



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: I (Environmental Biology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

Q. 1	a.	Discuss biology of TROPICAL FORESTS as the highest BIODIVERSITY BIOMES.	8
	b.	Discuss PHYSICAL, CHEMICAL and BIOLOGICAL features of SEA SHORE.	7
Q. 2	a.	Discuss the basic principles involved in MANAGEMENT of RENEWABLE NATURAL RESOURCES.	7
	b.	“AGE STRUCTURE of a population is indicator of its history of survival and future potentials of its growth.” Comment the statement.	8
Q. 3	a.	“BIOLOGICAL SUCCESSION is outcome of instability present in the ecosystem.” Discuss the statement.	9
	b.	How can RANGELANDS be sustainably managed to produce more meat?	6
Q. 4	a.	“SYMBIOSIS presents peak aspired for any INTER-SPECIFIC relationship.” Can you justify the statement?	9
	b.	Discuss POINT and NON-POINT SOURCE POLLUTANTS, giving suitable examples.	6
Q. 5	a.	Define ECOLOGICAL POPULATION. Give MATHEMATICAL DESCRIPTION of GEOMETRIC POPULATION GROWTH.	8
	b.	Describe FOOD CHAIN and FOOD WEB, giving suitable examples.	7
Q. 6	a.	Discuss the EVOLUTION of ANIMAL BEHAVIOUR in a MAJOR COMMUNITY.	8
	b.	Define LIMITING FACTOR. Give an account of possible limiting factors of an AQUATIC ECOSYSTEM.	7
Q. 7	a.	Discuss ECOCRISES and its management during ECOLOGICAL DISASTER.	7
	b.	Discuss GREENHOUSE EFFECT and its impact on ECOSPHERE.	8
Q. 8	a.	How is the PRIMARY PRODUCTIVITY regulated by PHYSICAL ECOLOGICAL FACTORS?	8
	b.	Discuss CHEMICAL PESTICIDES as ECOLOGICAL HAZARDS.	7
Q. 9		Write short but descriptive notes on: a. PREDATOR-PREY RELATIONSHIP b. OZONE LAYER c. CFC's (Chlorofluorocarbons)	3X5

# UNIVERSITY OF THE PUNJAB



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

Roll No. ....

Subject: Zoology

TIME ALLOWED: 3 hrs.

PAPER: II (Evolution and Principles of Systematic Zoology)

MAX. MARKS: 75

**NOTE: Attempt FIVE questions: THREE from Part A and TWO from Part B.**

## PART A

- |       |  |    |
|-------|--|----|
| Q1.   | What is rate of evolution? How theory of Punctuated Equilibrium is related with rate of evolution.     | 15 |
| Q2.   | How natural selection maintain polymorphism in population?   | 15 |
| Q3.   | Discuss theories of phyletic gradualism and punctuated equilibrium in the light of rates of evolution. | 15 |
| Q4    | Explain Fisher and Zahavi's theory of sexual selection.  | 15 |
| Q5. a | Discuss density dependent selection.   | 8  |
| b     | Discuss group as a unit of selection.  | 7  |

## PART B

- |       |   |   |
|-------|---|---|
| Q6. a | Describe Typological species concept and difficulties in its application. | 8 |
| b     | Discuss role of First Reviser Principle in the stability of nomenclature. | 7 |
| Q7. a | Discuss the concept of subspecies.  | 8 |
| b     | Describe the conditions which cause change in nomenclature of taxa.       | 7 |
| Q8. a | Discuss Biological species concept and difficulties in its application.   | 7 |
| b     | Define speciation. Describe different modes of speciation.                | 8 |
| Q9.   | Write notes on the followings   |   |
| a     | Cohesion species concept  | 8 |
| b     | Scope of animal collection  | 7 |



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology

PAPER: III (Zoogeography & Principles of Palaeontology)

TIME ALLOWED: 3 hrs.

