



UNIVERSITY OF THE PUNJAB

Part-II A/2015
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.	Define a HYDROLOGICAL CYCLE. How is it important for stability of ecosystem.	8
	b.	Discuss the ORIGIN of SOLAR SYSTEM and the EARTH.	7
Q. 2	a.	What is EUTROPHICATION? Discuss the role of PHOSPHORUS in aquatic ecosystem.	8
	b.	Discuss characteristics features of stream and river ecology.	7
Q. 3	a.	What is a BIOLOGICAL SUCCESSION? Discuss fundamental principles controlling succession.	7
	b.	Discuss different strategies adopted by a species to resolve the bad effects of INTRA-SPECIFIC and INTER-SPECIFIC COMPETITION.	8
Q. 4	a.	Write a detailed account of possible sources, composition and fate of water pollution.	7
	b.	Give an account of OZONE DEPLETING CHEMICALS produced through human activities.	8
Q. 5	a.	How do the feeding activities of a KEYSTONE SPECIES control the COMMUNITY STRUCTURE?	8
	b.	Write an essay on the CHEMICAL WARFARE.	7
Q. 6.	a.	What are GREENHOUSE GASES? How are these effecting organisms?	9
	b.	Discuss management of agriculture as a renewable resource.	6
Q. 7	a.	Give an account of PRIMARY PRODUCTIVITY in TERRESTRIAL ecosystem.	7
	b.	How does DEFORESTATION affect the life on the earth? What are the future challenges to mitigate the effects of deforestation?	8
Q. 8	a.	Discuss DIOXINS and PCBs as TOXIC land pollutants.	7
	b.	Discuss different patterns of POPULATION GROWTH when there are no environmental restrains on its growth.	8
Q. 9		Write short but descriptive notes on: a. ENVIRONMENTAL LAWS b. MTBEs (Methyl Tertiary Butyl Ether) c. GLOBAL WARMING	3X5



UNIVERSITY OF THE PUNJAB

Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology

PAPER: II (Evolution and Principles of Systematic Zoology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

PART A

- | | | |
|-------|--|----|
| Q1. | What are adaptations? Discuss causes of imperfect adaptations. | 15 |
| Q2. | Describe role of mutation, genetic drift and inbreeding in microevolution. | 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 | What are the causes of polymorphism in population? | 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 the importance of taxonomic collection. | |
| b | Define speciation. Describe different modes of speciation. | 7 |
| Q9. | Write notes on the followings | 8 |
| a | Density dependent variation | 8 |
| b | Scope of animal collection | 7 |



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Part-II A/2015
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: Draw Chart of Geological Time Scale showing Eras, Periods and Epochs 15
- Q 2: Explain the following; (a) Igneous Rocks (b) Metamorphic Rocks (8+7)15
- Q 3: Write Note on; (a). Fission Track Dating (b). Carbon dating (8+7)15
- Q 4: Write the evolutionary history of Camels 15
- Q 5: Write short notes on the following: (a) *Equus* (b) *Australopithecus* (c) *Deinotherium* 15

Part- II (Zoogeography)

- Q 6: Write Note on the following;
- (a) Wallace Line (b) Discontinuous Distribution (c) Ancient Islands (5+5+5)15
- Q 7: Give in detail the Physical Features, Climate and Fauna of Ethiopian Region 15
- Q 8: Give extent, physical features, climate and fauna of Nearctic Region 15
- Q 9: Give the Zoogeographical Distribution of the following animals;
- (i) Spider monkey (ii) Cuckoo (iii) Gibbons (iv) Gecko (v) Opossum
- (vi) Salamander (vii) Owls (viii) Peacock (ix) Eel (x) Rhea (1.5 each) 15
- Q 10: Describe the Faunal Distribution of Palaearctic Region 15



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Roll No.

