

**North Maharashtra University, Jalgaon**

**F.Y.B.Sc. Zoology (Theory) Question Bank.**

**With effect from June 2007.**

**Paper – I ; Section – A ( Diversity of Non-Chordates )**

*Unit 1. : Concept of animal diversity and its significance*

Q. 1] Multiple choice (Question for 2 marks)

1. Ecosystem diversity refers to .....

- (1) Ecological complexity      (2) Number of species increases  
(3) Genetic existing              (4) Variability in living organism

2. Biodiversity means .....

- (a) Interaction between biotic & abiotic factors  
(b) Variety & variability among living organisms  
(c) Equitable use of resources  
(d) Deforestation

3. Maintenance of biodiversity is important for

- (a) Ecological stability              (b) Zoological stability  
(c) Genetic stability                  (d) Botanical stability

Q. 1] Define / Explain / Comment (Questions for 2 marks)

1. Biological diversity,
2. Biodiversity,
3. Genetic diversity,
4. Species diversity,
5. Ecosystem diversity,
6. Exotic species,
7. Deforestation.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Concept of animal diversity
- 2) Genetic diversity

- 3) Species diversity
- 4) Ecosystem diversity
- 5) Animal diversity at global level
- 6) Animal diversity at India level
- 7) Significance of animal diversity

Q. 3] Questions for 6 marks.

- 1) Describe levels of animal diversity
- 2) Describe the causes for loss of animal diversity

*Unit 2. : Protozoa*

Q. 1] Multiple choice (Question for 2 marks)

1. Protozoan considered link between plant & animals.....  
(a) Paramecium (b) Amoeba (c) Euglena (d) Plasmodium
2. Protozoan animal groups are .....  
(a) Unicellular (b) Multicellular (c) Multiorganism (d) Highly developed
3. Amoeba locomote with the help of .....  
(a) Cilia (b) Pseudopodia (c) Flagella (d) Lobopodia
4. Paramecium locomotion by .....  
(a) Flagella (b) Pseudopodia (c) Cilia (d) Pellicle
5. In Euglena locomotion by .....  
(a) Cilia (b) Flagella (c) Pseudopodia (d) Myonemes
6. Reason for including amoeba in phylum protozoa is .....  
(a) Cell wall (b) Contractile vacuole  
(c) Acellular organization (d) Phagocytosis
7. Osmoregulation in amoeba is controlled by .....  
(a) Plasmalemma (b) Plasma gel  
(c) Exo osmosis (d) Contractile vacuoles
8. Malaria fever is caused by .....  
(a) *P vivax* (b) Monocystis (c) Cockroach (d) Mosquito
9. .... flagellate found in the gut of termites  
(a) Trichonympha (b) Entamoeba (c) Plasmodium (d) Gardia

Q. 1] Define / Explain / Comment (Questions for 2 marks)

1. Aquatic animals,
2. Marine animal,
3. Terrestrial animal,
4. Protozoa,
5. Unicellular,
6. Solitary,
7. Cilia,
8. Pseudopodia,
9. Flagella,
10. Commensal,
11. Contractile vacuole,
12. Osmoregulation.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Enlist any six characters of phylum protozoa.
- 2) Fresh water protozoans
- 3) Marine protozoans
- 4) Pathogenic protozoans
- 5) Protozoans of digestive tract
- 6) Protozoans of blood
- 7) Pseudopodia & their types
- 8) Flagella & their types
- 9) Cilia and myonemes
- 10) Amoeboid movement of protozoa
- 11) Flagellar movement
- 12) Ciliary movement
- 13) Working of contractile vacuole
- 14) Function & significance of contractile vacuole
- 15) Beneficial protozoan
- 16) Harmful protozoans
- 17) Water pollution causing protozoans
- 18) Protozoans for sanitation
- 19) Protozoan as a food
- 20) Commercial protozoans
- 21) Commercial uses of protozoan skeleton
- 22) Zoological importance of protozoa.

**Sketch and label.**

- 23) Amoeba
- 24) Euglena
- 25) Paramecium
- 26) Structure of contractile vacuole

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of phylum protozoa.

- 2) Describe habit, habitat & distribution of fresh water protozoans with 2 examples.
- 3) Describe the parasitic protozoans with 2 examples.
- 4) Describe the locomotary organs of protozoans.
- 5) Describe the modes of locomotion in protozoans.
- 6) What is osmoregulation? Give an account of the process of osmoregulation in protozoa.
- 7) Discuss the economic importance of protozoa.

*Unit 3. : Porifera*

Q. 1] Multiple choice (Question for 2 marks)

1. Classification of phylum Porifera is based on ....  
(a) Canal system (b) Spicules  
(c) Shape of choanocytes (d) Oscocytes
2. Osculum is related with  
(a) Starfish (b) Hydra (c) Silverfish (d) sponge
3. The coelenterates animals are ..... symmetry  
(a) Asymmetry (b) Bilateral symmetry (c) Radial symmetry  
(d) None of them
4. Which one is bath sponge .....  
(a) Sycon (b) Chalina (c) Euspongia (d) Spongilla
5. Which of the following is not coelenterate?  
(a) Jelly fish (b) Sea pen (c) Portuguese man of war  
(d) Cuttle fish
6. Mesoglea is found in .....  
(a) Porifera (b) Hydrozoa (c) Scyphozoa (d) Annelida
7. Porifera means .....  
(a) Bearing canal system (b) Having choanocytes  
(c) Bearing minute pore on body surface (d) Possessing osculum
8. .... is a glassy transparent sponge used for decoration purpose.  
(a) Hyalonema (b) Bath sponge (c) Leucosolenia (d) Euplectella

Q. 1] Define / Explain / Comment (Questions for 2 marks)

1. Porifera,
2. Diploblastic.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit & habitat of Porifera with 2 examples
- 2) Useful sponges
- 3) Harmful sponges
- 4) Sponge fishing
- 5) Sponge cultivation
- 6) Enlist 6 characters of porifera
- 7) Sponges for protection to commensals & symbiotic

**Sketch and label**

- 8) Sycon
- 9) Spongilla
- 10) Hylonema

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Porifera.
- 2) Discuss the economic importance of Porifera.

*Unit 4. : Coelenterata*

Q. 1] Multiple choice (Question for 2 marks)

1. Corals are formed by ...  
(a) Molluscs (b) Coelenterates (c) Protozoans (d) Echinoderms
2. Hydra is .....  
(a) Fresh water, diploblastic & radially symmetrical  
(b) Marine, diploblastic & radially symmetrical  
(c) Marine, triploblastic & bilaterally symmetrical  
(d) Fresh water, triploblastic & radially symmetrical

Q. 1] Define / Explain / Comment (Questions for 2 marks)

1. Coelenterata,
2. Coelom,
3. Polyps,
4. Medusa,
5. Polymerphism,
6. Gastrozooids,
7. Ductylozoid,
8. Gonozooids,
9. Pnematoaphore,
10. Phyllozooids or Bracts,

11. Nectophore or Nectocalyces,
12. Gonophore,
13. Corals,
14. Coral reefs.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit, Habitat of coelenterate with 2 example
  - 2) Polymorphism in hydrozoa
  - 3) Polypoid zooids
  - 4) Medusoid zooids
  - 5) Corals in coelenterate
  - 6) Coral reefs
  - 7) Enlist any 6 characters of phylum coelenterate
  - 8) Fringing reefs
  - 9) Barrier reefs
  - 10) Atoll
  - 11) Significance of corals & coral reefs
- Sketch and label**
- 12) Hydra
  - 13) Physalia

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of coelenterate
- 2) Write an essay on polymorphism in hydrozoa.
- 3) Describe habit, habitat & distribution of coelenterate with 2 examples.
- 4) What are coral reefs? Describe the types of coral reefs.
- 5) Give the economic importance of coelenterates

*Unit 5. : Helminthes*

Q. 1] Multiple choice (Question for 2 marks)

1. All worms are .....  
(a) Radial symmetrical (b) Asymmetrical (c) Triploblastic (d) Diploblastic
2. Platyhelminthes are generally called ....  
(a) Flat worms (b) Round worms (c) Tubiculus worms (d) Blind worms
3. Disease filariasis is caused by ....  
(a) Fasciola (b) Wucheria (c) Taenia (d) Ascaris

