



Dept. Of Zoology
Dinakrushna College, Jaleswar, Balasore

Question Bank — Semester 1, Paper: Major-1
INVERTEBRATES: Protista to Echinodermata
Sample Question - 5 Sets

Based on NEP 2020 Syllabus

Section	Question Type	Questions to Answer	Marks per Question	Total Marks
Section A	Fill in the Blanks / Objective Questions	10 (Compulsory)	1	10
Section B	Short Notes	9 (Compulsory)	2	18
Section C	Medium-length Analytical / Descriptive Notes	8 (Out of 10)	5	40
Section D	Long Essay / Illustrated Descriptive Questions	4 (Out of 5)	8	32
Total Marks:				100

SAMPLE QUESTION PAPER - SET 1

Semester I

Time: 3 Hours

Core I -Maj ZOO-I

Full Marks: 100

Answer all questions. The figures in the right-hand margin indicate marks.

SECTION - A

1. Fill in the blanks: 1 × 10 = 10

- a. The infective stage of *Entamoeba histolytica* to humans is the _____ cyst.
- b. In sponges, the flagellated collar cells lining the spongocoel or radial canals are called _____.
- c. The free-swimming, bell-shaped sexual zooid in the life cycle of metagenic cnidarians is the _____.
- d. The excretory units of Platyhelminthes containing a tuft of cilia are known as _____ cells.
- e. The body cavity of nematodes is not lined by mesodermal epithelium and is therefore termed a _____.
- f. The respiratory organs found in terrestrial chelicerates such as scorpions and spiders are _____.
- g. In *Nereis*, the lateral, unjointed fleshy locomotory appendages bearing setae are called _____.
- h. The specialized raspatory feeding organ found in the buccal cavity of most molluscs is the _____.
- i. In *Asterias* (starfish), the minute pincer-like calcareous structures used for cleaning the body surface are _____.
- j. The hypothetical dipleurula-like ancestral larva of echinoderms is characterized by a ciliated band and _____ symmetry.

SECTION - B

2. Write short notes on the following:

2 × 9 = 18

- a. Locomotory organelles in Protozoa
- b. Distinguishing features of Syconoid canal system
- c. Functions of cnidocytes in Coelenterata
- d. Morphological features of Scolex in *Taenia solium*
- e. Sexual dimorphism in *Ascaris lumbricoides*
- f. Structure and significance of the Clitellum in earthworms
- g. Structure of compound eye in Arthropods
- h. Radular structure and mechanism in Gastropoda
- i. Functions of the Water Vascular System in Echinodermata

SECTION - C

3. Write notes on any eight of the following:

5 × 8 = 40

- a. Conjugation in *Paramecium caudatum* and its genetic significance.
- b. Types of canal system in Phylum Porifera.
- c. Polymorphism in Siphonophora with suitable examples.
- d. Life cycle stages and pathogenesis of *Wuchereria bancrofti*.
- e. Structural organization and evolutionary position of *Onychophora*.
- f. Metamerism in Annelida: Types, origin, and evolutionary significance.
- g. Tracheal respiration mechanism in terrestrial insects.
- h. Mechanism and adaptive value of torsion in Gastropoda.
- i. Structure and functions of tube feet in *Asterias*.
- j. General characters and evolutionary affinities of Ctenophora.

SECTION - D

4. Answer any four of the following:

8 × 4 = 32

- a. Describe the life cycle, transmission, and pathogenic effects of *Plasmodium vivax* in the human host and female *Anopheles* mosquito.
- b. Provide a comparative account of the canal systems in Porifera (Asconoid, Syconoid, and Leuconoid) along with their evolutionary pathways.
- c. Give a detailed illustrated account of the life history and larval adaptations of *Fasciola hepatica* in its primary and intermediate hosts.
- d. Discuss the respiratory mechanisms in Arthropoda, highlighting gill systems in Crustacea, tracheae in Hexapoda, and book lungs in Arachnida.
- e. Describe the organization of the water vascular (ambulacral) system in *Asterias* with labelled diagrams and explain its role in locomotion.

SAMPLE QUESTION PAPER - SET 2

Semester I

Time: 3 Hours

Core I -Maj ZOO-I

Full Marks: 100

Answer all questions. The figures in the right-hand margin indicate marks.

