

Diversity in Living Organisms

EXAM DRILL

ANSWERS

1. Pteridophytes are also known as vascular cryptogams.
2. Division Thallophyta among plants has the simplest organisms.
- 3(i) Algae : – *Chara*
Bryophyta : – *Riccia*
Pteridophyta : – *Adiantum*
Gymnosperm : – *Cycas*
Angiosperm : – *Pisum*
- 3(ii) Whittaker gave five kingdom classification on the basis of complexity of cell structure, body organisation, mode and source of nutrition and phylogenetic relationships.
- 3(iii) (c) Slime moulds are placed into Kingdom Protista.
- 3(iv) (a) Monerans possess 70S ribosomes.
- 4(i) Coelenterates have radial symmetry whereas molluscs, have bilateral symmetry. Coelenterates do not have respiratory, and excretory organs, whereas in molluscs, gills and metanephridia or kidney is found for respiration and excretion respectively.
- 4(ii) Asexual reproduction by budding takes place in polyp form of coelenterates.
- 4(iii) (b) *Adamsia*, *Aurelia* and *Tubularia* are marine coelenterates.
- 4(iv) (c)
5. (b) : *Yeast* and *Amoeba* are examples of protista and fern is an example of pteridophytes.
6. (d) : Urchin is an echinoderm.

OR

- (a) : Bryophytes are group of amphibian plants, e.g., *Funaria* and *Marchantia*.
- (a) : Animals of Phylum Aschelminthes possess pseudocoelom. Animals of Phylum Annelida are coelomates.
- Kingdom Protista contains eukaryotic, photosynthetic and single celled organism.
- Walter G. Rosen coined the term biodiversity.

OR

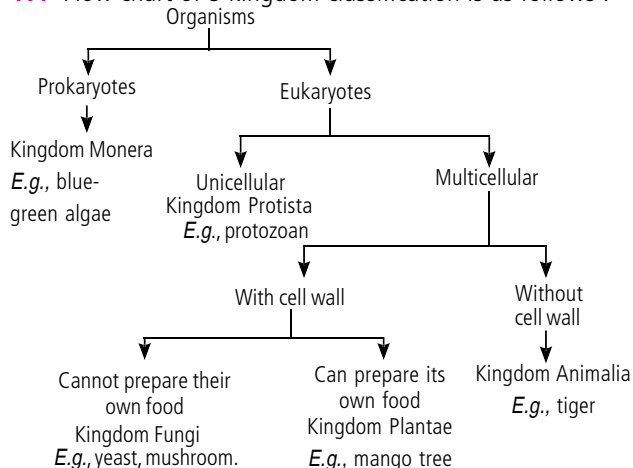
- Carolus Linnaeus proposed two kingdom classification.
- (c) : Bat, whale and kangaroo are viviparous animals.
- (d) : *Riccia* belongs to division bryophyta of Kingdom Plantae. Starfish belongs to Phylum Echinodermata. *Obelia* belongs to Phylum Coelenterata.

OR

- (b) : Jellyfish – Coelenterata
Starfish – Echinodermata
- (c)
- (c) : Binomial nomenclature is the system of providing organisms with appropriate and distinct names consisting of two words, first generic and second specific.
- (a) : The word, platys means flat, helminthes-worms, they are commonly called flatworm, on account of their flat, leaf like form.
- (a) The given figure is that of *Pila* (apple snail)
It belongs to the Phylum Mollusca.
(b) (i) A muscular foot aids for locomotion.
(ii) Open circulatory system is found in *Pila*.
(c) *Pila* exhibits bilateral symmetry.
- The difference between porifera and cnidaria are as follows :

S.No.	Porifera	Cnidaria
(i)	Animals are asymmetrical.	Animals are radially symmetrical.
(ii)	They show cellular level of organisation.	They show tissue level of organisation.
(iii)	Water canal system is well-developed.	Water canal system is absent.
(iv)	Cnidoblasts are absent.	Cnidoblasts are present.
(v)	They have a skeleton of spicules or sponging fibres.	Only some have a skeleton of calcium carbonate.

- Flow chart of 5 kingdom classification is as follows :



18. (i) Acoelomate : *Spongilla*, Sea anemone, *Planaria*, Liver fluke.
 (ii) Pseudocoelomate : *Wuchereria*, *Ascaris*.
 (iii) Coelomate: *Nereis*, Earthworm, Scorpion, Birds, Fishes, Horse.
19. Phylum Coelenterata is the phylum having gastrovascular cavity. These are radially symmetrical and diploblastic animals. The body encloses a single central cavity. It has a single aperture, the mouth. There is no anus. The mouth serves both for taking food and for throwing out faeces. The mouth often bears slender, flexible processes, the tentacles. Their central cavity is called coelenteron or gastrovascular cavity that helps in digestion and circulation. Body wall is formed of outer epidermis and inner gastrodermis. Some species are colonial (corals) while others have a solitary life span (*Hydra*).