4. Which zooid generally motile ....  
(a) Polyps      (b) Medusa      (c) Both      (d) None of them
5. Aschelminthes are also called ..... worms.  
(a) Cylindrical   (b) Leafworm      (c) Round worms   (d) Flat worm
6. Which is the flat worm .....  
(a) Seat worm   (b) Filaria worm      (c) Arrow worm   (d) Blood fluke
7. Which one is acoelomate?  
(a) Nematohelminthes   (b) Annelida   (c) Arthropoda   (d) Platyhelminthes
8. Ascaris is .....  
(a) Free living   (b) Ectoparasite      (c) Endoparasite   (d) Commensal
9. The posterior end of male Ascaris remains .....  
(a) Cylindrical   (b) Spiral      (c) Straight      (d) Curve

Q. 1] Define / Explain / Comment (Questions for 2 marks)

1. Helminthes,
2. Platyhelminthes,
3. Aschelminthes,
4. Hermaphrodite,
5. Acoelomate,
6. Ectoparasite,
7. Endoparasite.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit, Habitat of Platyhelminthes with 2 examples
- 2) Habit, Habitat of Aschelminthes with 2 examples
- 3) Economic importance of Platyhelminthes.
- 4) Economic importance of Aschelminthes
- 5) Habit, Habitat, Distribution and economic importance of *Fasciola hepatica*.
- 6) Habit, Habitat, Distribution and economic importance of Ascaris
- 7) Habit, Habitat, Distribution and economic importance of *Taenia solium*.
- 8) Habit, Habitat, Distribution and economic importance of Trichinella.
- 9) Habit, Habitat, Distribution and economic importance of *Wucheria bancrofti*.
- 10) Habit, Habitat, Distribution and economic importance of Schistosoma
- 11) Habit, Habitat, Distribution and economic importance of Planaria
- 12) Enlist 6 characters of Platyhelminthes.
- 13) Enlist 6 characters of Aschelminthes.

**Sketch and label-**

- 14) Planaria
- 15) Liverfluke
- 16) *Taenia solium*
- 17) Male, female Ascaris
- 18) *Trichinella*

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Platyhelminthes.
- 2) Give the distinctive characters of Aschelminthes.
- 3) Describe habit, habitat & distribution of any 2 Platyhelminthes.
- 4) Describe habit, habitat & distribution of any 2 Aschelminthes.
- 5) Give the economic importance of helminthes.

*Unit 6. : Annelida*

Q. 1] Multiple choice (Question for 2 marks)

1. The annelids are ..... worms.  
(a) Segmented worms (b) Flatworms (c) Round worm (d) Cylindrical worms
2. Which Annelida animal is sangivorous.....  
(a) Earthworm (b) Leech (c) Turbellaria (d) Aphrodite
3. In leech ..... anti-coagulant are present.  
(a) Heparin (b) Hirudin (c) Oxalic (d) Salisic acid
4. Which one of the following is an annelid .....  
(a) Taenia (b) Nereis (c) Ascaris (d) Fasciola

Q. 1] Define / Explain / Comment (Questions for 2 marks)

- |                            |                     |
|----------------------------|---------------------|
| 1. Annelida,               | 2. Triploblastic,   |
| 3. Metameric segmentation, | 4. Setae or chetae, |
| 5. Parapodia,              | 6. Polychacta,      |
| 7. Oligochacta,            | 8. Sanguivorous,    |
| 9. Hirudin.                |                     |

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit, Habitat of Annelida with 2 examples.
- 2) Economic importance of earthworm.
- 3) Economic importance of earthworm in agriculture.
- 4) Economic importance of Leech.
- 5) Habit, Habitat & distribution of earthworm.
- 6) Habit, Habitat & distribution of leech.
- 7) Explain the leech as surgical agent.
- 8) Enlist any 6 characters of phylum Annelida.

**Sketch and label**

- 9) Nereis
- 10) Earthworm
- 11) Leech



Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Annelida.
- 2) Describe habit, habitat & distribution of any 2 annelids.
- 3) Give the economic importance of earthworm.
- 4) Give the economic importance of leech.

*Unit 7. : Arthropoda*

Q. 1] Multiple choice (Question for 2 marks)

1. Which phylum has highest number of species?  
(a) Protozoa (b) Porifera (c) Arthropoda (d) Insecta
2. Main character of Arthropoda is.....  
(a) Chitinous exoskeleton (b) Segmentation & hair  
(c) Segmentation & one pair of antenna  
(d) Segmentation & one pair of chelicera
3. What is common between earthworm, leech & centipede .....  
(a) They have malphigian tubules  
(b) They are hermaphrodite  
(c) They have ventral nerve cord  
(d) They have no legs
4. Silk is obtained from ....  
(a) Laccifer lacca (b) Nosema Bombycis (c) Bombyx mori (d) None of them
5. Ecdysis is not found in .....  
(a) Insects (b) Polychaetes (c) Snakes (d) Cockroach
6. Chitinous exoskeleton is found in ...  
(a) Bird (b) Turtle (c) Insect (d) Fishes
7. Rearing of honey bee is called .....  
(a) Sericulture (b) Lac culture (c) Vermiculture (d) Apiculture
8. Prawn belongs to .....  
(a) Arthropoda (b) Annelida (c) Coelenterata (d) Echinodermata
9. Malaria is transmitted by .....  
(a) Anopheles (b) Culex (c) Aedes (d) Housefly

Q. 1] Define / Explain / Comment (Questions for 2 marks)

- 1.Arthropoda,
- 2.Ecdysis or moulting or casting or cast off,
- 3.Sericulture,
- 4.Lac culture.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Animal diversity in Arthropoda.
- 2) Habit, Habitat of phylum Arthropoda with 2 examples.
- 3) Species of silkworm
- 4) Sericulture
- 5) Silk production in India
- 6) Uses of silk
- 7) Prawn fishery
- 8) Lac culture & their uses
- 9) Properties of lac & lac industries in India.
- 10) Enlist any 6 characters phylum Arthropoda

**Sketch and label**

- 11) Grasshopper
- 12) Mosquito
- 13) Butterfly
- 14) Crab
- 15) Centipede
- 16) Millipede

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Arthropoda
- 2) Describe habit, habitat & distinctive characters of any 2 Arthropoda.
- 3) Give the economic importance of Silkworm
- 4) Give the economic importance of prawn fishery
- 5) Give the economic importance of lac insect

*Unit 8. : Mollusca*

Q. 1] Multiple choice (Question for 2 marks)

1. Pearl oyster belongs to .....  
(a) Gastropoda (b) Cephalopoda (c) Scaphapoda (d) Pelecypoda
2. Shell of Mollusca is derived from ....  
(a) Foot (b) Mantle (c) Ctenidium (d) Placoid
3. The alimentary canal molluscan is often ..... shaped.  
(a) S shaped (b) U shaped (c) J shaped (d) V shaped

4. The body of mollusca .....

- (a) Segmented (b) Unsegmented & soft (c) Vermiform (d) Star shaped

Q. 1] Define / Explain / Comment (Questions for 2 marks)

- 1.Mollusca,
- 2.Shell.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit, Habitat of phylum Mollusca with 2 examples
- 2) Pearl formation
- 3) Types of pearls
- 4) Culture of pearls
- 5) Pearl producing animal & composition of pearl.
- 6) Economic importance of shell
- 7) Harmful Mollusca
- 8) Enlist any 6 characters of phylum Mollusca

**Sketch and label -**

- 9) Pila                      10) Unio                      11) Chiton                      12) Octopus

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Mollusca
- 2) Describe habit, habitat & distribution of any two Molluscs
- 3) Give the economic importance of Molluscs
- 4) What is pearl? Explain the pearl formation.

*Unit 9. : Echinodermata*

Q. 1] Multiple choice (Question for 2 marks)

1. Water vascular system is identification of  
(a) Porifera (b) Coelenterata (c) Arthropoda (d) Echinodermata
2. The name Echinoderm literally means ..... Skinned.  
(a) Soft (b) Hard (c) Spiny (d) Calcarious
3. Which of the following group of animal found only in sea .....  
(a) Porifera (b) Echinodermata (c) Protozoa (d) Cestoda

4. Starfish is a .....

- (a) Chordate (b) Fish (c) Echinodermata (d) Arthropoda

Q. 1] Define / Explain / Comment (Questions for 2 marks)

- 1.Echinodermata,
- 2.Habit,
- 3.Habitat.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- 1) Habit, Habitat of Echinodermata with 2 examples
- 2) Economic importance of echinoderms
- 3) Useful activities of echinoderms
- 4) Harmful activities of echinoderms
- 5) Enlist any 6 characters of phylum Echinodermata

**Sketch and label**

- 6) Starfish                      7) Brittle star
- 8) Antedon                      9) Sea cucumber

Q. 3] Questions for 6 marks.

- 1) Give the distinctive characters of Echinoderms.
- 2) Describe habit, habitat & distribution of any two Echinoderms.
- 3) Give the economic importance of Echinoderms.