SECTION - A

1. Fill in the blanks:

1 × 10 = 10

- a. The active, feeding, motile stage in the life cycle of parasitic protozoans is called a _____.
- b. Internal asexual buds produced by freshwater sponges to survive unfavorable conditions are _____.
- c. The specialized sensory structures containing statocysts located at the bell margin of Scyphozoan medusae are called _____.
- d. The intermediate host in the life cycle of *Taenia saginata* (beef tapeworm) is _____.
- e. The infectious stage of *Plasmodium vivax* is the _____.
- f. The green glands (antennae glands) in crustaceans function primarily as _____ organs.
- g. The blood sucking anticoagulant substance present in the saliva of medicinal leeches is _____.
- h. The respiratory organ called ctenidium in molluscs is housed within the _____ cavity.
- i. The perforated plate through which seawater enters the water-vascular system of echinoderms is the _____.
- j. The free-swimming ciliated larva of Phylum Porifera with flagellated anterior cells is known as _____.

SECTION - B

2. Write short notes on the following:

2 × 9 = 18

- a. Binary fission in *Euglena*
- b. Histological types of cells in sponge pinacoderm and choanoderm
- c. Metagenesis in *Obelia*
- d. Proglottids in Cestoda and their maturation sequence
- e. Cuticle structure in parasitic Nematoda
- f. Structure of septal nephridia in *Pheretima*
- g. Social caste organization in Termites
- h. Pearl formation mechanism in Bivalvia
- i. Bipinnaria larva characteristics and affinities

SECTION - C

3. Write notes on any eight of the following:

5 × 8 = 40

- a. Locomotion in Amoeba: Sol-gel theory and molecular basis of amoeboid movement.
- b. Evolutionary significance and affinities of Ctenophora (Comb jellies).
- c. Formation, biological diversity, and environmental threats to Coral Reefs.
- d. Morphological and physiological adaptations of Helminthes to endoparasitism.
- e. Excretory system and nephridial variations across Annelida.
- f. Types and hormonal control of metamorphosis in Class Insecta.
- g. General characters of Class Onychophora and its status as a connecting link.
- h. Structure, modification, and function of the molluscan foot in different classes.
- i. Autotomy and regenerative capacity in Echinodermata.
- j. Classification of Phylum Protozoa up to classes with characteristic diagnostic features.

SECTION - D

4. Answer any four of the following:

8 × 4 = 32

- a. Describe in detail the life history, parasitic transmission, clinical symptoms, and prophylaxis of *Leishmania donovani* (Kala-azar parasite).
- b. Give a comprehensive essay on polymorphism in Cnidaria, detailing the structure and division of labor between gastrozooids, gonozooids, and dactylozooids.
- c. Discuss the origin and evolution of coelom in invertebrates, distinguishing clearly between acoelomate, pseudocoelomate, schizocoelomate, and enterocoelomate conditions.
- d. Write an essay on the economic importance of insects, categorizing beneficial insects (apiculture, sericulture, lac culture, biological control) and harmful agricultural/medical pests.
- e. Explain the phenomenon of torsion and detorsion in Gastropoda, detailing the 180-degree visceral twist, its anatomical consequences, and its evolutionary advantages/disadvantages.

SAMPLE QUESTION PAPER - SET 3

Semester I

Time: 3 Hours

Core I -Maj ZOO-I

Full Marks: 100

Answer all questions. The figures in the right-hand margin indicate marks

SECTION - A

1. Fill in the blanks:

1 × 10 = 10

- a. The organelle of osmoregulation in freshwater protozoa is the _____ vacuole.
- b. In leuconoid sponges, flagellated chambers are formed by the folding of _____ layer.
- c. The jelly-like extracellular matrix present between ectoderm and endoderm in Cnidaria is the _____.
- d. The free-swimming ciliated first larva that hatches from the egg of *Fasciola hepatica* is the _____ larva.
- e. *Enterobius vermicularis* is commonly known as the human _____ worm.
- f. The respiratory pigment dissolved in the plasma of earthworms is _____.
- g. Excretory tubules opening into the junction of the midgut and hindgut in insects are _____ tubules.
- h. The modification of mantle margin in cephalopods that expels water for jet propulsion is the _____.
- i. The specialized chewing and masticatory apparatus found in Sea Urchins (Echinoidea) is called _____.
- j. Onychophorans respire through unbranched _____ that open via numerous stigmata scattered over the body.