Subject: Zoology
PAPER: IV-I-A (Entomology 'A')

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q.1	What do you understand by aerodynamic theory of insects flight? How does wing coupling takes place in insects?	15
Q.2	Write down reasons of success of insects in diverse environment.	15
Q.3	What are two important parts of endoskeleton? Discuss briefly.	15
Q.4	Write down different types of insect communication.	15
Q.5	Define Entomology, write down segmentation and divisions of insect body.	15
Q.6	Write short notes on i. Primitive wing venation ii. Viviparity iii. Insect metamorphosis	15 (3x5)
Q.7	Differentiate between the following i. Epicuticle and Procuticle ii. Polyembryony and Hermaphroditism iii. Haemocytes and Nephrocytes iv. Trachea and Air sac v. Parasite and Parasitoid.	15 (5x3)
Q.8	Describe wing venation and wing coupling apparatus in insects.	15
Q.9	a) Write down methods of sound production in insects b) How sound is produced by cicada?	15 (7+8)



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Part-II A/2015
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. 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 Write note on any three:
- (a) Acidophiles 05
- (b) Thermophiles 05
- (c) Alkaliphiles 05
- (d) Psychrophiles 05
- (e) Halophiles 05
- 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:
- (a) Autotrophs & Heterotrophs 7.5
- (b) Phototrophs & Chemotrophs 7.5
- Q.No.8 Describe the hydrodynamics of bacterial flagella. Discuss mechanisms for peritrichous movements in flagella. 15
- Q.No.9 Describe with details all the possible differences between Gram's negative and Gram's positive bacteria. Draw diagrams where necessary. 15

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Part-II A/2015
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: DIFFERENTIATE between morphological characteristics of CARP and CAT FISH.
- Q. # 2: Describe various BODY COVERINGS, APPENDAGES, and OPENINGS of fish body?
- Q. # 3: Discuss types of KIDNEY in fish. Draw a labeled diagram to explain.
- Q. # 4: Write a comparative note on HEART in different groups of fishes, draw the diagrams also.
- Q. # 5: Describe the ZONATION IN OCEANS. Give the examples of fishes in various zones.
- Q. # 6: What do you know about EARLY JAWED and BONY FISHES with reference to evolution?
- Q. # 7: Compare DIGESTIVE SYSTEM in herbivore and carnivore fishes.
- Q # 8: Discuss in detail the FISH CULTURE IN PAKISTAN.
- Q. # 9: Write a note on the following:
a) Composite culture of carps
b) Tilapia Culture

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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: IV-7A (Principles of Environmental Health)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

- Q No.1. (a). Write a note on pollution prevention techniques for sustainable societies and cities (8).
(b). Why environmental justice is essential for ecosystems (7).
- Q No.2. (a). How ecosystem respond to the environmental degradation and make its sustainable? (8).
(b). How can we reduce the air pollution from the atmosphere (7).
- Q No.3. (a). What are the major features of thermodynamics of an aqueous ecosystem? (8).
(b). Analyze and compare the unsustainable and sustainable society? (8)
- Q No.4. (a). How can we relate the emergence of pest with predator- prey imbalance (7).
(b). Write a note on environmental toxicology and its application in various fields of science (8).
- Q No. 5. (a). Describe the chemical and physical properties of atmospheric aerosols and their measurements for management (8).
(b). What are the major causes for the loss of biodiversity in Pakistan (7).
- Q No. 6. (a). How primary pollutant are produce and convert into secondary air pollutants (8).
(b). Give an account on bio-aerosols and its implications on human health (7).
- Q No. 7. (a). Explain in detail the values of Ecosystem Capital. (8)
(b). Discus which groups of the animals are more vulnerable to synthetic chemical toxicity (8).
- Q No. 8. (a). What is the biological magnification? Describe the impacts of pollutants accumulation at higher trophic level (8).
(b). Describe indoor air pollution and give its impacts on the human health (8).
- Q No. 9. Write short notes on following (3 x 5 = 15)
- Municipal waste
 - Environment - animal interaction
 - Metals in aerosol

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Part-II A/2015
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

Attempt FIVE questions selecting THREE from section-I and TWO from Section-II.

SECTION-I

- Q.1. a) What are the diagnostic features of Diptera? 3,12
b) Describe important features and economic importance of any three families of Diptera.
- Q.2. a) Differentiate between Hemiptera and Hymenoptera. 3,12
b) Give diagnostic features and economic importance of the followings:
i) Cicadidae ii) Gelechiidae iii) Ichneumonidae
- Q.3. Describe details of the followings: 15
i) Embioptera ii) Thysanoptera
- Q.4. Give an account of economically important insects that attack cotton. 15
- Q.5. Write notes on the followings: 15
i) Neuroptera ii) Siphonaptera

SECTION-II

- Q.6. Write note on the followings. 15
a) Economic damage and economic boundary
b) Economic injury and economic threshold
c) Beneficial organism
- Q.7. Give details of Pyrethroid insecticides. 15
- Q.8. What are biological control? Discuss different steps involved in establishing biological control. 15
- Q.9. Write note on colonisation and attributes. 15