OR

The main characteristics of organisms belongs to Phylum Annelida are as follows :

- (i) Triploblastic, bilaterally symmetrical. (ii) They are elongated, cylindrical and vermiform. (iii) The body is metamerically segmented, *i.e.*, divisible into more or less similar segments or metameres. (iv) True coelom is present, which is divided into segments by internal septum. (v) Their alimentary canal is complete, straight and extends through the entire body from mouth to anus. (vi) These are the first animals to have closed blood vascular system. (vii) Their excretory organs are nephridia. (viii) In annelids, locomotion occurs with the help of chitinous structures setae (*e.g.*, earthworm), or unjointed appendages called parapodia (*e.g.*, *Nereis* - sand worm) or suckers (*e.g.*, leech). (ix) Nervous system developed with cerebral ganglia, nerve cord and segmental ganglia.
20. The differences between gymnosperm and angiosperms are as follows :

S. No.	Gymnosperms	Angiosperms
(i)	The seeds are naked as no fruit formation takes place.	The seeds are enclosed inside the fruit.
(ii)	Reproductive organs are in the form of sporophylls which form cones.	Reproductive organs are in the form of flowers.
(iii)	Xylem has only tracheids but no vessel.	In xylem, vessels are present.
(iv)	Ovules are not enclosed in ovary. Examples are <i>Cycas</i> and <i>Pinus</i> , etc.	Ovules are enclosed in ovary. Examples are wheat and mango, etc.

21. The difference between bilateral symmetry and radial symmetry is :

S.No.	Bilateral symmetry	Radial symmetry
(i)	Organism with a body design such that it can be divided into two equal halves by one plane only as organs are paired and occur on the two sides of a central axis called bilaterally symmetrical.	Organisms with a body design such that it can be divided into equal halves by any plane passing through the center from top to bottom are known as radially symmetrical.
(ii)	Examples: earthworm, spider, cockroach.	Examples: adult starfish and sea urchins.

OR

- (i) In thallophyta plant body is not differentiated into root, stem and leaves, whereas, in bryophyta plant body is commonly differentiated into stem and leaf-like structure.
 (ii) In nematoda pseudocoelom is present, has round unsegmented body, whereas, in annelida true coelom is present. Body is segmented.
 (iii) Amphibia can live on land and in water, whereas, reptilia are mostly terrestrial.
22. The criteria for deciding divisions in plants are the presence or absence of seeds and flowers, differentiation of body parts, presence or absence of specialised vascular tissues and nature of the seed. The criteria for subdivisions among animals are the presence or absence of notochord and coelom, position of nerve cord, gill slits, body segmentation, habitat and oviparity or viviparity.
23. The organisms that have acquired more complex structures and body designs relatively recently are called advanced organisms.

The advance organism are considered as complex organism because the 'advanced' organisms were also like the primitive ones. They have acquired their complexity relatively recently. There is a possibility that these advanced or 'younger' organisms acquire more complex structures during evolutionary time to compete and survive in the changing environment.

- 24.

S.No.	Plant	Division
(i)	<i>Spirogyra</i>	Thallophyta
(ii)	Fern	Pteridophyta
(iii)	<i>Funaria</i>	Bryophyta
(iv)	<i>Pinus</i>	Gymnosperm
(v)	Apple tree	Angiosperm
(vi)	Mustard plant	Angiosperm

OR

(ii) The kind of cells, organisms are made of, is a more basic characteristic for classifying organisms because it is the cell and its components which perform the specialised functions to help organisms survive and multiply. We cannot classify organisms on the basis of place where they live because many different kinds of organisms may live in the same habitat but they do not belong to the same group.

25. Different taxonomic categories of classification are :

- (i) **Species** : It is the lowest taxonomic category of living organisms regarded as basic unit of classification. Species includes a group of individuals which are capable of interbreed.
- (ii) **Genus** : It is a group of closely related species ranged higher than species, *e.g.*, potato and brinjal are placed in same Genus *Solanum* but are different species.
- (iii) **Family** : A number of genera having several common characters form a family, *e.g.*, *Solanum* and *Datura* have been placed in same Family Solanaceae.
- (iv) **Order** : A number of families having common characters are placed in an order *e.g.*, Ursidae (bears), Canidae (dogs, wolves, etc.) and Felidae (cats, tiger, etc.) belong to same Order Carnivora.
- (v) **Class** : Similar orders are placed together in a class. Class Mammalia includes orders like Carnivora, Chiroptera, Primata and Rodentia.
- (vi) **Phylum** : The classes having some specific characters which are common in them are placed