**Paper – I ; Section – A ( Diversity of Non-Chordates )**

Chapter wise weightage of Marks.

Sr.No.	Unit No.	Periods allotted	Marks allotted
1	1	03	04
2	2	05	06
3	3	05	07
4	4	05	06
5	5	05	07
6	6	05	07
7	7	07	09
8	8	05	07
9	9	05	07
		Total : 45	Total : 60

.....  
**Paper I : Section B (Diversity of Chordates)**

*Unit – 1 : Diversity of Chordates*

**Q.1 Multiple choice questions for two marks**

1. The name 'Chordata' refers to -----
  - a) All vertebrates
  - b) All animals with bony endoskeleton
  - c) All animals bearings 'notochord' during any phase of life.
  - d) All animals bearings hollow nerve cord.
2. Warm blooded animals are called -----
  - a) Homiotherms
  - b) Poikilotherms
  - c) Mesotherms
  - d) Endotherms
3. Chordates are distinguished from non –chordates by the presence of -- ----
  - a) Brain
  - b) Ventral nerve cord
  - c) Dorsal nerve cord
  - d) Dorsal tubular nerve cord
4. Vertebrates have -----
  - a) Body cavity with alimentary canals
  - b) Dorsal tubular nerve cord
  - c) Ventrally situated heart
  - d) All of these.
5. All the vertebrates are -----
  - a) Unisexual
  - b) Bisexual
  - c) Both a & b
  - d) None of these
6. Vertebral column is derived from -----
  - a) Dorsal nerve cord
  - b) Ventral nerve cord
  - c) Notochord
  - d) Outgrowth

**Define / Explain / Comment with suitable example.**

1. Bilateral symmetry.
2. Triploblastic animals
3. Coelomate animals
4. Parental Care

5. Notochord.
6. Endoskeleton
7. Exoskeleton
8. Cranium

Q.2 : Questions for 4 marks. (Write short notes)

1. What is Chordate ? Give origin of Chordates
2. Distinguish between Chordates & Non –Chordates.
3. Describe Chordate Diversity.

Q.3 Question for 6 marks (Write short answer questions)

1. Give main characteristic of phylum Chordata.
2. Classify phylum Chordata up to classes giving example of each group.
3. Distinguish between Acrania & Craniata.

*Unit -2 : Protochordata*

Q.1 Multiple choice questions for two marks

1. Which of the following is not Protochordate-----
  - a) Herdmania
  - b) Amphioxus
  - c) Salpa
  - d) Petromyzon
2. Herdmania belongs to group -----
  - a) Hermichordata
  - b) Urochordata
  - c) Pisces
  - d) Gnathostomata
3. In Urochordates the Larva is known as \_\_\_\_\_
  - a) Bipinnaria
  - b) Tadpole Larva
  - c) Pluteus
  - d) Tornaria
4. Which type of metamorphosis occurs in tadpole larva of Herdmania
  - a) Complete metamorphosis
  - b) Partial metamorphosis
  - c) Progressive metamorphosis
  - d) Retrogressive metamorphosis
5. Body of urochordates is enclosed with \_\_\_\_\_
  - a) Mantle
  - b) Test or tunic

- c) Shell
- d) Shield
- 6. Members of cephalochordate are \_\_\_\_\_
  - a) Carnivorous
  - b) Muscous feeder
  - c) Filter feeder
  - d) Predators
- 7. Amphioxus is \_\_\_\_\_
  - a) Planktonic
  - b) Pelagic
  - c) Sedentary
  - d) Burrowing animal.
- 8. Why amphioxus considered as degenerate chordates?
  - a) Due to unorganized brain
  - b) Due to absence of brain
  - c) Due to absence of kidney
  - d) Due to all above characters.

Define / Explain / Comment with suitable example.

- 1. Tubiculus
- 2. Pelagic
- 3. Polymorphism
- 4. Retrogressive metamorphosis

Q.2 : Questions for 4 marks. (Write short notes)

- 1. Describe habit , habitat, distribution of Balanoglossus.
- 2. Sketch & label - Balanoglossus.
- 3. Describe habit , habitat, distribution of Herdmania.
- 4. Sketch & label - Herdmania.
- 5. Sketch & label – Branchiostoma.

Q.3 Question for 6 marks (Write short answer questions)

- 1. Give general characters of Protochordata.
- 2. Give general characters of Hemichordata.
- 3. Describe characteristics features of urochordata.
- 4. Give general characters of Cephalochordata.
- 5. Describe habit , habitat, distribution of banchiostoma.

*Unit-3 : Cyclostomata.*

Q.1 Multiple choice questions for two marks

1. Parasite chordate is \_\_\_\_\_
  - a) Exocoetus
  - b) Petromyzon
  - c) Amphioxus
  - d) No chordates is parasites.
2. Characteristic features of Cyclostomata \_\_\_\_\_
  - a) Round mouth
  - b) Round mouth with Jaws
  - c) Cylindrical mouth
  - d) Round mouth without Jaws & paired.
3. Jawless vertebrate are members of \_\_\_\_\_
  - a) Agnatha
  - b) Cephalochordata
  - c) Gnathostomata
  - d) Urochordata
4. Example of class cyclostomata are \_\_\_\_\_
  - a) Labeo & Catla
  - b) Mystus & Exocoetus.
  - c) Petromyzon & myxine
  - d) Scoliodon & Torpedo.
5. In cyclostomes, endoskeleton is \_\_\_\_\_
  - a) Cartilaginous
  - b) Bony
  - c) Both a & b
  - d) None of these.

Define / Explain / Comment with suitable example.

1. Typhosole
2. Ammocoete.
3. Microphagus.
4. Filter feeder.

Q.2 : Questions for 4 marks. (Write short notes)

1. Distinguish between Agnatha & Gnathostomata.
2. Describe habit, habitat, distribution of Petromyzon.
3. Sketch & label - Petromyzon.
4. Describe habit, habitat, distribution of Myxine.
5. Sketch & label - Myxine.

Q.3 Question for 6 marks (Write short answer questions)

1. Give general characters of Cyclostomata.



2. Give economic importance of Petromyzon/ Lamprey.

*Unit-4: Pisces.*

Q.1 Multiple choice questions for two marks

1. A fish is characterized by the presence of \_\_\_\_\_
  - a) Paired fins.
  - b) Pharyngeal gills
  - c) Dermal Scales.
  - d) All of these.
2. Branch of biology dealing with study of fishes \_\_\_\_\_
  - a) Fishery.
  - b) Toxicology.
  - c) Ichthyology
  - d) Piscology.
3. Which one is true fish \_\_\_\_\_
  - a) Jelly fish.
  - b) Cuttle fish.
  - c) Silver fish.
  - d) Flying fish.
4. In India the best aquarium is located at \_\_\_\_\_
  - a) Z.S.I Calcutta
  - b) Tarapore Mumbai.
  - c) Chennai
  - d) Vishakhapattanam.
5. Anadromous fishes move \_\_\_\_\_
  - a) From sea to fresh water.
  - b) From sea to estuary.
  - c) From river to sea
  - d) From estuary to sea
6. The fish famous for parental care is \_\_\_\_\_
  - a) Sea-horse.
  - b) Labeo rohita
  - c) Gambusia.
  - d) Scolidon.
7. A catadromous fish migrates from \_\_\_\_\_
  - a) River to sea
  - b) River to estuary.
  - c) Sea to river.
  - d) Deep sea to surface water.

Define / Explain / Comment with suitable example.

1. Carnivores.

2. Yolk-sac placenta.
3. Parental care.
4. Internal fertilization.
5. Homocercal tail.
6. Heterocercal tail.
7. Diphyrcercal tail.
8. Shagreen.
9. Cycloid scale.
10. Placoid scale.
11. Ichthyology.
12. Isinglass.

