



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – II Supply – 2020 & Annual – 2021

Subject: Zoology

Paper: I (Environmental Biology)

Roll No.

Time: 3 Hrs. Marks: 75

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

1	i). Discuss in detail the movement of CARBON as an example of BIOGEOCHEMICAL CYCLE.	7
	ii). Define and explain the mechanism controlling BIOLOGICAL SUCCESSION.	8
2	i). Discuss conditions required for each of the two basic types of POPULATION GROWTH CURVES.	10
	ii). Discuss causes and effects of OZONE LAYER DEPLETION.	5
3	i). "All PREDATORS are KEYSTONE species." Do you support the statement?	8
	ii). "Present stability in ATMOSPHERE and OCEANS is net effect of series on past events." Justify the statement.	7
4	i). Discuss AGE STRUCTURE as a POPULATION CHARACTER.	8
	ii). "TREE PLANTATION is not an ideal alternative for NATURAL MANAGEMENT of FOREST RESOURCES." Discuss the statement.	7
5	i). Define and explain RADIATION POLLUTION.	9
	ii). "PREDATION and PARASITISM have role in controlling ECOLOGICAL POPULATIONS." Justify the statement?	6
6	"BIOLOGICAL WEAPONS are more hazardous than CHEMICAL WAREFARE in effecting national economy." Discuss the statement.	15
7	i). Discuss the SECOND LAW OF THERMODYNAMICS as it works in FOOD CHAIN.	7
	ii). Briefly describe ZONATION of SEA with ECOLOGICAL STANDPOINT.	8
8	i). What is DESERT and DESERTIFICATION? How are the DESERTS formed?	8
	ii). Define an ECOSYSTEM. How is HOMEOSTASIS maintained in an ECOSYSTEM?	7
9	i). Discuss AIR POLLUTION as it effects the life on the earth.	8
	ii). Discuss ENVIRONMENTAL PROBLEMS as these affect PUBLIC HEALTH and ECONOMIC PRODUCTIVITY of a nation.	7



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Roll No.

Time: 3 Hrs. Marks: 75

Subject: Zoology

Paper: II (Evolution and Principles of Systematic Zoology)

NOTE: Attempt any FIVE questions in all by selecting THREE questions from Part-A and TWO questions from Part-B. All questions carry equal marks.

PART A		
Q1.	Discuss the role of Mutations, Gene flow and Genetic drift in the process of evolution with the help of examples	15
Q2.	Describe Fisher and Zahavi theories of sexual selection in detail.	15
Q3.	a) What is the cost of selection? Explain b) Discuss reasons of imperfect adaptations in animals.	8 7
Q4.	How fitness is dependent of frequency of individuals? Explain in detail?	15
Q5.	Write notes on a) Allometry b) Genetic load c) Co-evolution	5x3
PART B		
Q6	a) Discuss the Typological Species Concept and problems in its applications. b) What are Polytypic Species? Explain	8 7
Q7	Describe types of Intrapopulation variations.	15
Q8	What is importance of Stability, Priority and First-Reviser Principle in nomenclature? Explain	15
Q9	Write note on a) Concept of taxon b) Phenetic classification c) Type of taxonomic publications	5x3



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Subject: Zoology

Paper: III (Zoogeography & Principles of Palaeontology)

Roll No.

Time: 3 Hrs. Marks: 75

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

Part-1

Palaeontology

- Q 1. Write the evolutionary history of ELEPHANTS 15
- Q 2. Write a note on: a. ALTERED Fossils b. UNALTERED Fossils 15
- Q 3. Write a note on: Life History of CENOZOIC Era 15
- Q 4. Write Note on: a. JURASSIC Mammals b. HIPPARION (8+7)=15
- Q 5. Write note on: a. IGNEOUS Rocks b. TRILOBITES (8+7)=15

Part-II

Zoogeography

- Q 6. Give the Zoogeographical distribution of the following animals
(i) Emu (ii) *Dromaius* (iii) Salamander (iv) *Bison* (v) *Caecilia* (vi) *Triturus*
(vii) *Elephas* (viii) King Cobra (ix) *Neoceratodus* (x) *Okapia* (1.5each) 15
- Q 7. Give in detail physical features, climate and fauna of AUSTRALIAN Region 15
- Q 8. Explain PLATE TECTONIC THEORY 15
- Q 9. Describe BARRIERS and Means of DISPERSALS for MARINE Animals 15
- Q 10. Write note on the following; a. COSMOPOLITAN Distribution b. ANCIENT Islands 15



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Subject: Zoology

Paper: IV-IA (Entomology 'A') [Morphology, Physiology & Ecology]

Roll No.

