ZOO201 – ANIMAL DIVERSITY (INVERTEBRATES)

MID TERM IMPORTANT QUESTIONS

1. **Write difference between Annelids and Arthropods.**

Arthropods are invertebrate animals that possess a segmented body, an exoskeleton, and paired appendages. Whereas, annelids are another group of invertebrates that are segmented worms by transverse rings. Though arthropods have an exoskeleton, annelids do not.

Furthermore, arthropods have an open circulatory system while annelids have a closed circulatory system. Moreover, arthropods have a chitinous cuticle while annelids have a collagenous cuticle. Insects, crustaceans, arachnids are several groups of arthropods while Earthworms, ragworms, and leeches are some groups of annelids. Thus, this summarizes the difference between arthropods and annelids.

2. **Explain body wall of Turbellarian.**

Body wall:

A basement membrane that separates the epidermis from mesodermally derived tissues. An outer layer of circular muscles and inner layer of longitudinal muscle lie beneath the basement membrane. The innermost layer is endodermis that comprises the digestive cavity. Rhabdites, protective mucus sheath around the body possibly in response to attempted predation or desiccation. Adhesive glands attract part of turbellaria to the substrate. Releaser glands release the enzyme that dissolved the attachment.

3. **Explain digestion and Nutrition in Turbellarian.**

Digestion and Nutrition:

Most turbellarians are carnivores, some are herbivores. Food digestion is extra cellular and intra-cellular.

4. **What are monoecious and dioecious species?**

Monoecious:

The plants or organisms that have both female and male sexual organs or flowers on the same plant are called Monoecious plants. Examples, banana, Squash, Earthworms, slugs, jellyfish and planarians.

Dioecious:

The plants or organisms that have separate female and male sexual organs or flowers are called dioecious plants. Examples, holly plants, ginkgo tree, Mammals, birds, reptiles and insects.

5. **What is function of pellicle in protozoa?**

Most protozoans are enclosed by a skeletal structure known as the pellicle consisting of the plasma membrane and underlying cytoskeleton (with additional membranes, microtubules, microfilaments, or plates of cellulose or protein). The pellicle maintains the shape of the cell.

6. **Write general characters of phylum Cnidaria.**

- Radial or biradial symmetry.
- They have body walls of ectoderm and endoderm separated only by mesogloea; a single
- body cavity (enteron) with a mouth but no separate anus;
- a simple nerve net;
- No separate excretory or circulatory systems.
- Nematocysts are present.
- Solitary or colonial, and they are often polymorphic with alternate polyps and medusa.

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7. What are characteristics of deuterostomes?

Deuterostome originates from the Greek word meaning "mouth second". In deuterostomes, the anus develops first and the mouth develops later.

Important Characteristics:

1. Enterocoely: In deuterostomes, the mesoderm forms as invaginations of the developed gut that pinch off, forming the coelom. This is called the enterocoely.
2. Some major clades: There are three major clades of deuterostomes i.e., Chordata (vertebrates and their kin), Echinodermata (starfish, sea urchins, sea cucumbers, etc.) and Hemichordata (acorn worms).
3. Bilateral symmetry
4. Radial and Indeterminate cleavages:
5. Larval type: Some deuterostomes possess a kidney-shaped larva called a dipleurula.

8. Prove that parasitic nematoda show evolutionary adaptation.

The main evolutionary innovation of nematodes is their complete digestive system, which contains two openings (a mouth and anus).

Since the ingestion and the defecation processes can occur at different extremities of the digestive tube, organisms with a complete digestive system have the advantage of being able to ingest new food while the residue of already eaten food is still inside the body and has not yet been eliminated.

- They have high reproductive potential.
- Their life cycles increase the likelihood of transmission from one host to another.
- They develop an enzyme resistant cuticle, resistant eggs, and encysted larvae.

9. Differentiate between monophyletic, diphyletic and polyphyletic.

Monophyletic group is a group of organisms that includes an ancestral species and its entire descendent species. Monophyleyic group is also known as a clade. A clade is a natural kind of a group that is very important in phylogenetic classification. Monophyletic groups are created based on the shared derived characteristics. Hence, monophyletic group can visualize relationships among the organisms in a phylogenetic tree.