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Part-II A/2015
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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) | What are the characteristics of an ideal DISINFECTANT? Write the mode of action of any three disinfectants. | 12 |
| | b) | Enlist the factors that affect the process of STERILIZATION. | 3 |
| Q.2. | a) | Describe the modes of action of "ANTIBIOTICS". | 10 |
| | b) | Write a note on any one of the following: | 5 |
| | | a. Antiviral Chemotherapeutic agents | |
| | | b. Synthetic Chemotherapeutic agents | |
| Q.3. | a) | What is an AIR-BORNE DISEASE? What diseases are commonly spread by air-borne transmission? | 8 |
| | b) | What are A-B toxins? Explain structure and mode of action of cholera toxin. | 7 |
| Q.4. | a) | Describe the NONSPECIFIC defense mechanism. How do microbes fight against host defense mechanisms? | 10 |
| | b) | How do intact mucous membrane resist microbial invasion of the host? | 5 |
| Q.5. | a) | Differentiate between PATHOGENICITY and VIRULENCE. Explain virulence factors of pathogenic bacteria. | 10 |
| | b) | Briefly describe the process of microbial Infection. | 5 |
| Q.6. | a) | Outline the process of waste water treatment in small villages. How this water is disposed off? | 10 |
| | b) | What could be the possible consequences of disposal of inadequately treated waste water? | 5 |
| Q.7. | | Describe the antimicrobial action of the following methods of food preservation. | 15
(3 x5) |
| | a. | Canning | |
| | b. | Pasteurization | |
| | c. | Boiling | |
| | d. | Dehydration | |
| | e. | Food Irradiation | |
| Q.8. | a) | What is the importance of aquatic microbial ecosystem? Explain. | 8 |
| | b) | How do microbes help in biochemical transformation of carbon and carbon compounds? | 7 |
| Q.9. | a) | How the microbes are engineered for industrial purposes? | 10 |
| | b) | Explain the role of microbes in BIOREMEDIATION. | 5 |



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Part-II A/2015
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. Write a detailed note on osmoregulation in teleost fishes. 8,7
b. Write a comprehensive note on swim bladder of fishes.
- Q.No.2.a. Give a detailed account on the stomach of fishes. 7,8
b. Write a note on dry concentrates as fish feed supplements.
- Q.No.3.a. Describe morphology and ratio of various blood cells in fishes. 10,5
b. Discuss the role of gills in respiration.
- Q.No.4. Give a detailed account of the structure and function of kidney in freshwater fish. 15
- Q.No.5. Describe the process of seasonal maturation in fish and describe the factors affecting the process of maturation. 15
- Q.No.6.a. Describe hormonal induced breeding in freshwater fishes. 10,5
b. Write a note on spermatogenesis in fishes.
- Q.No.7. Write a detailed account on migration in fishes. 15
- Q.No.8.a. Explain cleavage in different groups of fishes. 9,6
b. Describe the structure and function of ovaries.
- Q.No.9. Write short note on the following: 5,5,5
a. Intensive fish culture
b. Lungs in fish
c. Extensive fish culture



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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: IV-7B (Ecosystem Health Dynamics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Attempt any FIVE questions. All questions carry equal marks.			
Q1.	a)	What is water pollution. What are the main environmental effects of water pollution.	10
	b)	Discuss some of the animal diseases caused by water pollution	5
Q2.	c)	What are pesticides and its residues. Explain different groups of pesticides with examples.	10
	d)	Describe hazards associated with food additives	5
Q3.		Define pollution. Describe air pollutants in detail. Also discuss harmful effects of air pollutants on animals and plants.	15
Q4.	a).	What do you mean by term toxicity. Explain different types of toxicants related to health.	10
	b).	Give an account of Freshwater Blooms.	5
Q5.		How is pollution affecting wildlife and what are different management strategies to control impacts of pollutants on wildlife.	15
Q6		What are Ecological indicators. Discuss its different types. How can lichen be used as biological indicator of air pollution.	15
Q7.	a).	What is noise pollution. Describe in detail sources of noise pollution	10
	c)	How is noise pollution affecting health	5
Q8.		Define biological markers. Write down in detail the application of biological markers to study risk of environmental pollutants.	10
Q9.		What is radiation. Discuss biological effects of radiation.	15