**Q.2 : Questions for 4 marks. (Write short notes)**

1. Describe habit , habitat, distribution of Scoliodon.
2. Sketch & label - Scoliodon.
3. Describe habit , habitat, distribution of Chimaera.
4. Describe habit , habitat, distribution of Torpedo.
5. Sketch & label –Electric ray.
6. Describe habit , habitat, distribution of Neoceratodus.
7. Describe habit , habitat, distribution of Protopterus.
8. Describe habit , habitat, distribution of Anguilla.
9. Describe habit , habitat, distribution of Anabas.
10. Sketch & label - Neoceratodus.
11. Sketch & label - Protopterus.
12. Sketch & label - Anguilla.
13. Sketch & label - Anabas.
14. Sketch & label – Hippocampus/Seahorse..
15. Sketch & label – Labeo rohita.
16. Sketch & label – Exocoetus.
17. Describe habit , habitat, distribution Hippocampus.
18. Describe habit , habitat, distribution Labeo rohita.
19. Describe habit , habitat, distribution Exocoetus.
20. Describe temporary migration in fishes.
21. Describe permanent migration in fishes.
22. Describe anadromous migration in fishes.
23. Describe catadromous migration in fishes.
24. Use of Fish product as Medicine.
25. Fish skin & Fish Glue.
26. Fish meal & Fish manual.
27. Describe harmful Fishes.

**Q.3 Question for 6 marks (Write short answer questions)**

1. Describe general characters of Pisces.

2. Compare between Chondrichthyes and Osteichthyes
3. Give economic importance of Fishes.
4. What is migration ? Describe migration in Fishes.

*Unit-5:Amphibia.*

Q.1 Multiple choice questions for two marks

1. Which is limbless amphibian\_\_\_\_\_
  - a) Alytes.
  - b) Ichthyophis.
  - c) Hyla..
  - d) Phyllobotamus..
2. Axolotl is the name given to Larva of \_\_\_\_\_
  - a) Aurelia.
  - b) Ambystoma.
  - c) Amphioxus.
  - d) Amia.
3. Salamander is \_\_\_\_\_
  - a) Mollusc.
  - b) Bird.
  - c) Echinoderm.
  - d) Amphibian.
4. Frog has \_\_\_\_\_
  - a) 5 fingers & 4 toes.
  - b) 4 fingers & 5 toes .
  - c) 5 fingers & 5 toes.
  - d) 4 fingers & 4 toes .
5. Summer sleep of frog is known as\_\_\_\_\_
  - a) Aestivation
  - b) Hibernation.
  - c) Paedogenesis.
  - d) Neoteny.
6. Amphibians are characterized by\_\_\_\_\_
  - a) Presence of scaleless , glandular, moist skin.
  - b) Presence of dermal scales on the skin.
  - c) Hind webbed limbs.
  - d) Their amphibious habit living on water & land.

Define / Explain / Comment with suitable example.

1. Neoteny.
2. Paedogenesis.
3. Hibernation.
4. Aestivation.

5. External fertilization.
6. Acoelous.
7. Procoelous.
8. Amphicoelous.

Q.2 : Questions for 4 marks. (Write short notes)

1. Give outline classification of Amphibia.
2. Describe habit , habitat, distribution of Ichthyophis.
3. Describe habit , habitat, distribution of Salamander.
4. Describe habit , habitat, distribution of Rana tigrina.
5. Describe habit , habitat, distribution of Bufo.
6. Sketch & label - Ichthyophis.
7. Sketch & label - Ambystoma.
8. Sketch & label - Rana tigrina.
9. Sketch & label - Bufo.
10. Sketch & label - Rhycolophorus.
11. Explain parental care in Pipa..
12. Explain arboreal habit of Hyla.
13. Explain flying habit of Rhycolophorus.

Q.3 Question for 6 marks (Write short answer questions)

1. Give Diagnostic characters of class Amphibia.
2. What are the adaptations to Amphibious life.
3. Describe role of Amphibia as biological control agent.

### *Unit-6: Reptilia*

Q.1 Multiple choice questions for two marks

1. Which of the following is poikilothermic animal \_\_\_\_\_
  - a) Whale..
  - b) Penguin.
  - c) Otter.
  - d) Tortoise.
2. The poison glands of poisonous snake are modified \_\_\_\_\_
  - a) Buccal glands.
  - b) Palantine glands.
  - c) salivary glands.
  - d) Lacrymal glands.
3. A flying lizard is \_\_\_\_\_
  - a) Chameleon..
  - b) Draco

- c) Neurotoxic
  - d) None of these.
4. The Venom of snake is \_\_\_\_\_
- a) Haemolytic
  - b) Neurotoxic & Haemolytic
  - c) Neurotoxic.
  - d) None of these.
5. Antivenom injection for snake bite are prepared at \_\_\_\_\_
- a) I.A.R.I New Delhi.
  - b) N.D.R.I Lucknow.
  - c) N.D.R.I Karnal..
  - d) Hoffkins R.I.Mumbai.
6. In case of snake bite the best medicine to inject is \_\_\_\_\_
- a) Antivein.
  - b) Penicillin..
  - c) Antibiotics.
  - d) Streptomycin.

Define / Explain / Comment with suitable example.

1. Harpetology.
2. Serpentology.
3. Living fossils.
4. Antivenin.
5. Insectivores.

Q.2 : Questions for 4 marks. (Write short notes)

1. Describe habit , habitat, distribution of Chelone.
2. Describe habit , habitat, distribution of Trionyx.
3. Describe habit , habitat, distribution of Sphenodon.
4. Describe habit , habitat, distribution of Calotes.
5. Describe habit , habitat, distribution of Draco.
6. Describe habit , habitat, distribution of Chameleon.
7. Describe habit , habitat, distribution of Cobra.
8. Describe habit , habitat, distribution of Krait.
9. Describe habit , habitat, distribution of Rat snake..
10. Sketch & label – Chelone..
11. Sketch & label – Tortoise..
12. Sketch & label – Calotes.
13. Sketch & label – Draco.
14. Sketch & label – Cobra.
15. Venom of Cobra.
16. Venom of Krait.

17. Venom of Viper.
18. What are Fangs? Describe types of Fangs.
19. Sketch & label – Poison apparatus.
20. Describe poison glands & ducts.
21. Describe biting mechanism of poisonous snakes.

Q.3 Question for 6 marks (Write short answer questions)

1. State distinctive characters of Reptilia.
2. Give outline classification of Reptilia with one example.
3. Distinguish between Poisonous and Non-poisonous snakes.
4. Give effects of Snake –venom on prey.

*Unit-7: Aves.*

Q.1 Multiple choice questions for two marks

1. Which of the following are flightless bird \_\_\_\_\_
  - a) Emu
  - b) Ostrich
  - c) Cossowary
  - d) All of these.
2. Birds fly with help of \_\_\_\_\_
  - a) Pategium.
  - b) Wings.
  - c) Feathers
  - d) Limbs.
3. During migration birds determine compass direction using \_\_\_\_\_
  - a) Land marking & water bodies.
  - b) Water bodies & mountain
  - c) Mountains & Land marking
  - d) Celestial bodies.
4. Indian ornithologist known as 'Bird man of India' was \_\_\_\_\_
  - a) Dr. M.S .Mani.
  - b) Dr.R.Manocha.
  - c) Dr.Salim Ali.
  - d) Dr.P.K.Mehta.
5. A well known 'Bird Sancuary' of country is situated at \_\_\_\_\_
  - a) Kaziranga..
  - b) Palamu.
  - c) Bandipur. .
  - d) Bharatpur.

Define / Explain / Comment with suitable example.

1. Graminivorous
2. Frugivorous.
3. Oviparous.
4. Migration.
5. Flight muscles
6. Ornithology.

Q.2 : Questions for 4 marks. (Write short notes)

1. Give outline classification of Aves with example..
2. Describe habit , habitat, distribution of Ostrich .
3. Describe habit , habitat, distribution of Vulture .
4. Describe habit , habitat, distribution of Owl.
5. Describe habit , habitat, distribution of Pigeon.
6. Describe habit , habitat, distribution of Penguin.
7. Sketch & label – Any bird.
8. Describe Latitudinal migration..
9. Describe Altitudinal migration.
10. Describe Longitudinal migration.
11. Describe Partial & Vagrant migration.
12. Describe Seasonal migration.
13. Describe Diurnal & Nocturnal migration.
14. Describe Routs & Range migration.
15. Describe Segregation & Order of migration.
16. Describe Altitude & velocity migration.
17. Describe Seed eating beak.
18. Describe Cutting beak.
19. Describe Fruit eating beak.
20. Describe Insectivorous beak.
21. Describe Wood – chiseling beak.
22. Describe Tearing & Piercing beak.
23. Describe Mud probing beak.
24. Describe Water & mud straining beak.
25. Describe Fish catching beak.
26. Describe Spatulate beak.
27. Describe Pouched beak.
28. Describe Flower probing beak.
29. Describe Cursorial or running feet.
30. Describe Perching feet.
31. Describe Scratching feet.
32. Describe Raptorial feet.
33. Describe Wading feet.
34. Describe Swimming feet.
35. Describe Climbing feet.