MAX. MARKS: 75

**NOTE: Attempt any FIVE questions. Select at least TWO questions from each part.  
All questions carry equal marks.**

## Part- I (Paleontology)

- Q 1: Write Note on; (a). Fission Track Dating (b). Carbon dating (8+7) 15
- Q 2: Describe the following; (a) Igneous Rocks (b) Metamorphic Rocks (8+7) 15
- Q 3: Write down the evolutionary history of Elephants 15
- Q 4: Write short note on; (a) Cro-Magnon Man (b) Paleomagnetism (c) *Hipparion* 15
- Q 5: Write a detailed note on Cenozoic Life 15

## Part- II (Zoogeography)

- Q 6: Give in detail Physical Features, Climate and Fauna of Australian Region 15
- Q 7: Describe Barriers and Means of Dispersal for Terrestrial Animals 15
- Q 8: Write Note on; (a) Discontinuous Distribution (b) Ancient Islands (8+7) 15
- Q 9: Describe in detail the Continental Drift Theory 15
- Q 10: Write in detail the Continental Islands 15

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*Part-II* A/2016  
Examination:- M.A./M.Sc.

Roll No. ....

Subject: Zoology

PAPER: IV-IB (Entomology 'B')

Classification of Insects and Pest Management)

TIME ALLOWED: 3 hrs.

MAX. MARKS: 75

**NOTE: Attempt FIVE questions selecting THREE from section-I and TWO from Section-II**

## SECTION-I

- Q.1. a) What are the diagnostic features of Hymenoptera? 3,12  
b) Describe important features and economic importance of any three families of Hymenoptera.
- Q.2. a) Differentiate between a wasp and ant. 3,12  
b) Give diagnostic features and economic importance of the followings:  
iii) Lampyridae ii) Aphidae iii) Cicadidae
- Q.3. Describe details of the followings: 15  
ii) Dermoptera ii) Odonata
- Q.4. What is a pest? Explain different pests of cotton in detail. 3,12
- Q.5. Write notes on the followings: 15  
iii) Siphunculata ii) Phasmida

## SECTION-II

- Q.6. a) What is meant by integrated pest management? 3,12  
b) Describe different strategies involved in integrated pest management.
- Q.7. Give details of pyrethroid insecticides and their mode of action. 15
- Q.8. Discuss different biological control agents and their benefits. 15
- Q.9. Write notes on the following: 15  
a) Colonisation  
b) Beneficial organism



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

**Subject: Zoology**  
**PAPER: IV-3A (Physiology -A)**

**TIME ALLOWED: 3 hrs.**  
**MAX. MARKS: 75**

**NOTE: Attempt any FIVE questions. All questions carry equal marks. Support your account with illustration's where necessary.**

- |       |   |    |
|-------|---|----|
| Q. 1. | Discuss, in detail, the structure and function of G Protein-Coupled receptors.  | 15 |
| Q. 2. | Discuss, comprehensively, the mechanism of action of Insulin involving Cell signaling by Receptor Tyrosine Kinase.          | 15 |
| Q. 3. | Give a detailed account of abnormalities of growth hormone secretion.   | 15 |
| Q. 4. | Describe, in detail, the causes and consequences of rickets in children and adults.   | 15 |
| Q. 5. | a) Give a detailed account of sliding filament mechanism of muscle contraction.   | 9  |
|       | b) Briefly describe the functions (any three) of muscular tissue  | 6  |
| Q. 6  | a) With the help of labeled figures only, show the hypothalamic control of anterior and posterior lobes of pituitary gland. | 6  |
|       | b) Give a brief account of the hormones of anterior pituitary gland.  | 9  |
| Q.7.  | a) Give a detailed account of transmission of nerve signal to the next cell.  | 10 |
|       | b) Write a note on electroencephalogram.  | 5  |
| Q. 8. | Describe, in detail, the role of human ear in maintaining equilibrium   | 15 |
| Q. 9. | a) Comprehensively, account, depression and Manic-depressive psychoses  | 8  |
|       | b) Account Schizophrenia, in detail   | 7  |



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology

PAPER: IV-5A (Microbiology 'A'  
General Microbiology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q.No.1 Describe various methods of selection of microorganisms used in microbiology. 15
- Q.No.2
- (a) Describe various nutritional groups of bacteria based on their energy and carbon sources. 7.5
- (b) Write a brief note about different types of growth media used for the cultivation of microorganisms. 7.5
- Q.No.3 Write a comprehensive essay on different types of methods for isolating pure cultures. 15
- Q.No.4 Discuss in detail different growth phases of a typical bacterium. 15  
Draw a typical growth curve and label it.
- Q.No.5 Describe different types of microscopes used in microbiology. Elaborate the principle and usage of phase contrast microscope with more details. 15
- Q.No.6 Write a detailed essay on biological and economic importance of algae. 15
- Q.No.7 Write down differences between following groups, give examples: 7.5
- (a) Autotrophs & Heterotrophs 7.5
- (b) Phototrophs & Chemotrophs
- Q.No.8 Describe the hydrodynamics of bacterial flagella. Discuss mechanisms for peritrichous movements in flagella. 15
- Q.No.9 Describe various methods of maintenance and preservation of pure cultures. 15

# UNIVERSITY OF THE PUNJAB



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

Roll No. ....