Paraphylatic group is a group of organisms that consist of an ancestral species and some of its descendant species. Not all the descendent species are included in this group. Paraphyletic group is nearly monophyletic. The paraphyletic group is created based on the symplesiomorphy. Some well known paraphyletic taxa are Pisces and Reptilia.

A polyphyletic taxon is a group of organisms that lack a common ancestor. The polyphyletic group consists of unrelated organisms who are descended from more than one ancestor. It is kind of an unnatural group of organisms. Normally when a polyphyletic taxon is found, it is reclassified since it is a totally unnatural assemblage.

10. What is spongocoel?

The simplest and least common sponge body form is the ascon. Ascon sponges are vase like. Ostia are the outer openings of porocytes and lead directly to a chamber called the spongocoel.

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11. Define Determinate cleavage.

Cleavage is a process of rapid mitotic cell divisions of the zygote to form number of cells for building up the offspring's body.

Determinate cleavage: It results in developmental fate of cells being set early in embryo development.

12. Explain circulatory system in cephalopods.

Cephalopods are the only molluscs with a closed circulatory system. Coleoids have two gill hearts (also known as branchial hearts) that move blood through the capillaries of the gills. A single systemic heart then pumps the oxygenated blood through the rest of the body.

Like most molluscs, cephalopods use hemocyanin, a copper-containing protein, rather than hemoglobin, to transport oxygen. As a result, their blood is colorless when deoxygenated and turns blue when exposed to air.

13. What role does Osphradia plays?

Osphradia are chemoreceptors and help detect prey. It is a single or paired sense organ connected with one of the visceral ganglia and situated near the gill of most aquatic mollusks that is supposed to be olfactory or to test the purity of the water passing to the gills.

14. Define siphon.

Siphons in mollusks are tube-like structures in which water flows (or more rarely in which air flows). The water flow is used for one or more purposes such as locomotion, feeding, respiration, and reproduction. The siphon is part of the mantle of the mollusk, and the water flow is directed to (or from) the mantle cavity.

15. Explain phylum Nematoda.

Phylum Nematoda is a phylum of invertebrate animals. They are comprised of roundworms. They are identifiable by their smooth and tough outer covering and narrow cylindrical unsegmented body. Their name is etymologically derived from the Greek word nema or Nematos, meaning "thread.

The Nematodes present in the soil feed on the bacteria, fungi, and other nematodes, and play an important role in nutrient recycling. They also attack the insects and control the pests. However, they cause severe damage to plants. They feed on the plant roots and reduce the nutrient uptake and stress tolerance of the plant.

16. What is Ecdysis? Write its four stages.

The growth of an arthropod would be impossible unless the exoskeleton is not periodically shed, such as in molting process called ecdysis.

- Enzymes, secreted from hypodermal gland, begin digesting the old procuticle to separate the hypodermis and exoskeleton.
- New procuticle and epicuticle are secreted.
- The old exoskeleton splits open along predetermined ecdysal lines when the animal stretches by the air or water intake; pores in the procuticle secrete additional epicuticle.
- Finally, calcium carbonate deposits or sclerotization harden the new exoskeleton.

17. How new procuticle and epicuticle are secreted?

- The old exoskeleton splits open along predetermined ecdysal lines when the animal stretches by the air or water intake; pores in the procuticle secrete additional epicuticle.

18. What are pinacocytes?

Pinacocytes are the lining of cells that help in engulfing of food in the form of liquid.

19. What is Mastax?

In rotifers, pharynx contains a structure called the mastax (jaws). The mastax is a muscular organ. It grinds food. The inner walls of the mastax contain several sets of jaws called trophi. The trophi have different structures.

20. Explain reproduction in Hydra.

Hydra is a genus of small, freshwater organisms of the phylum Cnidaria and class Hydrozoa. They are native to the temperate and tropical regions.

- Hydra reproduces asexually by budding. During the summer season, when the animal is well-fed and healthy, budding is the usual reproduction method. It occurs all time of the year.
- Hydra reproduces sexually by the fusion of gametes when the environmental condition becomes unfavorable (generally in autumn).