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Part-II A/2015
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. Why we use IPM? Describe different **INTEGRATED PEST MANAGEMENT** strategies and tactics 3, 12
- Q. 2. a) Give the **NAME OF THE LARVAE** of the following insects. 5
i) Butterfly ii) House fly iii) Firefly iv) Blowfly v) Dragonfly
- b) Give a detailed account of **FUMIGANTS** 10
- Q. 3. a) Give a detailed account of **ORGANOPHOSPHATES**. 10
b) Write a note on **NEONICOTINOIDS**. 5
- Q. 4. Write **NOTES** on the following with regard to economic injury level 9, 6
a) Degree of Injury per Insect b) Crop Susceptibility to Injury
- Q. 5. a) Give a detailed account of **BIOLOGICAL INSECTICIDES**. 10
b) How does repeated use of insecticides produce resistant variety of insects. 5
- Q. 6. a) Differentiate between **FIXED** and **DESCRIPTIVE** economic threshed. 5
b) Discuss the relationship between **ET** and **EIL**. 10
- Q. 7. a) Differentiate between **contact poison** and **stomach poisons**. 5
b) Give a detailed account of **BOTANICALS**. 10
- Q. 8. Describe different methods of **INSECT STERILIZATION**. 15
- Q. 9. a) Describe **REDUCE-NUMBER** Strategies 5
b) Write **SHORT NOTES** on the following: 10
i) Insect Equivalent ii) Carrying Capacity
iii) Synchronization iv) Occasional Pests
v) General Equilibrium Position



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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology

PAPER: (Biological & Chemical Control of Insects)

TIME ALLOWED: 3 hrs.

MAX. MARKS: 75

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

- | | | |
|-----|---|---------|
| Q1. | Give detail account on negative impacts of chemicals insecticides. | 15 |
| Q2 | What is Biological Control? Why it is considered better than using chemical pesticides? | 15 |
| Q3 | Give detail account on various natural predators of agricultural importance. | 15 |
| Q4 | a How can we manage insect pests of agricultural crops?
b What are the qualities of a good predator? | 10
5 |
| Q5. | a Give detail account on Economic thresh hold level and Economic injury level.
b Give five characters of a parasitoid. | 10
5 |
| Q6. | Explain various types of insecticides with respect to their functions. | 15 |
| Q7. | Give detail account on Pink Bollworm and Armyworm. | 15 |
| Q8. | What are the factors which affects density of natural predators in agro-ecosystems? | 15 |
| Q9. | Write conceptual definition of the following terms
a Types of pests
b Organophosphates
c Bio-pesticides | 15 |

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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: V-3 (Insect Classification Pests of Agriculture)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any FIVE questions selecting THREE from Section – I and TWO from Section – II.

SECTION-I

- Q.1. a) What are the diagnostic features of Hemiptera? 3,12
b) Describe important features and economic importance of any three families of Hemiptera. 1
- Q.2. a) Differentiate between hemimetabola and Holometabola. 3,12
b) Give diagnostic features and economic importance of the followings:
i) Scarabidae ii) Aphidae iii) Coccinellidae
- Q.3. Describe details of the followings: 15
i) Thysanura ii) Collembola
- Q.4. What is a pest? Explain different pests of rice in detail. 3,12
- Q.5. Write notes on the followings: 15
i) Dermoptera ii) Siphonaptera

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) Recovery



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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology

PAPER: V-7 (Molecular and Clinical Endocrinology)

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:
a) Abnormal conditions that cause female sterility 8
b) Insulinoma 7

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Part-II A/2015
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. How extensive aquaculture is different from intensive aquaculture? What is the difference between mono and poly-culture systems? (10, 9)
2. How pond liming improves water quality in a fish pond? Why earthen ponds require manuring and fertilization? (9, 10)
3. What are the important physico-chemical water quality parameters in aquaculture? Why monitoring of water quality parameters is important in intensive aquaculture? (10, 9)
4. What is difference between finfish and shellfish aquaculture? How freshwater aquaculture is different from saltwater aquaculture? (12, 7)
5. How land-based pond aquaculture is different from marine cage culture? How pond fertilization helps to increase pond productivity? (12, 7)
6. What are the common signs and symptoms of a diseased fish? What are the major bacterial fish diseases in carps and their control measures? (7, 12)
7. Write short notes on the following: (5,5,4,5)