Subject: Zoology  
PAPER: IV-6A (Fisheries 'A'  
Principles of Fish Biology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q. # 1: Compare the taxonomic characters of family CYPRINIDAE and SILURIDAE.
- Q. # 2: Write a note on the different FEEDING MODIFICATIONS of mouth and major FEEDING GROUPS in fishes.
- Q. # 3: Discuss GILLS, BLOOD and SWIM BLADDER in fishes.
- Q. # 4: Describe various types of FIN RAYS and SPINES in fishes, draw diagrams also.
- Q. # 5: Describe FRESHWATER ECOSYSTEM in detail.
- Q. # 6: Write a comprehensive note on EVOLUTION IN FISH.
- Q. # 7: Describe the structure of HEART and KIDNEY in fish, sketch the diagrams also.
- Q. # 8: Write a note on SKELETON, EYES and GONADES in fishes.
- Q. # 9: Write a note on the following:  
a) Barbells in fishes  
b) Tilapia Culture

# UNIVERSITY OF THE PUNJAB



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

Roll No. ....

**Subject: Zoology**  
**PAPER: IV-3B (Physiology 'B')**

**TIME ALLOWED: 3 hrs.**  
**MAX. MARKS: 75**

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

Q.1	Explain cardiac cycle and its regulation.	15
Q.2	Describe fine structure and function of glomerulus.	15
Q.3	Describe the fine structure and functions of the nephron and collecting ducts.	15
Q.4	Explain in detail the function of respiratory epithelium of lungs.	15
Q.5	Write a note on hepatic structure and functions.	15
Q.6	Explain physiological actions of gastrointestinal hormones.	15
Q.7	Describe structure and functions of salivary glands.	15
Q.8	Describe Ischemic heart disease (IHD). How stenosis is induced in IHD.	15
Q.9	Write note on the following: a) Cystic fibrosis in bronchiole b) Structure and function of Parietal cells in stomach c) Liver necrosis	15





# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology

PAPER: IV-5B (Microbiology-B  
Applied Microbiology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q. 1 a) Discuss the characteristics of an ideal antimicrobial chemical agent. 10  
b) Discuss the process of microbial infection. 5
- Q. 2 Give an account on various methods of food preservation 15
- Q. 3 a) What are the main methods of development of resistance to antibiotics? 8  
b) What are the major roles of microbial biotechnology for human therapy? 7
- Q. 4 a) What is A-B toxin? Describe the tetanus toxin in detail. 8  
b) Describe the internal defense mechanisms against pathogens. 7
- Q. 5 Give a detailed account on different classes of immunoglobulin. 15
- Q. 6 a) Give an account on role of microorganism in nitrogen cycle. 8  
b) Write the pharmacological effects of endotoxin 7
- Q. 7 a) What is meant by activated sludge? Explain 5  
b) Write a note on natural waters 5  
c) Define the terms 5  
a- Nuisance organisms  
b- BOD  
c- Coliform  
d- Composting  
e- Lagoons
- Q. 8 a) Give a detail account of moist and dry heat method for sterilization. 10  
b) Discuss the microbial susceptibility to chemotherapeutic agents. 5
- Q. 9 Describe various aspects of microbial involvement in petroleum. 15



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology

PAPER: IV-6B (Fisheries 'B')

Fish Physiology and Breeding)

TIME ALLOWED: 3 hrs.