21. Write down three characters of arthropods.

They have paired jointed appendages.

- Ecdysis or molting takes place during growth.
- They have central nervous system.
- Coelom reduced to cavities. These cavities are reduced to gonads and sometimes excretory organs.

22. Write short note on rotifers.

They are abundant in most fresh water habitats.

- A few species (less than 10%) are marine.
- Some have beautiful colors, although most are transparent, and some have odd and bizarre shapes.
- They are triploblastic, bilateral, unsegmented, and pseudo coelomate.

23. What is excretory system?

The systems that excrete wastes from the body. For example, the system of organs that regulates the amount of water in the body and filters and eliminates from the blood the wastes produced by metabolism.

24. How excretion occurs in earthworms?

Excretion in earthworm is performed by long, thin and coiled tubules known as nephridia. It is found in all segments except first two. They are the small microscopic coiled tube with the thin wall which is glandular and vascular. According to location, nephridia are of three types they are:

- Septal nephridia
- Pharyngeal nephridia
- Integumentary nephridia

25. List types of Malarial Parasites.

Five species of Plasmodium (single-celled parasites) can infect humans and cause illness:

- Plasmodium falciparum (or P. falciparum)
- Plasmodium malariae (or P. malariae)

- Plasmodium vivax (or P. vivax)
- Plasmodium ovale (or P. ovale)
- Plasmodium knowlesi (or P. knowlesi)

26. Differentiate between Protonephridia and Metanephridia.

Protenephridia refers to the tubular excretory structures in certain invertebrates, usually ending internally in flame cells and having an external pore. Protonephridia are a network of dead-end tubules without internal openings.

Metanephridia refers to the primitive excretory organs present in many invertebrates, originating in a ciliated coelomic funnel. Metanephridia is composed of ciliated funnel-like opening structures.

27. Write methods of copulation.

Sexual intercourse, or copulation, is the deposition of sperm into a female via a male intromittent organ. In humans, the intromittent organ is the penis, and sperm are deposited into the vagina, where they make their way to towards the uterus to fertilize an egg.

28. Explain body structure of Oligochaetes.

Oligochaete worms have long, segmented, tubular bodies, giving them the appearance of a piece of thick spaghetti. They can range in length from just a few millimeters to over 10 feet! You won't find a head or any limbs on these guys either, but they can still get around pretty well by peristalsis. This is when the body moves by contracting and relaxing its segments so that a wave-like motion pushes it along.

Oligochaetes are an also simultaneous hermaphrodite, which means that they are both male and female at the same time. This doesn't mean that they can self-fertilize, but it does mean that they can mate with just about any other member of their species they come across. That's pretty efficient. They don't need a respiratory system because gas exchange occurs through the body itself.

29. What is Blastomere?

A blastomere is a type of cell produced by cleavage (cell division) of the zygote after fertilization and is an essential part of blastula formation.

30. What is fate of blastophores?

The fate of the blastopore was traditionally used as a character for building taxonomic trees, separating protostomes (in which the blastopore becomes the opening to the mouth) from deuterostomes (in which the mouth forms separately from the blastopore, and the latter often becomes the anus).

31. Write formation of Mesoderm.

Gastrulation is an early stage of development during which an embryo, then a single-layered ball of cells called a blastula, reorganizes itself into a three-layered ball of cells, called a gastrula. During this process, the primary germ layers, endoderm and ectoderm, interact to form the third, called mesoderm.

32. How coelom is developed?

In protostomes, the coelom forms when the mesoderm splits through the process of schizocoely, while in deuterostomes, the coelom forms when the mesoderm pinches off through the process of enterocoely. Protostomes undergo spiral cleavage, while deuterostomes undergo radial cleavage.

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33. What are larval forms of insects?

The larval forms of the various insects are called caterpillars, grubs, maggots, and nymphs. Echinoderms (e.g., starfish) also have larval forms.

34. What is Trichinosis?

The young larvae encyst in the skeletal muscles and remain infective for many years. The disease this nematode is called trichinosis.