- a) Planktons
- b) Pond engineering
- c) Water quality
- d) Integrated aquaculture



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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 black spot disease in fishes and its treatment.
- Q. No. 2 What do you know about costiosis disease of fish explain it?
- Q. No. 3 Dactylogyrosis is a serious gill disease discuss it.
- Q. No. 4 Discuss ichthyophonous disease, its transmission and pathology in fishes.
- Q. No. 5 Furunculosis is a serious disease of salmonids describe it.
- Q. No. 6 Describe Trichodinosis in fish and its treatment.
- Q. No. 7 Describe two Nutritional diseases occur in fish.
- Q. No. 8 Write notes on following:
- (i) *Aeromonas hydrophila*
 - (ii) *Gyrodactylus sp.*

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Part-II A/2015
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.1 a) Give a grouping of bacteria with respect to their optimum pH. 05
b) Discuss different methods of laboratory selection(Enrichment) of bacteria from natural samples 10
- Q.2 a) Discuss importance of lichens. 05
b) Discuss different nutritional types of bacteria with respect to their carbon and source of electrons. 10
- Q.3 Give a detail account of history of microbiology as a foundation of the modern sciences. 15
- Q.4 a) Discuss ecological importance of phytoplanktons. 05
b) Give grouping of bacteria with respect to their optimum gaseous requirements. 10
- Q.5 What is the importance of continuous culturing of bacteria? Describe methods by which continuous bacterial cultures are established. 15
- Q.6 Give a comprehensive note on normal growth cycle of bacteria with emphasis on transitional phases. 15
- Q.7 What is meant by bacteriological medium? Explain different types of media and their specific applications. 15
- Q.8 a) What do you know about bacteriophage-typing? 05
b) Discuss biological and economical importance of algae. 10
- Q.9 Write short notes on the followings: 05
a) Bacteriophages 05
b) Methanotrophs 05
c) Free living protozoa 05



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Part-II A/2015
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	Write Order and Distribution of the following mammals. a-Black Bear c-Rhinoceros e-Girraffe g-Musk Deer i-Squirrel b-Duck-Billed Platypus d-Vampire Bat f-Red Panda h-Sea Cow j-Hippopotamus	1.5x10
2	Write a note on the followings:- (a) Cetacea (b) Carnivora	7.5 7.5
3	Give an account of the Structural Peculiarities and Distribution of Metatheria.	15
4	Differentiate between :- (a) Artiodactyla and Perissodactyla (b) Chiroptera and Dermoptera	7.5 7.5
5	Discuss Evolution of Mammalian Molar according to Tritubercular Theory.	15
6	Discuss the following:- (a) Specialization in Mammalian Teeth. (b) Echolocation in Bats (c) Flight in Mammals	5 5 5
7	Give General Characters and Classification of Order Primate upto Families.	15
8	Write short notes on :- (a) Hibernation (b) Aestivation (c) Migration	5+5+5
9	What are the characteristics of :- (a) Triconodonta (b) Multituberculata (c) Symmetrodonta	5+5+5

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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: V-22 (Vector Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q.1 Define the followings

- | | |
|----------------------------|------------------------------|
| (I) Flame cells | (II) Allergic reaction |
| (III) Parasite | (IV) Zoonosis |
| (V) Complete metamorphosis | (VI) Paddles |
| (VII) Spiracles | (VIII) Omithophagous species |
| (IX) Reservoir | (X) Annoyance |

Q.2 Discuss morphology, life cycle, medical importance and control of sand flies

Q.3 Discuss morphology of the followings

- (I) Horse flies
- (II) Common house flies
- (III) Black flies

Q. 4 Discuss control of the followings

- (I) *Musca domestica*
- (II) Mosquito
- (III) Screw-worm

Q. 5 Discuss life cycle, morphology, medical importance and control of *Aedes aegypti*

Q. 6 Discuss medical importance of the followings

- (I) Horse flies
- (II) Black flies
- (III) Green bottle flies

Q. 7 What you understand the followings

- (I) Phoresis
- (II) Horizontal transmission (vector to vector)
- (III) Screw-worm

Q. 8 (a) Discuss myiasis in details

(b) Discuss Loiasis in details

Q. 9 Draw a neat and labelled diagram of the followings

- (I) Pupa of *Culex*
- (II) Larva of *Anopheles*
- (III) Larva of Tsetse fly

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Part-II A/2015
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.