MAX. MARKS: 75

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

- |   |         |
|---|---------|
| Q.No.1.a. Describe various feed ingredients obtained from plants.                   | 9, 6    |
| b. Write a note on stomach of fishes.   |         |
| Q.No.2.a. Discuss how osmoregulation is controlled by endocrine glands?             | 8, 7    |
| b. Discuss the origin and morphology of swim bladder in fish.                       |         |
| Q.No.3. Describe morphology and ratio of various blood cells in fishes.             | 15      |
| Q.No.4.a. Give a detailed account on arterial system in fishes.                     | 5, 10   |
| b. Describe the structure and function of gills in freshwater fishes.               |         |
| Q.No.5.a. Describe the structure and function of ovaries in fishes.                 | 8, 7    |
| b. What is hormonal induced breeding in major carps?                                |         |
| Q.No.6. Give an account of the structure and function of kidney in freshwater fish. | 15      |
| Q.No.7. Write a note on migration in fish.  | 15      |
| Q.No.8. Explain cleavage and gastrulation in fishes.                                | 15      |
| Q.No.9. Write short notes on  | 5, 5, 5 |
| a. Fish lungs   |         |
| b. Extensive fish culture   |         |
| c. Pituitary gland in fish  |         |



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: V-1 (Integrated Pest Management)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q. 1. a) Derive the equation:  $EIL = \frac{C}{vbK}$  10  
b) Give names of any five Microbial insecticides. 5
- Q. 2. a) What do you know about **Do-Nothing** strategy and **Reduce-Crop-Susceptibility** strategy? 5, 5  
b) Compare **Sub-economical** and **Occasional** pests. 5
- Q. 3. What are **TRANSGENIC PLANTS**? Discuss the benefits and risks of transgenic plants. 3, 12
- Q. 4. Give a comprehensive account of the following: 7<sup>1/2</sup>, 7<sup>1/2</sup>  
i) Types of **INSECTICIDE FORMULATIONS**  
ii) **STERILE INSECT** Techniques
- Q. 5. a) Give a detailed account of **BOTANICALS**. 10  
b) How does **IPM** differ from **Organic**? 5
- Q. 6. Describe **TWO METHODS** of insect sterilization. 7<sup>1/2</sup>, 7<sup>1/2</sup>
- Q. 7. Describe the **ECOLOGICAL** and **INDUCED RESISTANCE**. 7<sup>1/2</sup>, 7<sup>1/2</sup>
- Q. 8. Differentiate between the followings: 3, 3, 3, 3, 3  
i) Perennial and Severe Pests  
ii) Primary and Tertiary Parasitoids  
iii) Pheromones and Hormones  
iv) Fixed and Descriptive Economic Threshold  
v) Polyphagous and Monophagous Parasitoids
- Q. 9. a) What role do **TRAP CROP** and **INTERCROPING** play in ecological management of insect pests? 5, 5  
b) What do you understand by the term **Degree Days** 5



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: V-7 (Molecular and Clinical Endocrinology  
Molecular Endocrinology of Steroids)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

**NOTE: Attempt any FIVE questions. All questions carry equal marks. Support your account with illustrations, where necessary.**

- |       |   |    |
|-------|---|----|
| Q. 1. | Comprehensively, describe the characteristic features of Idiopathic nontoxic colloid goiter and Cretinism.  | 15 |
| Q. 2. | Give a detailed account of Abnormalities of Growth hormone secretion.   | 15 |
| Q. 3. | With the help of an example of Glucose mobilization, elaborate the signal transduction response of cAMP derived second messenger system.                          | 15 |
| Q. 4. | Give a detailed account of causes, consequences and treatment options of Hyperadrenalism-Cushing's syndrome.  | 15 |
| Q. 5. | Describe, in detail, the causes and consequences of rickets in children.  | 15 |
| Q. 6. | In Cell-signaling pathways, describe, with the help of a G-protein cycle, the involvement of GTP-binding proteins as switches that turn the activities on or off. | 15 |
| Q. 7. | Describe, in detail, the causes and consequences of Type 1 Diabetes mellitus.   | 15 |
| Q. 8. | Discuss, comprehensively, the mechanism of action of Insulin involving Cell signaling by Receptor Tyrosine Kinase.  | 15 |
| Q. 9. | Write notes on the following:<br>a) Abnormal conditions that cause female sterility   | 8  |
|       | b) Insulinoma   | 7  |