35. What is Polyp and Medusa?

Polyp:

Polyp is a sessile life cycle stage of species who belong to phylum cnidaria. Famous examples of polyp are sea anemones and adult corals. Polyp is formed with a mouth surrounded with tentacles, referred to as a head and head is attached to the bottom with a foot-like disk. Direction of mouth and tentacles face towards the water. Mode of reproduction in polyp is either sexual or asexual.

Medusa:

Medusa is a life cycle stage of the species that belongs to cnidaria phylum. One of the most common examples of species having a medusa life cycle is Hydrozoa or jellyfish. External appearance of medusa is bell shaped and has capability of undergoing muscular contractions which enables the medusa to swim. Several types of tentacles like photoreceptors, gravity

36. Write advantages of coelom.

- The organs like that of the digestive tract need more space to grow.
- Some organs like gonads need more space only during the breeding season. ...
- Coelom also allows the formation of well-organized circulatory system with an efficient heart to draw blood from vessels.

37. Write life cycle of apicomplexans.

The apicomplexa have complex life cycles that are characterized by three distinct processes: sporogony, merogony and gametogony. Although most apicomplexa exhibit this overall general life cycle the details can vary between species.

38. Define Aurelia.

Aurelia is a genus of scyphozoan jellyfish, commonly called moon jellies. Aurelia undergoes alternation of generations, whereby the sexually-reproducing pelagic medusa stage is either male or female, and the benthic polyp stage reproduces asexually.

39. What are three classes of Platyhelminthes?

Phylum Platyhelminthes is divided into 4 distinct classes. They are:

1. Class Turbellaria
2. Class Monogena
3. Class Trematoda
4. Class Cestoida

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40. What is Coccodiosis?

Coccidiosis is usually an acute invasion and destruction of intestinal mucosa by protozoa of the genera Eimeria or Isospora. Clinical signs include diarrhea, fever, inappetence, weight loss, emaciation, and in extreme cases, death.

41. What is Zonites?

The body surface of kinorhyncha is devoid of cilia and is composed of 13 or 14 definite unit which is called zonites.

42. What is Kingdom Animalia?

The Kingdom Animalia is a large group that consists of eukaryotic, multicellular organisms that are heterotrophic in nature.

Kingdom Animalia divided into two major groups:

- Invertebrates
- Vertebrates

Characteristics of kingdom Animalia are:

•They are multicellular organisms which do not possess chlorophyll.
•They are eukaryotic organisms.
•Cell wall is absent.
•Mode of nutrition is heterotrophic

43. What is Cnidocytes?

A cnidocyte (also known as a cnidoblast or nematocyte) is an explosive cell containing one large secretory organelle called a cnidocyst (also known as a cnida or nematocyst) that can deliver a sting to other organisms.

44. What are three major clades of deutrostomes?

Some major clades:

There are three major clades of deuterostomes i.e., Chordata (vertebrates and their kin), Echinodermata (starfish, sea urchins, sea cucumbers, etc.) and Hemichordata (acorn worms).

45. Define Pseudocoelomates with examples.

A pseudocoelomate is an organism with body cavity that is not derived from the mesoderm, as in a true coelom, or body cavity.

Examples are: The nematodes, rotifers, gastrotrichs, and introverts.

46. What is metamerism?

Metamerism is the repetition of homologous body segments. This type of development can be seen in the Annelids, which include earthworms, leeches, tubeworms, and their relatives. It is also seen in a more advanced form in the Arthropods, such as crustaceans, insects, and their relatives.

47. Write charactes of Kingdom Animalia.

These organisms are multicellular, eukaryotic and without chlorophyll.

- The cells possess no cell walls and plastids.
- Central vacuoles are absent but small vacuoles may occur.

- Most of them are free moving (except sponges and some coelentrates)
- Nutrition is primarily ingestive.
- Reproduction is generally sexual and the haploid stage is represented only by gametes.
- Growth of organisms stops when the adult stage is reached

48. Write molting in short.

When an insect gets too big for its exoskeleton, it sheds it. This process, known as molting, might sound matter-of-fact, but it's not. Insects stop eating, many lie still, and they become more vulnerable to predators.

49. What is Trepang?

A kind of edible holothurian, as Holothuria edulis; a sea-slug, sea-cucumber, sea-pudding, or bêche-de-mer; also, such holothurians as a commercial product prepared for food.