36. Describe Clinging feet.

Q.3 Question for 6 marks (Write short answer questions)

1. Describe distinctive features of class Aves.
2. Differentiate between Ratitae & Carinatae.
3. Describe Morphological aerial adaptations
4. Describe Anatomical aerial adaptations
5. State purpose or advantages of migration of birds.

*Unit-8: Mammals.*

Q.1 Multiple choice questions for two marks

1. Animals giving birth to young ones are called \_\_\_\_\_
  - a) Oviparous
  - b) Viviparous
  - c) Coelomate.
  - d) Amphibious.
2. Mammary glands are modified \_\_\_\_\_
  - a) Sebaceous glands.
  - b) Sudorific glands / Sweat.
  - c) Cutaneous glands.
  - d) Scant glands.
3. Hair, Nails, hoofs, horns are formed with the help of protein , known as \_\_\_\_\_.
  - a) Keratin.
  - b) Globulin.
  - c) Chitin
  - d) Histone

Define / Explain / Comment with suitable example.

1. Herbivorous.
2. Omnivorous.
3. Viviparous
4. placenta.
5. Alolentic placenta.
6. Chorionic placenta.
7. Homeotherms.
8. Adaptations.
9. Monophodont
10. Diphyodont.
11. Polyphyodont
12. Homodont
13. Heterodont



14. Mammnology.
15. Marsupium.

Q.2 : Questions for 4 marks. (Write short notes)

1. Give outline classification of Mammals with example.
2. Describe Egg laying mammals with example.
3. Describe Pouched mammals with suitable example.
4. Describe Flying mammals with suitable example.
5. Describe Arboreal mammals with suitable example.
6. Describe Aquatic mammals with suitable example.
7. Describe Carnivorous mammals with suitable example.
8. Describe various adaptive Radiation in mammal.

Q.3 Question for 6 marks (Write short answer questions)

1. Give distinguishing characters of class mamalia.

*Unit:-9 Conservation of species.*

Q.1 Multiple choice questions for two marks

1. National Animal of India is \_\_\_\_\_
  - a) Cow.
  - b) Elephant
  - c) Tiger.
  - d) Lion.
2. In India now Lion ( Panthera lea) is restricted to \_\_\_\_\_
  - a) Kaziranga Sanctuary (Assam).
  - b) Gir forest (Gujrat).
  - c) Annamalai Sanctuary ( Tamilnadu.)
  - d) Corbet National Park (Uttar Pradesh)

Define / Explain / Comment with suitable example.

1. Endangered species.
2. Vulnarable species.
3. Rare species.
4. Threatened species.

Q.2 : Questions for 4 marks. (Write short notes)

1. Describe In situ conservation of Biodiversity.

- 2. Describe Ex situ conservation of Biodiversity.
- 3. Describe Identification of Species.
- 4. Describe long term Captive breeding .
- 5. Describe short term Captive breeding .
- 6. Describe Endangered & Vulnerable species.
- 7. Describe Rare & Threatened species.
- 8. Describe various adaptive Radiation in mammal.

**Q.3 Question for 6 marks (Write short answer questions)**

- 1. What is Conservation ? Give importance of Conservation.
- 2. Give Causes for threatened species.

---

**Paper-I; Section- B (Diversity of Chordates)**

Chapter wise weightage of marks.

Sr.No.	Unit No.	Periods allotted	Marks allotted
1	1	02	02
2	2	06	08
3	3	04	06
4	4	07	09
5	5	05	07
6	6	04	06
7	7	08	10
8	8	05	07
9	9	04	05
		Total : 45	Total : 60

\*\*\*\*\*

## Paper- II Section A – Pest Management

### *Unit- 1 - Introduction to Pests*

#### Q1 Multiple Choice Questions( 2 Marks each )

- 1) Economic pest causes loss -----  
a) 5-10%                      b) 15-20%                      c) 0-4%                      d) none or above
- 2) The potential pest is that when -----  
a) major pest species become a minor pest.  
b) minor pest species become a major pest.  
c) both major & minor pests get mixed.  
d) none of above.
- 3) Which one of the following belongs to agricultural crop pest.  
a) *Musca domestica*.  
b) *Pediculus humanis*  
c) *Dysdercus singulatus*  
d) *Anopheles sps.*
- 4) ----- is the non insect pest.  
a) Aphid  
b) Rat  
c) Rice weevil  
d) Grasshopper
- 5) Structural pests cause damage to -----  
a) crop  
b) stored grains  
c) furniture  
d) pet animals.

#### Q 1 Define/Explain/Comment (2 Marks Each)

- |                       |                          |
|-----------------------|--------------------------|
| 1) Pest               | 2) Agricultural pest     |
| 3) Stored grain pest  | 4) Animal husbandry pest |
| 5) Public health pest | 6) Structural pest       |

#### Q. 2] Short notes / Sketch and label (Questions for 4 marks)

- |                        |                                   |
|------------------------|-----------------------------------|
| 1) Concept of pest     | 2) Categories of pest             |
| 3) Agricultural Pest   | 4) Invertebrate Non- insect pests |
| 5) Stored grain Pests  | 6) Animal Husbandry Pests         |
| 7) Public health Pests | 8) Structural Pests.              |

Q. 3] Questions for 6 marks.

1. What is Pest ? Mention different types of pests with at least two examples of each.
2. Describe various agricultural pests in brief.
3. Write in brief on store grain pest or structural pest.
4. Give brief account of animal husbandry pest & common pest of public health.

*Unit – 2 - Study of selected insect pest w.r.t.—*

**Q1 Multiple Choice Questions( 2 Marks each )**

- 1) *Cosmopolites stordidus* is the pest of-----
  - a) sugarcane
  - b) jowar
  - c) banana
  - d) cotton
- 2) Pink boll worm causes damage to-----
  - a) stored grains
  - b) mango
  - c) cotton boll
  - d) banana
- 3) ----- is the major pest of sugarcane.
  - a) *Pyrilla perpusilla*
  - b) *Dysdercus koenigi*
  - c) *Batocera rubus*
  - d) *Chilo partellus*
- 4) ----- stage in the life cycle of *Chico pertellus* is harmful to jowar.
  - a) Catterpillar
  - b) Pupa
  - c) Adult
  - d) None of the above.
- 5) Workers & soldiers are belonging to -----
  - a) reproductive
  - b) complimentary
  - c) sterile
  - d) both a) & b)
- 6) *Sitophilus orzac* is the ----- pest.
  - a) stored grain
  - b) agricultural
  - c) animal husbandary
  - d) structural
- 7) Fumigation with EDBR helps to control -----
  - a) *Pyrilla perpusilla*
  - b) *Callasobruchus chinenisis*
  - c) *Leucinodes orbonalis*
  - d) *Culex futigans*

**Q 1 Define/Explain/Comment (2 Marks Each)**

- 1) Mechanical control
- 2) Physical control
- 3) Cultural control
- 4) Legislative control
- 5) Quarantine measures
- 6) Superheating
- 7) Solarisation
- 8) Crop rotation
- 9) Intercropping.