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

**Subject: Zoology**  
**PAPER: V-16 (Applied Fisheries)**

**TIME ALLOWED: 3 hrs.**  
**MAX. MARKS: 75**

**NOTE: Attempt any FOUR questions. All questions carry equal marks.**

1. What are the types of fish ponds? What are the limiting factors in fish growth? (9, 10)
2. What is composite fish culture, discuss its benefits. How freshwater aquaculture is different from saltwater aquaculture? (10, 9)
3. What is the difference between natural and artificial breeding of fish? Discuss the mechanism of hormone induced reproduction of *Labeo rohita*. (9, 10)
4. Discuss the role of organic and inorganic fertilizers in fish ponds. Why liming in fish ponds is important? (12, 7)
5. Discuss different fish enemies in detail. Prepare a chart of monthly activities to be done on a fish farm. (10, 9)
6. What are the fish quality and food safety issues of seafood products? Discuss in detail fish harvesting and the post-harvest management. (14)
7. Write short note on the following (5, 4, 5, 5)
  - a) Water quality
  - b) Integrated aquaculture
  - c) Aquatic weeds and their control
  - d) Common bacterial diseases of carps



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: V-18 (Fundamentals of Microbiology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q. No. 1 a- Discuss different nutritional types of bacteria with respect to their carbon and energy sources. 10  
b- Mention different modes of bacterial cell division. 05
- Q. No. 2 a- Give grouping of bacteria with respect to their optimum pH. 05  
b- Describe different methods of maintenance and preservation of bacterial cultures. 10
- Q. No. 3 a- Write a note on importance and formation of bacterial capsules. 05  
b- Discuss major characteristics of microorganisms taken into account while characterizing and identifying them. 10
- Q. No. 4 Discuss different types of bacteriological media and their specific applications. 15
- Q. No. 5 How would you determine number of generations that have taken place within a period of 24 hrs if you knew the initial (at time of inoculation) bacterial population and the population after growth has occurred. 15
- Q. No. 6 Give a detail account of history of microbiology as a foundation of modern science. 15
- Q. No. 7 a- Discuss distinguishing characteristics and importance of fungi. 10  
b- Write a note on cultivation of fungi. 05
- Q. No. 8 Give a detailed account of contributions of Robert Koch to the development of medical microbiology. 15
- Q. No. 9 Write a brief note on the followings:  
a- Rickettsias 05  
b- Psychrophiles and Thermophiles 05  
c- Replication of bacteriophages 05



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

Roll No. ....

Subject: Zoology  
PAPER: V-17 (Fish Disease & Health Management)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q.No.1 Describe different methods of fish disease control.
- Q. No.2 What are Nutritional diseases in fish and how these effect fishes?
- Q. No.3 Describe Abdominal Dropsy in fish and its treatment.
- Q. No. 4 What is impact of water quality on fish health?
- Q. No. 5 Explain infection, pathology and treatment of Bacterial kidney disease in fish.
- Q. No.6 Describe *Lernaeosis* disease in fish and its treatment.
- Q. No.7 Describe white spot in fish and its treatment.
- Q. No.8 Describe Viral *Hemorrhagic Septicemia* in fish and its control.
- Q. No.9 Write note on following:
- i. Intensive Fish Culture.
  - ii. *Posthodiplostomum cuticola*



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: V-20 (Mammalogy)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

**NOTE: Attempt any FIVE questions. Each question carries equal marks.**

1	Give an account of the Structural Peculiarities and Distribution of Metatheria.	15
2	Write Orders and Distribution of the following mammals. Give one Specific Name for each mammal also. iii. Mongoose                      ii. Northern Palm Squirrel iii. Snow Leopard                  iv. Rhinoceros v. Porcupine                          vi. Flying Fox vii. Asian Elephant                viii. Flying Phalanger ix. Walrus                              x. Whale	1.5 X 10
3	Discuss the following: (a) Specialization in mammalian teeth. (b) Feeding and food storage in mammals (c) Hibernation and Aestivation	5+5+5
4	Give diagnostic features of Order Carnivora. Also differentiate between Pinnipedia and Fissipedia.	7.5 + 7.5
5	(a) Define and explain Territory and Territoriality. (b) Write a note on Prototheria.	7.5 + 7.5
6	(a) Differentiate between Cetacea and Sirenia. (b) Differentiate between African and Asian Elephants.	7.5+7.5
7	Give an account of the diagnostic features and affinities of Mammals.	15
8	Differentiate between the following: (a) Artiodactyla and Perissodactyla (b) Horn and Antlers (c) Plantigrade and Digitigrade	5+5+5
9	Discuss Evolution of mammalian Molar according to Triassic Theory	15