50. What are protostomes?

The term Protostomia (from the Greek "proto," meaning first, and "stoma," meaning mouth) was coined by the biologist Karl Grobben in 1908. It distinguishes a group of invertebrate animals based upon the fate of the blastopore (the first opening of the early digestive tract) during embryonic development.

51. What are subphylums of Arthropods?

Phylum Arthropoda have following subphylums:

- Subphylum Hexapoda
- Subphylum Myriapoda
- Subphylum Crustacea
- Subphylum Chelicerata

52. What is pedomorphism?

Speeding up of the rate of development, resulting in an adult form that has the appearance of its larval or juvenile ancestor.

53. What is Hirudin?

Hirudin is a naturally occurring peptide in the salivary glands of blood-sucking leeches (such as Hirudo medicinalis) that has a blood anticoagulant property.

54. What is Pseudocoelom?

The pseudocoelom is a fluid-filled body cavity lying inside the external body wall of the nematode that bathes the internal organs, including the alimentary system and the reproductive system.

55. What is lobopodium?

The lobopodians, members of the informal group Lobopodia (from the Greek, meaning "blunt feet"), or the formally erected phylum Lobopoda Cavalier-Smith (1998), are panarthropods with stubby legs called lobopods, a term which may also be used as a common name of this group as well.

56. Write general characters of apicomplexa.

The Apicomplexa are a monophyletic group composed almost entirely of parasitic.

Characteristics of the phylum include:

- Apical complex for penetrating the host cells.

- Single type of nucleus.
- No cilia and flagella, except in some reproductive stages.
- Life cycles that typically include asexual (schizogony, Sporogony) and sexual (gametogony) phases.

57. Write note on Fasciola Hepatica.

Fasciola hepatica, also known as the common liver fluke or sheep liver fluke, is a parasitic trematode (fluke or flatworm, a type of helminth) of the class Trematoda, phylum Platyhelminthes. It infects the livers of various mammals, including humans, and is transmitted by sheep and cattle to humans the world over. Adults of Fasciola hepatica are large and broadly-flattened, measuring up to 30 mm long and 15 mm wide. The anterior end is cone-shaped, unlike the rounded anterior end of Fasciolopsis buski. Adults reside in the bile ducts of the liver in the definitive host.

58. What is Rhabdites?

Rhabdites is a characteristic of Turbellaria but also found in nemerteans, gastrotricha and annelids. The actual function of Rhabdites is unknown but it helps in the defence mechanism of the worm. They release with mucus and form a thick layer over the body and provide adhesion, especially in strong currents.

59. Write functions of hectocotylus.

It is a modified arm of a male cephalopod that is specially and variously adapted to effect the fertilization of the eggs especially : an arm that in argonauts and some octopods receives the spermatophores, is inserted into the female mantle cavity, and then is broken free from the body of the male. A hectocotylus is one of the arms of male cephalopods that is specialized to store and transfer spermatophores to the female.

60. Explain Axopodium.

It is a semipermanent pseudopodium that consists of an axial rod surrounded by an ectoplasmic sheath and that is typically present in Radiolaria and Heliozoa.

61. What are functions of hydrostatic skeleton?

The hydrostatic skeleton is made possible by closed fluid-filled internal spaces of the body. It is of great importance in a wide variety of animal groups because it permits the antagonistic action of muscles used in locomotion and other movements. The fluid spaces are part of the gastrovascular cavity in the Coelenterata, part of the coelomic cavity (between the gut and the body wall) in the worms, and hemocoelic (i.e., in a type of body cavity consisting of a complex of spaces between tissues and organs) or vascular in mollusks and arthropods. As the exoskeleton becomes more rigid and the apodemal endoskeleton more fully developed in arthropods, the importance of the hemocoele in promoting antagonistic muscle action decreases. In larger and more heavily sclerotized species, the hydrostatic skeleton is no longer of locomotory significance; the muscles work directly against the articulated skeleton, as in vertebrates.

62. Write process of strobilation.

Strobilation is asexual reproduction (as in various cnidarians and tapeworms) by transverse division of the body into segments which develop into separate individuals, zooids, or proglottids.

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