**Q. 2] Short notes / Sketch and label (Questions for 4 marks)**

1. Banana thrips.
2. Nature of Damage of Banana stem borer.
3. Nature of Damage of Red cotton bug.
4. Nature of Damage of Pink boll worm.
5. Nature of Damage of Mango stem borer.
6. Nature of Damage of Jowar stem borer.
7. Nature of Damage of Brinjal shoot & fruit borer
8. Nature of Damage of White ants (Termite) or Dimak.
9. Nature of Damage of Rice weevil.
10. Nature of Damage of Pulse beetle.
11. Nature of Damage of Identification marks & nature of damage by Banana stem borer.
12. Nature of Damage of Red cotton bug.
13. Nature of Damage of Pink boll worm.
14. Nature of Damage of Sugar cane leafhopper.
15. Nature of Damage of Mango stem borer.
16. Nature of Damage of Jowar stem borer.
17. Nature of Damage of Brinjal shoot & fruit borer
18. Nature of Damage of Rice weevil.
19. Nature of Damage of Pulse beetle.
20. Life cycle / History Banana stem borer.
21. Life cycle / History of Red cotton bug.
22. Life cycle / History of Pink boll worm.
23. Life cycle / History of Sugar cane leafhopper.
24. Life cycle / History of Mango stem borer.
25. Life cycle / History of Jowar stem borer.
26. Life cycle / History of Brinjal shoot & Fruit borer.
27. Life cycle / History of Rice weevil.
28. Life cycle / History of Pulse beetle.
29. Life cycle / History of Pest of wood / Termite.
30. Reproductive cast of termite / white ant.
31. Sterile castes of Termite.
32. King & Queen of Termite.
33. Worker & Soldier of Termite.
34. Control Measures of Termite.
35. Control Measures of Red Cotton bug.
36. Control Measures of pink boll worm.
37. Control Measures of Pest of Cotton.
38. Control Measures of Mango stem borer.
39. Control Measures of Jowar stem borer.
40. Control Measures of Brinjal of fruit borer.
41. Control Measures of Termite.
42. Control Measures of Pulse beetle

43. Cultural / Chemical / Biological Method of Controlling Jowar Stem borer  
(any two method of control may be ask.)
44. Preventive method of stored grain pest.

Q. 3] Questions for 6 marks.

1. What is pest? Give brief account of red cotton w. r. t. identification life cycle, nature of damage & control measures.
2. Cotton - Pink boll worm
3. Sugarcane – *Pyrilla perpusilla* (Walkar)
4. Fruits – mango stem borer
5. Jowar – Jowar stem borer.
6. Vegetables – Brinjal shoot & fruit borer.
7. Stem grain – Pulse beetle.

*Unit – 3 Primary Control Measures*

Q1 Multiple Choice Questions( 2 Marks each )

- 1) ----- is the mechanical measure of controlling pest.  
a) Use of pesticides                      b) Hand picking  
c) Crop rotation                          d) Prunning and thinning
- 2) APDNWA comes under ----- measure.  
a) mechanical                              b) chemical  
c) quarantine                              d) legislative

Q 1 Define/Explain/Comment (2 Marks Each)

1. Insecticide / Pesticide
2. Stomach poison
3. Contact poison
4. Systemic poison
5. Fumigants
6. Endolytic systemic poisons
7. Endometatoxic systemic poison
8. Insecticide formulation
9. Emulsifiable concentrate.
10. Clean cultivation
11. Screening

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

1. Hand picking & Bait traps.
2. Explain any one or two primary Mechanical measures.

3. Hand netting and bagging.
4. Artificial bagging.
5. Insect traps.
6. Mechanical trap & suction type trap.
7. The grid type & glass trap.
8. A pheromone trap
9. Light trap.
10. Flooding & Mechanical means of Insect trapping.
11. Write any One or Two Primary Physical measures.
12. Artificial cooling & Super heating.
13. Radiation.
14. Solarisation.
15. Super heating & burning.
16. Write short note on any One of the Cultural Method.
17. Primary Control by planting pest resistant variety.
18. Ploughing in relation to insect control.
19. Crop radiation.
20. Flooding or irrigation.
21. Use of manures & fertilizers.
22. Time of planting and harvesting.
23. Closed season & Destruction of volunteer crop.
24. Ship farming & Tolerance of insect infestation.
25. Crop Competition.
26. Trap Crop.
27. Legislative measures.
28. Quarantine Measures.
29. Pre- requisites of Quarantine.

Q. 3] Questions for 6 marks.

1. How insect can be controlled by mechanical measure ?
2. Give physical measure to control insect pests.
3. Give any six culture measures to control insects.
4. How legislative & quarantine measures can be applied to control the pest.

*Unit- 4 – Chemical Control*

**Q1** Multiple Choice Questions ( 2 Marks each )

- 1) ----- is taken along with food by insect pest.
- |                          |                |
|--------------------------|----------------|
| a) Paris green           | b) BHC         |
| c) Carbon tetra chloride | d) Fertilizer. |

Q 1 Define/Explain/Comment (2 Marks Each)

1. Biological control
2. Predator
3. Parasite
4. Pathogen
5. Microbial pesticides
6. Autocidal control
7. Sterile male technique
8. Chemosterillants
9. Genetic technique
10. Pheromone
11. Primer effect pheromones
12. Alarm pheromone
13. Releaser effect pheromones
14. Trail pheromones
15. Aggregation pheromones
16. Juvenile hormone
17. Moulting hormone.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

1. Write short note on any one method of Chemical Control.
2. Stomach Poison.
3. Contact Poison.
4. Action of Contact Poison.
5. Systemic Poison.
6. Fumigants.
7. Draw- backs of chemical control (any one).
8. Resistance / Tolerance to insecticides.
9. Adverse effects of chemical / Pesticides on Agro ecosystem.
10. Adverse effects of chemical / Pesticides on human hygiene.

Q. 3] Questions for 6 marks.

1. What is chemical control of pest ? Classify insecticides on the basis of modes of their action with example and add a notes on any one.
  - i. Stomach poison
  - ii. Contact poison
  - iii. Systemic Poison
  - iv. Fumigants.
2. Describe any three insecticidal formulations and dilutions.
3. Enlist the drawbacks of chemical control and describe any one in detail.



*Unit -5 - Biological Control of Insect Pests*

**Q1 Multiple Choice Questions( 2 Marks each )**

- 1) *Gambusia affinis* is the predator of -----
  - a) caterpillars
  - b) predator
  - c) mosquito larvae
  - d) fish
- 2) *Bacillus thuringiensis* is used to control insect pest comes under ----- category.
  - a) parasite
  - b) predator
  - c) pathogen
  - d) all above
- 3) The sterile male technique comes under ----- control.
  - a) chemical
  - b) mechanical
  - c) biological
  - d) autocidal
- 4) Bombykol belongs to -----
  - a) aggregation pheromone
  - b) alarm pheromone
  - c) trail pheromone
  - d) sex pheromone

**Q 1 Define/Explain/Comment (2 Marks Each)**

- 1) J H analogue

**Q. 2] Short notes / Sketch and label (Questions for 4 marks)**

1. Biological control
2. Advantages of biological Control.
3. Describe qualities of the biological agents.
4. Explain any 1 or 2 biological agents.
5. Explain any 1 or 2 predators of biological agents.
6. The Parasites.
7. Parasites as biological agents.
8. Pathogen as a biological agents
9. Microbial pesticides.
10. Biological control management.
11. Drawbacks of biological Control Method.
12. Autocidal Control (any one)
13. The sterile – male technique.
14. Chemosterillants.
15. Types of chemosterillants.
16. Advantages of Chemosterillants.
17. The Genetic Technique.
18. Pheromone Control.
19. Sex Pheromones.
20. Aggregation Pheromones.

21. Alarm Pheromones.
22. Trail Pheromones.
23. Hormonal Control.
24. The Juvenile Hormone.
25. J H analogues.

Q. 3] Questions for 6 marks.

1. What is biological Control ? Comment on its advantages.
2. What are the biological agents related to biological control ? Describe their desirable qualities.
3. Explain the role of natural biological agents as predators.
4. Explain the role of natural biological agents as parasites
5. Explain the role of natural biological agents as pathogens.
6. Give brief account of biological control management.
7. Give the main drawbacks of biological control methods.
8. What is autocidal control ? Describe sterile male technique.
9. Describe sterile genetic technique.
10. Describe sterile pheromone technique.
11. What are chemosterillants ? Give their classification.
12. What are chemosterillants ? Give advantages of chemosterillants.

*Unit-6 - Integrated Pest management*

Q1 Multiple Choice Questions( 2 Marks each )

- 1) IPM abbreviation stands for -----
- a) Integrate Pest Management
  - b) International Pest Management
  - c) Indian Petrochemical Management
  - d) Integrated Pest manipulation

Q 1 Define/Explain/Comment (2 Marks Each)

- 1) Integrated Pest Management.

Q. 2] Short notes / Sketch and label (Questions for 4 marks)

1. Principles of Integrated pest Management.
2. Integrated tactics(any one or two)
3. Pesticides.
4. Pest Management strategies.
5. Integrated pest management modeling.
6. Steps of IPM program.

Q. 3] Questions for 6 marks.

1. What do you mean by IPM ? Give its principle?
2. Define IPM and give brief account of integrated tactics
3. Comments on pest management strategies and IPM modeling.