Time: 3 Hrs. Marks: 75

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

- Q1. Give a detailed account of metamorphosis in insects? [15]
- Q2. Write a detailed note on Insect's antennae? [15]
- Q3. Discuss structure, composition and function of cuticle with labelled sketch? [15]
- Q4. Write a detailed account on Insect coloration? [15]
- Q5. Write down different types of mouthparts of insects? [15]
- Q6. Briefly discuss endocrine glands in insects? [15]
- Q7. Write short notes on the following [5,5,5]
- i. Parthenogenesis
 - ii. Malpighian tubules
 - iii. Tentorium
- Q8. What are the General characteristics of insects? [15]
- Q9. Write a note on the Nutrition of insects? [15]



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M.A./M.Sc. Part – II Supply 2020 & Annual – 2021

Subject: Zoology

Paper: IV-3A (Physiology -A) (Physiology of Coordination)

Roll No.

Time: 3 Hrs. 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 generation of cAMP as a second messenger taking the example of glucose mobilization as a response induced by cAMP. 15
- Q.2 Write comprehensive account on structure and function of G protein coupled receptor 15
- Q.3 How nerve impulse is transmitted from one cell to next? Discuss in detail the events take place during transmission of impulse 15
- Q.4 Give a detailed account of abnormalities of growth hormone secretion 15
- Q.5 Describe, in detail, the causes and consequences of Rickets in children 15
- Q.6 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.7 Give a detailed account of
a) Depression and Manic-Depressive 7.5
b) Schizophrenia 7.5
- Q.8 a) Write a note on adrenal cortex and its hormones 9
b) Give endocrine functions of liver, heart and adipose tissues 6
- Q.9 Describe, in detail, the role of human ear in maintaining equilibrium 15



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M.A./M.Sc. Part – II Supply – 2020 & Annual – 2021

Subject: Zoology

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

Roll No.

Time: 3 Hrs. Marks: 75

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

- Q. 1 Draw a typical bacterial growth curve and label its various phases. Discuss the factors which determine the beginning and end of each phase. 15
- Q. 2 Discuss different types of bacteriological media. 15
- Q. 3 Write a detailed note on structure and composition of cell walls of bacteria 15
- Q. 4 Discuss the place of microorganisms in Whittaker's five kingdoms' classification scheme. 15
- Q. 5 What is meant by bacterial growth? Discuss ~~different modes of cell division~~ in microorganisms 15
- Q. 6 Enlist and briefly describe major kinds of microbial characteristics and indicate those that must be determined by examination of individual cells 15
- Q. 7 What is meant by pure culture? What are the advantages and disadvantages of the various techniques used for the isolation of microorganisms in pure cultures 15
- Q. 8 Give a comprehensive note on maintenance and preservation of pure cultures 15
- Q. 9 Discuss different physical conditions required for growth of microorganisms 15



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M.A./M.Sc. Part – II Supply 2020 & Annual – 2021

Subject: Zoology Paper: IV-6A (Fisheries 'A') [Principles of Fish Biology]

Roll No.

Time: 3 Hrs. Marks: 75

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

1. Write in detail the about the function and importance of swim bladder.
2. Describe about the major feeding types of fishes.
3. Explain Zoological nomenclature of fishes.
4. What are different kinds and functions of teeth in major groups of fishes.
5. Describe about fish brain and cranial nerves.
6. Describe estuarine ecosystem with examples.
7. What is appendicular firm skeleton in fishes? Explain with diagrams.
8. Explain about social factors in fish ecology.
9. Write notes on followings:-
 - a- Fish gonads
 - b- Opportunity in ichthyology



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M.A./M.Sc. Part – II Supply – 2020 & Annual – 2021

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Subject: Zoology

Paper: IV-IB (Entomology 'B') (Classification of Insects and Pest Management)

Time: 3 Hrs. Marks: 75

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

Q1	Give a general account and classification of order Lepidoptera.	15
Q2	Write note on any three of the following a) Bombycidae b) Apidae c) Coccinellidae d) culicidae	5x3
Q3	Write a detail note on different biological control agents.	15
Q4	Describe Diagnostic characters of any three families a) Thysanura b) Thysanoptera c) Mallophaga d) Tricoptera	5x3
Q5	Write notes on any two insects of economic importance.	15
Q6	a) Write a note on Economic Threshold b) Discuss insecticides mode of action	8 7
Q7	Describe different Pest Management Strategies.	15
Q8	Describe types of insecticides in detail.	15
Q9	Write notes on a) Economic importance of Diptera b) Environmental EIL c) Insecticide formulation	5x3