# UNIVERSITY OF THE PUNJAB



Part-II A/2016  
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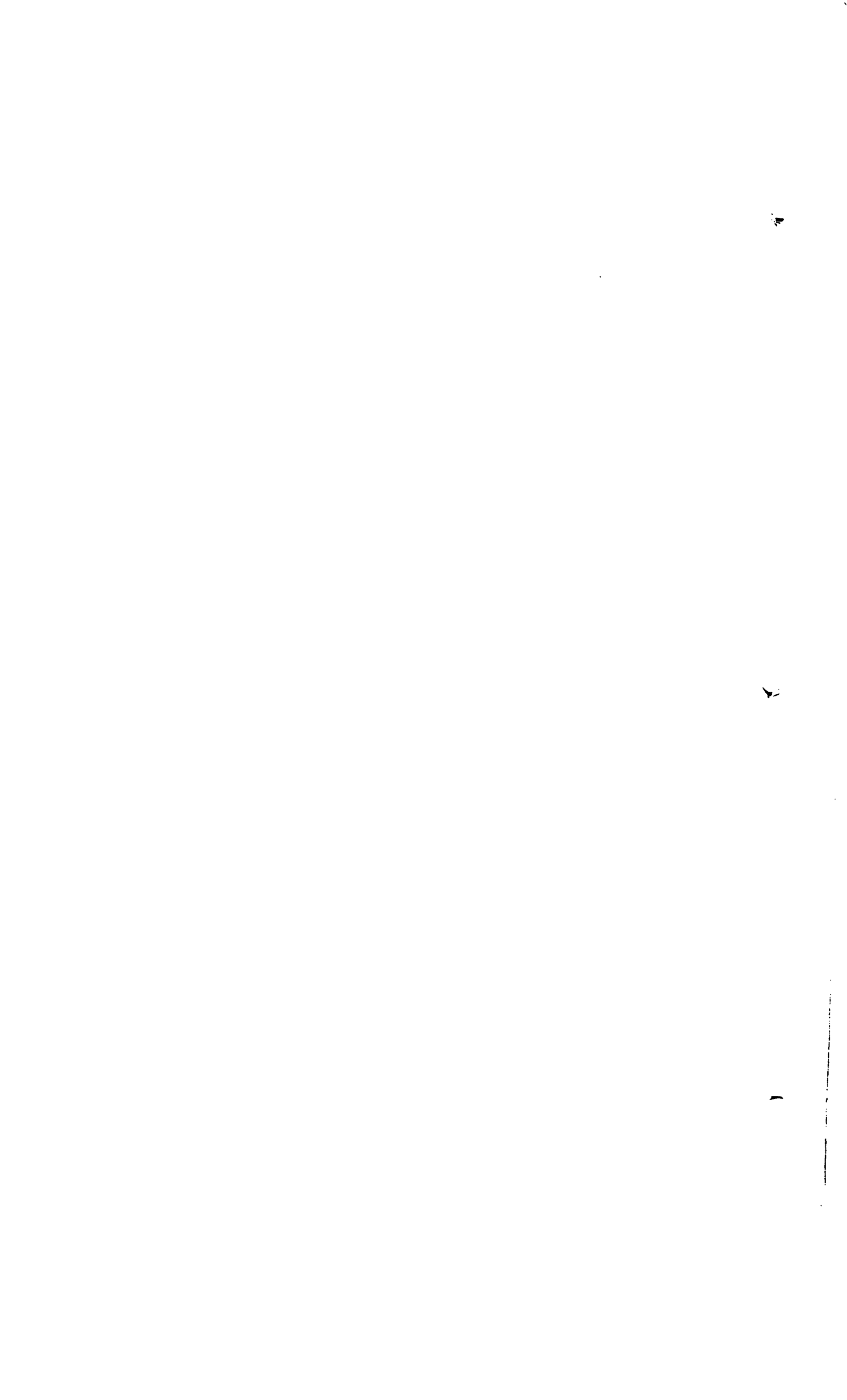
Roll No. ....