*Unit-7 - Pesticide Appliances*

**Q1 Multiple Choice Questions( 2 Marks each )**

- 1) The pesticide in the form of powder can be used with help of -----
  - a) Sprayer
  - b) knap sac sprayer
  - c) duster
  - d) power operated sprayer
- 2) ----- is used in the insect killing bottle.
  - a) sodium chloride
  - b) sodium cyanide
  - c) sodium hydroxide
  - d) sodium bicarbonate
- 3) ----- should be pinned thro' the right elytra during preservation.
  - a) Orthopteran
  - b) Coleopteran
  - c) Lepidopteran
  - d) Dipteran
- 4) To prevent the development of mould in the insect collection box ----- is used.
  - a) Naphthalene
  - b) Sodium cyanide
  - c) Sodium chloride
  - d) Sodium hydroxide

**Q 1 Define/Explain/Comment (2 Marks Each)**

- 1) Sprayer
- 2) Duster

**Q. 2] Short notes / Sketch and label (Questions for 4 marks)**

1. Describe any one form, from pesticide appliances.
2. The Duster.
3. Hand operator duster.
4. Power operator duster.
5. Hand operator Sprayer.
6. Hand automate (or Flit pump).
7. Hand compression sprayer.
8. Power operated sprayer.
9. Advantages & disadvantages of spraying.
10. Care & maintenance of spray & Dust.
11. The Cynogas food pump.
12. Insect collecting Net.
13. Insect Killing bottles.
14. Preservation of Insect pest.
15. Spreading Board.





Paper-II ; Section-A.( Pest Management )

Chapter wise weightage of marks

Sr.No.	Unit No.	Periods allotted	Marks allotted
1	1	4	05
2	2	8	11
3	3	4	05
4	4	4	05
5	5	5	07
6	6	8	11
7	7	4	05
8	8	4	06
9	9	4	05

Total : 45

Total : 60

**Paper II ; Section-B (Apiculture)**

*Unit .1 Introduction to modern bee keeping*

Q1. Define /explain----- each two marks

1) Apiculture

Q1. Multiple Choice Questions ----- each two marks

1) The process of rearing honeybee artificially is called as -----

a) Horticulture b) Apiculture c) Sericulture d) pisciculture

2) In Maharashtra board is engaged in research and extension of bee keeping

a) KVI b) CBI c) AGI d) KVIC

3) The primary objective of beekeeping is to increase

a) Propagation b) Honey extraction c) Crop production d) Wax production

Q.2 Write a short notes on ----- each four marks

1) Explain the Scope of bee keeping in India and Maharashtra

2) Explain beekeeping as industry

Q.3 Answer the following ----- each six marks

- 1) Explain the importance of beekeeping in rural /social development.

*Unit.2 Taxonomy, Bee species and their distribution*

Q1. Multiple Choice Questions

- 1) The honey bees are belong to phylum-----  
a) Mollusca b) Annelida c) Arthropoda d) Echinodermata
- 2) ----- species of honeybee is more medicinal importance  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*
- 3) ---- is commonly known as ferocious bee  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*
- 4) Honey bee is belong to order -----  
a) Lepidoptera b) Hymenoptera c) Orthoptera d) Diptera
- 5) -----Indian species is popularly domesticated in India.  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*
- 6) Species construct hive in bushes is  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*
- 7) Species construct hive on tall plants, building is----  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*
- 8) ----- bee is the smallest honeybee.  
a) *Apis mellifera* b) *Apis dorsata* c) *Apis cerana indica* d) *Apis florea*

Q.2 Answer the following ----- each four marks

- 1) Comment on *Apis dorsata*
- 2) Comment on *Apis cerana indica*
- 3) Comment on *Apis florea*
- 4) Comment on *Apis mellifera*

Q.3 Answer the following ----- each six marks

1. Give systematic position of honey bee and write a short note on  
*Apis dorsata* / *Apis cerana inidca* / *Apis florea* / *Apis mellifera*

*Unit.3 Morphology of honeybee*

Q1.Define and explain ----- each two marks

- 1) Nuptial flight
- 2) Cleaning operation
- 3) Orientation flight
- 4) Administering to the Queen
- 5) Guard duty
- 6) Polymorphism
- 7) Field bee
- 8) Crop of worker bee
- 9) Robber bee
- 10) Honey flow period
- 11) Dearth period

Q.1 Multiple Choice Questions

- 1) The pollen basket is present on ----- leg  
a) Prothoracic    b) Mesothoracic    c) Metathoracic    d) All
- 2) The antenna cleaner is present on -----leg  
a) Prothoracic    b) Mesothoracic    c) Metathoracic    d) All
- 3) The pollen spur is present on -----leg  
a) Prothoracic    b) Mesothoracic    c) Metathoracic    d) All
- 4) The sting apparatus is absent in----  
a) Worker    b) Queen    c) Drone    d) All
- 5) ----- bee is called as sterile female  
a) Worker    b) Queen    c) Drone    d) All
- 6) The unfertilized eggs are laid in -----  
a) Queen cell    b) Drone cell    c) Worker cell    d) Honey cell
- 7) The location of drone's pupal eye is ---  
a) Far apart    b) Nearer    c) Laterally    d) Ventrally



- 8) The colony of honey bees is  
a) Monomorphic b) Polymorphic c) Dimorphic d) All three
- 9) ----- bee provides the cohesive force to the colony  
a) Worker b) Drone c) Queen d) All
- 10) Life span of drone is -----  
a) Two to four weeks b) Twelve to Sixteen weeks c) Seven to nine weeks  
d) Six to seven years
- 11) Life span of Queen is -----  
a) Two to four weeks b) Twelve to Sixteen weeks c) Seven to nine weeks  
d) Six to seven years

**Q.2 Short notes----- each four marks**

1. Comment on Queen less colony
2. Describe the role of field bees
3. Explain the external morphology and function of drone
4. Explain the external morphology of worker bee
5. Explain the morphology and function of the Queen bee
6. What is Nuptial flight give its significance
7. Describe the structure of prothoracic leg and its function.
8. Describe the structure of metathoracic leg and mention its function.
9. Describe the structure of mesothoracic leg and mention its function.
10. Explain the stinging mechanism of guard bee
11. Comment on mechanism of ventilating the bee hive
12. Describe the thoracic gland of worker bee
13. Describe the structure of wings in worker bees
14. Comment on execution of robber bees.
15. Describe development and cast determination in honey bee.
16. Explain the comb building mechanism of worker bees

**Q.3. Answer the following----- each six marks**

- 1) With the help of well labelled diagram explain the digestive system of worker bee .Add a note on physiology of digestion.
- 2) What is polymorphism .Describe the polymorphism in honey bee
- 3) With the help of neat labeled diagram describe in detail the structure of sting apparatus of worker bee
- 4) Give a brief account on the life history of honey bee.
- 5) Give brief account of the indoor and outdoor duties of worker bees
- 6) Describe the social organization in honey bees .State the role played by each constituents
- 7) Give brief account of division of labour in worker bees

Sketch and label the diagram----- each four marks

- 1) Sting apparatus of worker bee
- 2) Mouth parts of worker bee
- 3) Digestive system of worker bee
- 4) Metathoracic leg
- 5) Prothoracic leg
- 6) Mesothoracic leg
- 7) Queen bee
- 8) Worker bee
- 9) Drone

*Unit.4 Bee behaviour and communication*

Q1. Define and explain----- each two marks

- 1) Absconding
- 2) Bee communication
- 3) Round dance
- 4) Wagtail dance
- 5) D.V.A.V. dance
- 6) Cleaning dance
- 7) Massage dance
- 8) Alarm dance

Q1 Multiple Choice Questions

- 1) ----- invented the bee language  
a) Aristotle    b) Mendel    c) Karl von Frisch    d) Fleming
- 2) When bee happy she performs ----- dance  
a) Circular dance    b) Wriggle dance    c) DVAV    d) Alarm dance
- 3) When colony is in danger worker bee performs ---  
a) Circular dance    b) wriggle dance    c) DVAV    d) Alarm dance

Q.2 Short notes ----- each four marks

- 1) Comment on DVAV dance
- 2) Describe the wagtail dance and give its significance
- 3) Comment on Alarm dance
- 4) Explain Massage dance

- 5) Explain the Cleaning dance and give its significance
- 6) Explain the Round dance and give its significance

Q.3 Answer the following ----- each four marks

- 1) Give short resume of each type of the communication dances in honey bee
- 2) What is bee communication? Give an account on different dances