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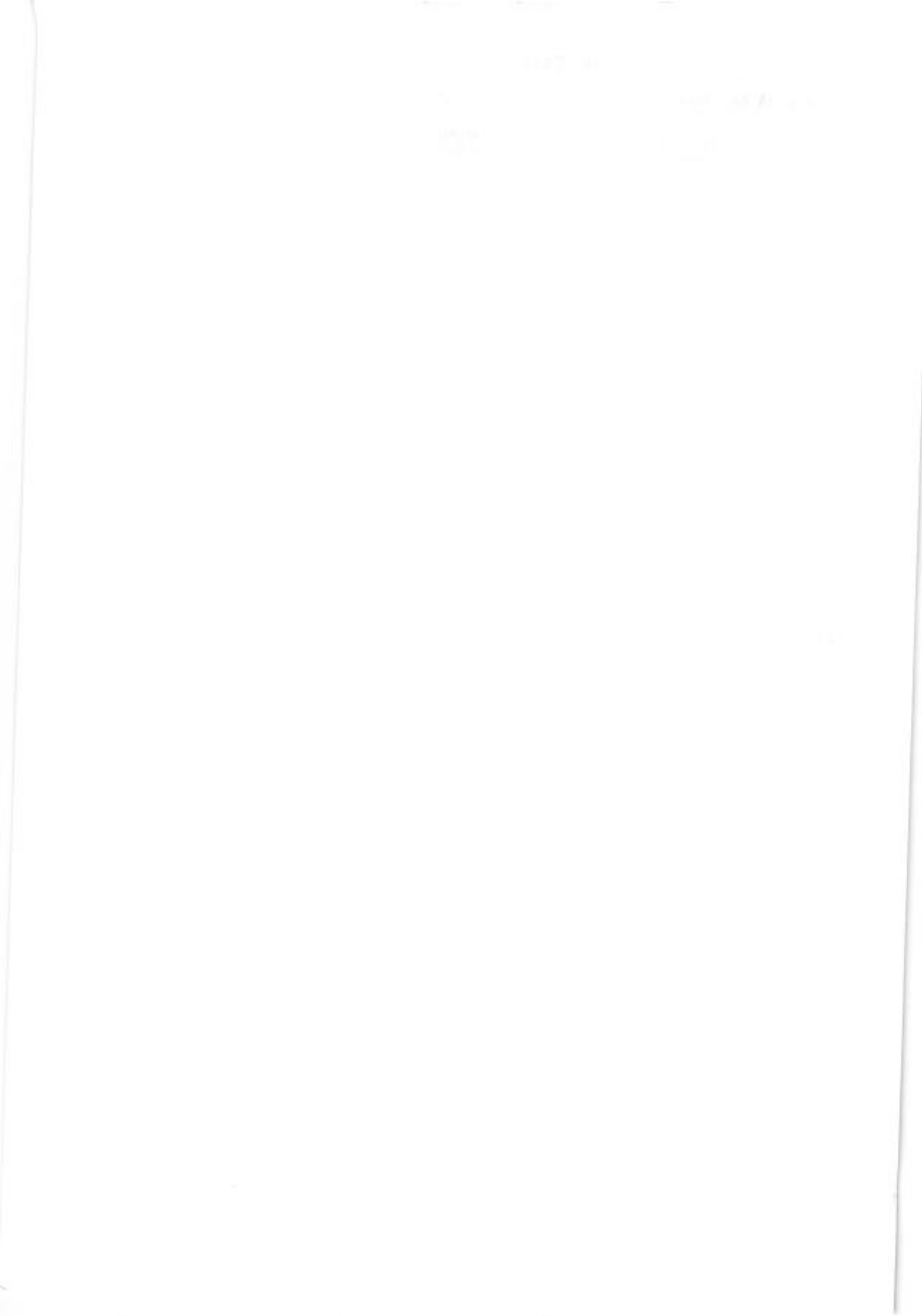
Time: 3 Hrs. Marks: 75

Subject: Zoology

Paper: IV-3B (Physiology 'B') (Physiological systems and adaptations)

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

Q.1	Write a comprehensive note on the composition of blood.	15
Q.2	Write a detailed note on coronary arteries and their functions.	15
Q.3	Explain briefly cardiac cycle.	15
Q.4	Describe the fine structure and functions of lymph node.	15
Q.5	Describe the process of acidosis and alkalosis in the body.	15
Q.6	Describe the structure of glomerulus basement membrane. What is function of the membrane in urine formation?	15
Q.7	Write a note on activation of T and B cells.	15
Q.8	Describe the structures and functions of olfactory mucosa.	15
Q.9	Write a note on the followings. <ul style="list-style-type: none">➤ Podocytes➤ Alveolar septum➤ Types of capillaries	15





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Roll No.