SECTION - B

2. Write short notes on the following:

2 × 9 = 18

- a. Nutrition types in Mastigophora
- b. Sponge gemmule structure and hatching
- c. Colloblasts in Ctenophora and their predatory role
- d. Cysticercus (bladder worm) larva structure
- e. Rhabditiform larva of nematodes
- f. Trochophore larva structure and phylogenetic significance

- g. Types of insect mouthparts (Chewing vs. Siphoning)
- h. Glochidium larva and its parasitic life on fishes
- i. Ophiuroid larval stage (Ophiopluteus) characteristics

SECTION - C

3. Write notes on any eight of the following:

5 × 8 = 40

- a. Nutrition and reproduction in *Euglena viridis*.
- b. Classification of Phylum Porifera up to classes with characteristic diagnostic examples.
- c. Stinging mechanism, structure, and discharge kinetics of Nematocysts.
- d. Pathogenicity and life cycle of *Ancylostoma duodenale* in humans.
- e. Detailed morphology and taxonomic position of *Peripatus* as an evolutionary link.
- f. Nervous system organization in Annelida with reference to *Nereis* or Earthworm.
- g. Structure, sensory mechanism, and vision formation in Arthropod ommatidium (Mosaic vision).
- h. Respiration in Mollusca: Ctenidia, pulmonary sacs, and secondary gills.
- i. Larval forms across Echinodermata and their phylogenetic significance.
- j. General characteristics and classification of Phylum Platyhelminthes.

SECTION - D

4. Answer any four of the following:

8 × 4 = 32

- a. Describe the different modes of reproduction (asexual fission, budding, syngamy, conjugation, and autogamy) found across Phylum Protozoa.
- b. Explain the various theories regarding the origin and evolution of metameric segmentation in Annelida (Locomotion theory, Fission theory, Cyclomerism theory).
- c. Provide a comprehensive account of the life history, pathogenicity, and control measures of *Ascaris lumbricoides* with a labelled diagram of its developmental cycle.
- d. Describe the structure, formation, types (Fringing reefs, Barrier reefs, and Atolls), and Darwin's Subsidence Theory of Coral Reef formation.
- e. Discuss the organization of nervous and sensory systems in Cephalopoda, emphasizing eye specialization compared to the vertebrate eye.

SAMPLE QUESTION PAPER - SET 4

Semester I

Core I -Maj ZOO-I

Time: 3 Hours

Full Marks: 100

Answer all questions. The figures in the right-hand margin indicate marks.

SECTION - A

1. Fill in the blanks:

1 × 10 = 10

- a. The class of Protozoa that exclusively moves using cilia and possesses nuclear dualism is _____.
- b. The opening through which water leaves the spongocoel of a sponge is the _____.
- c. The sensory balance organs situated on the rhopalium of scyphomedusae are _____.
- d. The free-living class of flatworms represented by *Planaria* is Class _____.
- e. The non-cellular outer layer that covers the body of parasitic nematodes is the _____.
- f. The chitinous exoskeleton of arthropods is shed periodically during growth by a process termed _____.
- g. The coelomic fluid-filled cavities of annelids provide structural support functioning as a _____ skeleton.
- h. The mantle cavity of freshwater mussels contains _____ gills modified for filter-feeding and respiration.
- i. The larval form of Sea Cucumbers (Class Holothuroidea) is the _____ larva.
- j. Onychophora shares arthropodan characteristics such as chitinous cuticle, hemocoel, and open _____ system.

SECTION - B

2. Write short notes on the following:

2 × 9 = 18

- a. Nuclear dimorphism in Ciliophora
- b. Asconoid type of water canal system
- c. Morphology of coral polyps
- d. Regeneration in *Dugesia* (Planaria)
- e. Epidemiology and transmission of Pinworm
- f. Structure and significance of Parapodia in Polychaetes
- g. Endocrine control of ecdysis (molting) in Insects
- h. Shell layers (Periostracum, Prismatic, Nacreous) in Mollusca
- i. Aristotle's Lantern morphology and function in *Echinus*

SECTION - C

3. Write notes on any eight of the following:

5 × 8 = 40

- a. Schizogony and Gametogony cycles of *Plasmodium* in the human erythrocyte.
- b. Histology and functional cellular diversity in Porifera.
- c. Comparative account of Hydra polyp vs. Obelia medusa.
- d. Life cycle and pathogenic consequences of *Taenia solium* (Cysticercosis).
- e. Comparative morphology of male and female reproductive systems in *Ascaris*.
- f. Adaptations and morphological diversity of appendages in Crustacea.
- g. Annelidan affinities vs. Arthropodan affinities of *Peripatus*.
- h. Circulatory system and respiratory pigments in Mollusca.
- i. Water vascular system in *Asterias*: Structure and mechanism of ampullae and podium.
- j. Diagnostic characteristics and classification of Phylum Echinodermata up to living classes.

