describe the phyllogenetic development in excretion regarding the nature of excretory products as explained by Joseph Needham and Baldwin. b) Describe the various steps in the absorption of lipids in gastrointestinal tract.	08 07

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Subject: Zoology **TIME ALLOWED: 3 hrs.**
PAPER: V (Developmental Biology) **MAX. MARKS: 75**

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

Q1: What is POLYSPERMY? How is it prevented?

Q2: Write an essay on CLEAVAGE and GASTRULATION in chick

Q3: Write a descriptive note on AGING with emphasis on its environmental causes

Q4: Describe the process of OOGENESIS in amphibians with special reference to its vitellogenic activity

Q5: What is SPERMIOGENSIS? Explain all the changes which occur during this process. Also explain the ULTRA-STRUCTURE OF MAMMALIAN SPERMATOZOON

Q6: Describe the DEVELOPMENT OF Kidney in mammals

Q7: Write an essay on REGENERATION and regenerative abilities

Q8: Give a detailed account on METAMORPHOSIS in amphibians.

Q9: Write notes on

a) Parthenogenesis
b) Determinate cleavage
c) FATE MAPS

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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

Q 1 How do animal diversity survive in following ecosystems? 5×3

i. Grasslands and Savannahs
ii. Hydrothermal vents
iii. Freshwater habitats

Q 2 Differentiate between; 5×3

i. Body plans found in the animal kingdom
ii. Types of symmetry in animal kingdom.
iii. Deuterostomes and protostomes

Q 3 Describe structural diversity and adaptations in different animal phyla. 15

Q 4 Describe in detail the phylogenetic relationship between Echinoderms, Hemichordates and Chordates. 15

Q 5 Write down salient features of each class of the Chordates. 15

Section – II

Q 6 (a) Define wildlife. Write detailed note on philosophy and significance of wildlife. 8

(b) Differentiate between *ex-situ* and *in-situ* conservation. 7

Q 7(a) Define wetlands and Ramsar sites. Write down the criteria on the basis of which a wetland is classified as Ramsar site. 8

(b) Define protected area and IUCN categories of protected areas. 7

Q 8 (a) Define National Park. How many national parks are there in Pakistan? Write detailed note on any two of them 6

(b) Write brief notes on the following animals; 9

i. Indus Dolphin ii. Brown Bear iii. Snow Leopard

Q 9 What area the rules that are followed for zoo management? 15