Subject: Zoology

Paper: IV-5B (Microbiology-'B' Applied Microbiology)

Time: 3 Hrs.

Marks: 75

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

- Q. 1 What is meant by control of microorganism? Give a comprehensive note on control of microorganisms using high temperature and filtration. 15
- Q. 2 Write a note on humoral and cell mediated immunity. 15
- Q. 3 Give a comprehensive note on endotoxin. Also write difference between endotoxin and exotoxin. 15
- Q. 4 What is meant by potable water? Give a comprehensive note on Trickling filters bed. Also write briefly about role of radiation in wastewater treatment. 15
- Q. 5 Write about contribution of different scientists in development of chemotherapy and antibiotic. 15
- Q. 6 What is meant by Sanitation? Give a detail account on mode of action of phenol, sterilizing gases and heavy metals to control the microorganism. 15
- Q. 7 Write about interferon in detail with suitable sketches 15
- Q. 8 a) Discuss briefly Microbial population interactions 8
 b) Write the benefits of normal flora 7
- Q. 9 Write a note on 15
 a) Penicillin production
 b) Microbial spoilage of foods
 c) Genetic Engineering of microorganism



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M.A./M.Sc. Part – II Supply – 2020 & Annual – 2021

Subject: Zoology

Paper: IV-6B (Fisheries 'B') [Fish Physiology and Breeding]

Roll No.

Time: 3 Hrs. Marks: 75

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

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|------|---|----|
| Q. 1 | What is meant by excretion? Discuss excretion in fishes. | 15 |
| Q. 2 | Explain the role of Pituitary and thyroid glands in fishes. | 15 |
| Q. 3 | Give an account on structure and function of heart in fishes | 15 |
| Q. 4 | Write a comprehensive note on natural breeding of fishes. | 15 |
| Q. 5 | What is meant by fish growth? Discuss factor affecting on fish growth.
Also discuss fish growth due to natural and artificial food | 15 |
| Q. 6 | Discuss role of swim bladder in fishes with suitable sketches | 15 |
| Q. 7 | Write a detailed note on Gonads in fishes. | 15 |
| Q. 8 | Give a comprehensive note on plant and animal origin feed ingredients. | 15 |
| Q. 9 | Write about gill in fishes with suitable sketches | 15 |



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Paper: V-1 (Integrated Pest Management)

Roll No.

Time: 3 Hrs. Marks: 75

Subject: Zoology

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

Q1	Describe different ecological management practices to control pest population.	15
Q2	What is ecological Backlash? How can we manage it.	15
Q3	Describe factors that affect Economic Injury Level.	15
Q4	a) Discuss relationships between damage boundary and gain threshold b) Write a note on insecticide mode of action	7 8
Q5	Describe types of chemical insecticides and their mode of actions.	15
Q6	Write a note on various pest management strategies and tactics.	15
Q7.	Describe biological control in detail with suitable examples.	15
Q8	Describe types of insecticide Formulations in detail	15
Q9	Write note on : a) Crop Rotation b) Augmentation of Biocontrol Agents c) Sub-Economic Pests	5x3



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M.A./M.Sc. Part – II Supply 2020 & Annual – 2021

Roll No.

Subject: Zoology

Paper: V-3 (Classification of Insects, Pest of Agriculture and Pest Management)

Time: 3 Hrs. Marks: 75

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

Q1. a). Give diagnostic characters of order COLEOPTERA? [3, 12]

b). Write notes on the morphology & bionomics of any three families of order COLEOPTERA?

Q2. Give diagnostic features of order LEPIDOPTERA. Give economic importance of any three important families? [15]

Q3. Write note on the following: [15]

1. Order Thysanura
2. Order Siphunculata

Q4. Explain Biology and Lifecycle of any two pest of cotton crop? [15]

Q5. Write a detailed account on Pyrethroids? [15]

Q6. What are the attributes of the beneficial organisms? [15]

Q7. What is Colonization? Describe different steps involved in establishing effective colonization? [15]

Q8. Write note on any three of the following: [15]

- a. Apidae
- b. Bombycidae
- c. Culicidae
- d. Coccinellidae
- e. Reduviidae

Q9. Write note on [15]

1. Economic Threshold
2. Economic Injury level