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

Subject: Zoology  
PAPER: V-21 (Immunology)

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

Q. No.	Question	Marks
1	Define innate immunity. Discuss the role of skin, mucosal surface and physiological barrier in defense system.	15
2	Define antibody. Describe structure and function of IgG. Also compare structure of IgM, IgG and IgA.	15
3	What are primary and secondary lymphoid organs. Explain the structure and functions of thymus and spleen in detail.	15
4	Draw and explain structure of antibody, Describe the mechanisms of variable region rearrangements in detail.	15
5	Define MHC molecules. Describe structure and function of class I MHC molecules and class II MHC molecules.	15
6	Define antigens. Describe the factors affecting immunogenicity of an antigen.	15
7	Enlist various immunodiagnostic techniques. Explain principal and procedure of different types of ELISA	15
8	What are monoclonal antibodies how they are synthesized	15



# UNIVERSITY OF THE PUNJAB



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

Roll No. ....

Subject: Zoology  
PAPER: V-26 (Human Embryology & Teratology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

- Q. 1. Describe the process of gastrulation in humans. 15
- Q. 2. Enlist the drugs as teratogens, with brief account of their harmful effects. 15
- Q. 3. Describe the development of human testis, emphasizing the origin of primordial germ cells. 15
- Q. 4. Describe the development of Brain in humans 15
- Q. 5. Describe the development of cranium with special reference to its developmental defects. 15
- Q. 6. Describe the development of female reproductive duct system with a note on the anomalies found in this organ. 15
- Q. 7. Describe the differentiation of gut with emphasis on the developmental anomalies of liver 15
- Q. 8. Describe the development of Eye in human's emphasizing on the process of induction. 15
- Q. 9. Write notes on the following: 3x5= 15
- I. Abortion
  - II. Sperm capacitation
  - III. Extra embryonic membranes



# UNIVERSITY OF THE PUNJAB

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

Roll No. ....

Subject: Zoology  
PAPER: V-29 (Molecular Biology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

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

Serial No. of Question	Questions	No. of Marks
Q.1.	a) Give the biochemical structure of DNA and RNA.	8
	b) Explain the process of initiation of DNA replication in prokaryotes	7
Q.2.	a) Describe the structure of a nucleosome. What is 30nm fiber?	7.5
	b) Explain the nucleosome remodeling and nucleosome positioning.	7.5
Q.3.	(a) Describe the process of transcription initiation of 5S rRNA genes by RNA polymerase III.	7
	b) Describe the structure and function of spacer DNA in rDNA gene repeat.	8
Q.4.	a) Describe the processing of mRNA in eukaryotes? Explain the role of snRNPs in mRNA processing.	7
	(b) Enlist the chemical post-translational modifications. Give detail of phosphorylation, glycosylation and acetylation	8
Q.5.	What are vectors? Give its various types and describe the characteristics of each type of vectors.	15
Q.6	(a) What is DNA finger printing and DNA typing? Explain their forensic uses.	9
	(b) What are expression vectors? Give method for expressing a cloned gene.	6
Q.7.	a) Discuss the characteristics of three RNA polymerases of eukaryotes and structure of their respective promoters.	8
	b) What are mutations? Describe the effects of missense, non-sense and silent mutations.	7
Q.8.	Give an account of <i>lac</i> operon.	15
Q.9.	Write notes on two of the following:	(7.5X2)=
	(a) General transcription factor.	15
	(b) Give comparison of initiation, elongation and termination factors in bacteria and eukaryotes	
	(c) Effect of oxidation and alkylation on DNA molecule	

# UNIVERSITY OF THE PUNJAB



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

Roll No. ....

Subject: Zoology  
PAPER: V-30 (Virology & Viruses)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

*NOTE: Attempt any FOUR questions. All questions carry equal marks.*

1.	Give a comprehensive account of the virus structure and genetic composition.	18.75
2.	Describe the Transmission of viruses via vector in detail.	18.75
3.	Give comprehensive account on the viral attachment and entry into the host cells.	18.75
4.	Define plus and minus strand of RNA. Explain the Single stranded and double stranded RNA replication.	18.75
5.	Define an ORF (open reading frame). Explain the translation of viral genes in the eukaryotic host cells.	18.75
6.	What is Hepatitis? Enlist its types. Explain the life cycle of Hepatitis C-Virus.	18.75
7.	Discuss in detail the formation of virion membranes during assembly of the ciruses.	18.75