- Q1. Write an essay on the age related human sperm and egg abnormalities
- Q2. Write an essay on human SPERM CAPACITATION and the events of fertilization
- Q3. Describe the development of human excretory system with emphasis on the development of kidney
- Q4. Write an essay on the development of human heart
- Q5. Write a comprehensive note on the development of eye
- Q6. Describe the events of implantation and the development of extra-embryonic membranes in human embryo
- Q7. Briefly discuss development of lungs in human embryo
- Q8. Give a detailed account of early cleavage and the events of implantation in human embryo
- Q9. Write short notes on:-
 - i, Embryonic body plan
 - ii, Spina bifida.
 - iii, Fertilization membrane



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Part-II A/2015
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) Briefly describe the experiments performed for the discovery of DNA.	7
	b) Explain DNA super coiling in detail.	8
Q.2.	a) Describe the RNA polymerase I promoter with the schematic diagram of rRNA transcription initiation.	7.5
	b) Illustrate the structure of TFIID and TATA binding protein (TBP) transcription factor and describe their functions.	7.5
Q.3.	Give an account of the transcription in prokaryotes.	15
Q.4.	a) Describe various types of physical and chemical mutagens which cause damage to DNA structure.	10
	(b) What is DNA lesion? Explain the mechanism of nucleotide excision repair.	5
Q.5.	a) Explain the mechanism involved in amplifying a gene by Real Time polymerase chain reaction (Real Time PCR).	7
	(b) Explain the technique of colony hybridization for the identification of a clone.	8
Q.6.	a) What is an attenuator? Explain the structure of attenuator and mechanism of attenuation in	10
Q.7.	<i>E.coli.</i>	5
	b) Describe positive regulation of <i>lac</i> operon.	5
Q.8.	a) What is 30nm fiber?	10
	b) Explain the nucleosome remodeling and nucleosome positioning.	15
Q.9.	Give an account DNA replication in Eukaryotes	
	Write notes on two of the following:	(7.5X2= 15)
	(a) tRNA processing in eukaryotes.	
	(b) General transcription factor.	
	(c) Forms of DNA (A, B and Z).	



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Part-II A/2015
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 on the properties of viruses. Discuss symmetry, genome, morphology as well as nature of viruses.	18.75
2.	How DNA viruses get replicated? Support your answer using example of SV40 (Polyoma) Virus.	18.75
3.	What do you know about adenoviruses? Give an account on replication and transcription of adenoviruses.	18.75
4.	What is viral genetics. Discuss "mutation can cause genomic change". Describe copy choice recombination in RNA viruses	18.75
5.	a. What are NEGATIVE-RNA Viruses? Exemplify with Rhabdovirus.	9
	b. What are strategies for RNA virus replication? Describe Positive RNA viruses in detail.	9.75
6.	What is Hepatitis? Enlist its types. Explain the life cycle of Hepatitis C-Virus.	18.75
7.	What are viruses? Write a comprehensive not on history of viruses.	18.75

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Part-II A/2015
Examination:- M.A./M.Sc.

Roll No.

Subject: Zoology
PAPER: V-42 (Ecological Modeling and Natural Photography)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Note: Attempt any five questions, all questions carry equal marks

Sr. No.	Questions	Marks
Q 1 (a)	What is meant by metapopulation? Discuss metapopulation models.	8
(b)	Write a note on basic principles kept in mind while photographing the bird in flight and aquatic system.	7
Q 2 (a)	Discuss limited and unlimited growth in detail.	8
(b)	Describe the importance and understanding of the different components of the ecology.	7
Q 3 (a)	Describe the needs the ecological modeling.	8
(b)	Discuss the conservation photography.	7
Q 4 (a)	Write a note on major components of camera.	8
(b)	Give an account on individual-based models.	7
Q 5 (a)	Describe the presentation of natural ecosystem in photography.	8
(b)	Describe the maintenance of photography camera.	7
Q 6 (a)	Discuss the relation between spatial auto-correlation with distance.	8
(b)	Describe the stochastic limited growth in detail.	7
Q 7 (a)	What is ecology? Describe the spatial models in ecology.	8
(b)	Describe photography use as a tool for conservation.	7
Q 8 (a)	Discuss the bridging between bottom-up and top-down approaches.	8
(b)	What do you understand by environmental changes?	7
Q 9	Write a short note on the following a) Factor affecting the field of vision b) Different types of camera c) Models with temporal variability	5x3=15