*Unit.5 Beehive, swarm and colony of bees and scientific beekeeping*

Q1. Define and explain----- each two marks

- 1) Swarm
- 2) Pheromones
- 3) Nasonov pheromones
- 4) Queen bee substance
- 5) Alarm pheromones
- 6) Queen trail pheromone
- 7) Brood pheromone

Q 1. Multiple Choice Questions

- 1) Queen cell shape is -----  
a) Hexagonal b) Pentagonal c) Octagonal d) Dome
- 2) ----- is important in the recognition of worker, drone larvae and pupae.  
a) Brood pheromone b) Queen Trail pheromone c) Queen Bee substance  
d) Alarm pheromones

Q.2 Short notes----- each four marks

- 1) Explain the scope of synthetic pheromones in beekeeping
- 2) Describe the method of capturing swarm from a tree brushes
- 3) Describe the method of capturing swarm from a ground
- 4) Give brief account of pheromones of bees and its significance
- 5) Give an account of food of bees.
- 6) Comment on winter management
- 7) Comment on summer management
- 8) Comment on monsoon management
- 9) Comment on selection of species for running a good apiary

Q.3 Answer the following ----- each six marks

- 1) Give an account of the methods of swarm capturing from tree branch & ground

- 2) Explain the seasonal management of bee colony
- 3) How inspection of bee colonies can be done
- 4) Give detail account of establishment of an apiary
- 5) Describe the process of controlling swarming
- 6) Explain the steps of hiving a colony
- 7) Give the steps during the handling of colony

Sketch and label the diagram .....each four marks

- 1) Hive Architecture

*Unit.6. Beekeeping equipments*

Q1 Define / Explain----- each two marks

- 1) Bee veil
- 2) Bee dress
- 3) Smoker
- 4) Hive tool
- 5) Bee brush
- 6) Uncapping knife
- 7) Queen cage
- 8) Honey extractor
- 9) Solar wax extractor
- 10) Venom extractor
- 11) Ant wells
- 12) Feeder
- 13) Swarm net

Q.2 Write short notes on ----- each four marks

- 1) Describe the Swarm catching equipments
- 2) Honey extractor
- 3) Explain the importance of modern beekeeping box in beekeeping industry
- 4) Pollen trap

Q.3. Answer the following ----- each six marks

- 1) Comment on equipments required for improving hygienic productivity
- 2) Comment on equipments required for improving the efficiency of beekeepers
- 3) Describe the components of Langstroth frame hive

Sketch and label the diagram – each four marks

- 1) Bee keeping box
- 2) Smoker
- 3) Bee escape board

- 4) Bee dress

*Unit.7. Apiculture in Agriculture*

Q1 Define and explain

- 1) Floral calendar
- 2) Bee flora
- 3) Foraging behaviour of bee
- 4) Foraging distance and area
- 5) Robber bee
- 6) Foraging speed and foraging rate
- 7) Bee pollination
- 8) Migratory beekeeping

Q 1. Multiple Choice Questions

- 1) The period denoting the blossom of flower
  - a ) Numerical calendar
  - b) Floral calendar
  - c) Periodic calendar
  - d) alphabetical calendar
- 2) Time spend per flower is called --
  - a) Foraging rate
  - b) Foraging speed
  - c) Foraging flow
  - d) Foraging
- 3) Number of flower visited per minute is called as --
  - a) Foraging rate
  - b) Foraging speed
  - c) Foraging flow
  - d) Foraging

Q.2 Write shorts notes on ----- four marks each

- 1) Give importance of bee flora in beekeeping
- 2) Describe good qualities of bee flora
- 3) Explain the benefits of bee pollination
- 4) Explain the importance of floral calendar in beekeeping
- 5) Pollination efficiency of bees
- 6) Colony distribution in the crop
- 7) Comment on improvement of the bee forage
- 8) Explain the concept of migratory bee keeping
- 9) Give an account of food of bees.

Q.3 Answer the following ----- each six marks

- 1) Give brief account of the role of honey bees in agricultural input
- 2) Explain the beekeeping and its prospectus for agriculture, horticulture,

- and forest development
- 3) Explain recent trends in pollination with reference to bees and future thrust
  - 4) Explain how bees are efficient pollinators
  - 5) Explain foraging behavior of bees
  - 6) Comment on management of honeybees for pollination
  - 7) Explain the morphological adaptations of worker bee in relation to pollination

*Unit.8 Honey bee products*

Q1. Define and explain ----- each two marks

- 1) Royal Jelly
- 2) Honey
- 3) Bee venom
- 4) Propolis
- 5) Bee wax

Q.1 Multiple Choice Questions----- each two marks

- 1) The rich source of proteins, minerals and amino acids is  
a) Royal jelly   b) Honey   c) Wax   d) Propolis
- 2) Arthritis and rheumatics pains can be treated with  
a) Royal jelly   b) Honey   c) Bee venom   d) Propolis
- 3) Royal jelly is rich in ----- vitamins  
a) vit-A   b) vit-B   c) vit-C   d) vit-D
- 4) -----is the resinous material collected from trees  
a) Royal jelly   b) Honey   c) Propolis   d) Venom
- 5) --- enzyme convert sucrose into glucose in honey  
a) Endonuclease   b) Ribonuclease   c) Invertase   d) Lipases

Q.2 Write short notes on ----- each four marks

- 1) Economic importance of honey
- 2) Comment on uses of pollen
- 3) Comment on uses of royal jelly
- 4) Comment on uses of venom
- 5) Comment on uses of propolis
- 6) Comment on uses of bee wax

- 7) Describe the methods of extraction of wax
- 8) Describe the method of collection of bee venom
- 9) Describe the method of collection of royal jelly

**Q.3 Answer the following ----- each six marks**

- 1) Give the chemical constituents, method of collection and uses of royal jelly
- 2) Explain the chemical constituents, method of collection and uses of pollen
- 3) Explain the chemical constituents, method of collection and uses of bee venom.
- 4) Describe the chemical constituents, method of collection and uses of propolis
- 5) Explain the chemical constituents, method of collection and uses of bee wax
- 6) Give the list of any four bee products and their uses
- 7) Describe the chemical constituents and economic importance of honey

*Unit.9 Problems of beekeeping industries*

**Q1. Define and explain ----- each two marks**

- 1) Brood disease

**Q 1. Multiple Choice Questions**

- 1) *Aspergillus flavus* causes
  - a) Chalk brood disease
  - b) Stone brood disease
  - c) Sac brood disease
  - d) All three
- 2) Nosema disease is caused by
  - a) *Aspergillus flavus*
  - b) *Nosema apis*
  - c) *Pericystis apis*
  - d) All
- 3) Chalk brood diseases is caused by---
  - a) *Aspergillus flavus*
  - b) *Nosema apis*
  - c) *Pericystis apis*
  - d) All
- 4) Stone brood disease is caused by ---
  - a) *Aspergillus flavus*
  - b) *Nosema apis*
  - c) *Pericystis apis*
  - d) All
- 5) The American Foul Brood disease is caused by ----
  - a) *Aspergillus flavus*
  - b) *Nosema apis*
  - c) *Pericystis apis*
  - d) *Bacillus*

**Q.2 Write Short notes on ----- each four marks**

- 1) Comment on honey bee repellent
- 2) Comment on Chalk brood disease
- 3) Comment on Stone brood disease
- 4) Comment on Sac brood disease

Q.3 Answer the following ----- each six marks

- 1) Give an account of bee enemies, bee pest and its control measures
- 2) Explain the symptoms of bee poisoning
- 3) Describe harmful activities of human being to honey bees
- 4) Explain how you prevent the bee poisoning
- 5) Give brief account of apiary and hive hygiene
- 6) Describe the adult bee diseases
- 7) Explain the American Foul Brood diseases and its control measures
- 8) Explain the European Foul Brood diseases and its control measures
- 9) Give brief account of various courses of beekeeping

### Paper-II ; Section B – Apiculture

Chapter wise weightage of Marks.

Sr.No.	Unit	Period allotted	Marks allotted
1	1	3	04
2	2	3	04
3	3	7	09
4	4	3	04
5	5	8	10
6	6	3	04
7	7	8	10
8	8	4	06
9	9	4	06
10	10	2	03
		Total: 45	Total : 60

**Dr.A.Y.Mahajan.**  
**Chairman,**  
**Board of Studies in Zoology,**  
**North Maharashtra University, Jalgaon.**