SECTION - D

4. Answer any four of the following:

8 × 4 = 32

- a. Give a comprehensive illustrated account of the life history of *Plasmodium vivax*, detailing its polymorphic forms, vector transmission by Mosquito, and pathogenesis of malaria.
- b. Describe the types, development, skeletal framework, and socioeconomic-ecological significance of Coral Reefs, and explain coral bleaching phenomena.
- c. Provide an essay on parasitic adaptations in Platyhelminthes and Nematelminthes, highlighting structural degenerations, specialized attachments, physiological resistance, and reproductive enhancements.
- d. Discuss the respiratory adaptations in Arthropoda with specialized notes on aquatic branchial systems, aerial tracheal networks, and book gills/book lungs.
- e. Describe the structure, development, and phylogenetic significance of the Trochophore larva, explaining its role in demonstrating evolutionary relationships between Annelida and Mollusca.

SAMPLE QUESTION PAPER - SET 5

Semester I

Time: 3 Hours

Core I -Maj ZOO-I

Full Marks: 100

Answer all questions. The figures in the right-hand margin indicate marks.

SECTION - A

1. Fill in the blanks:

1 × 10 = 10

- a. The protozoan parasite that causes primary amoebic meningoencephalitis (PAM) through contaminated water is _____.
- b. Sponge skeleton is secreted by specialized mesenchymal cells called _____.
- c. The solitary freshwater hydrozoan polyps that lack a medusa stage in their life history belong to genus _____.
- d. The intermediate host in the life cycle of the blood fluke *Schistosoma mansoni* is an aquatic _____.
- e. Microfilariae of *Wuchereria bancrofti* exhibit _____ periodicity, appearing in peripheral blood predominantly at night.
- f. The respiratory pigment hemocyanin present in molluscs and crustaceans contains the metal ion _____.
- g. In earthworms, fertilization and cocoon formation take place within secretions produced by the _____.
- h. The largest class of Phylum Mollusca characterized by asymmetrical body organization and coiled shells is Class _____.
- i. In starfish, the coelomic fluid is circulated through the hemal system and the branches of the _____ ring.
- j. The free-swimming ciliated larva of sea urchins (Echinoidea) is the _____ larva.

SECTION - B

2. Write short notes on the following:

2 × 9 = 18

- a. Encystment and its survival value in freshwater Protozoa
- b. Leuconoid (Rhagon) canal system structure
- c. Differences between hydromedusae and scyphomedusae
- d. Miracidium larva adaptations for host penetration
- e. Pathogenicity of *Ancylostoma duodenale* (Hookworm anemia)
- f. Structure of chloragogen cells in Annelida
- g. Castes and division of labor in Honeybee society
- h. Structure and functions of Osphradium in Gastropoda
- i. Structure of Pluteus larva and its metamorphosing modifications

SECTION - C

3. Write notes on any eight of the following:

5 × 8 = 40

- a. Osmoregulation and contractile vacuole mechanism in fresh water Protozoans.
- b. Water current generation and dietary particle filtration in Porifera.
- c. Metagenesis and alternation of generation in *Obelia*.
- d. Classification of Phylum Nematelminthes up to classes with representative examples.
- e. Adaptations and evolutionary significance of Trochophore larva.
- f. Structure and functions of excretory organs (coxal glands and Malpighian tubules) in Arachnida and Insecta.
- g. Diagnostic characteristics, anatomical affinities, and taxonomic status of *Peripatus*.
- h. Mechanism of pearl culture and histological layers of oyster shell.
- i. Ambulacral groove and podial locomotion mechanism in *Asterias*.
- j. Classification of Phylum Arthropoda up to subphyla and classes with distinctive characters.

SECTION - D

4. Answer any four of the following:

8 × 4 = 32

- a. Give a comprehensive illustrated account of the life history, modes of infection, pathogenic effects, and clinical manifestations of *Wuchereria bancrofti* (Elephantiasis).
- b. Describe the types, architectural variations, water flow mechanics, and evolutionary progression of the Canal System in Phylum Porifera.
- c. Discuss the origin, morphological variations, and evolutionary significance of the Coelom in major invertebrate phyla.
- d. Describe social organization, communication mechanisms (round and waggle dance languages), and polyethism in Honeybees (*Apis* sp.).
- e. Give a detailed account of the Water Vascular System in Echinodermata, explaining its anatomical components, hydraulic propulsion mechanism, and multifunctional roles.