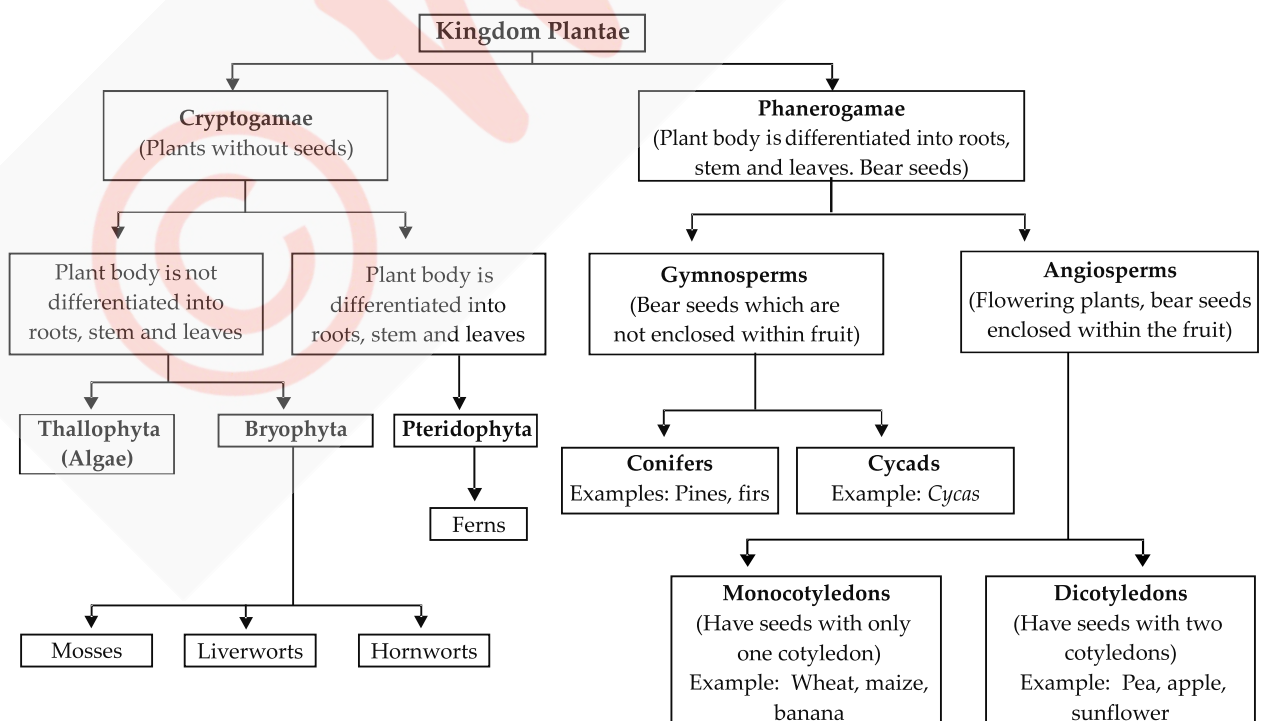
under same phylum. Phylum is the largest group of animals comprising similar classes. Phylum Chordata includes classes like Pisces, Amphibia, Reptilia, Aves and Mammalia.

(vii) **Kingdom** : It is the highest category of taxonomic studies. There are two kingdoms – plantae and animalia, the former comprising all the phyla of plants and the later comprising all the phyla of animals.

26. Biodiversity means different forms of living organisms or a variety of life forms found in a particular region. Biodiversity can be expressed or measured in the following four different ways:

- (i) **Genetic variability within a species** – It includes the difference in body size, colour etc., expressed due to genetic differences.
- (ii) **Diversity of population of a species** – This is measured in terms of number of individuals within a local group as well as the distribution of a species in geographic range.
- (iii) **Diversity of species within a natural community** – It includes the varieties of different species in a particular habitat.
- (iv) **Ecosystem diversity** – It includes the alpha diversity *i.e.*, diversity of organism sharing same habitat, Beta diversity *i.e.*, rate of replacement of species in habitats within a same geographic area and Gamma diversity *i.e.*, rate of replacement of species between similar habitats in different geographical regions.

27. (a) Flow chart of Kingdom Plantae is as follows :



(b) The five peculiar features of Class Mammalia are as follows :

- (i) Warm-blooded vertebrates. Usually terrestrial, few are aquatic (dolphins, whales, walruses, seals).
- (ii) Body covered with hair. Sweat glands and sebaceous glands present in the skin.
- (iii) Two pairs of limbs with pentadactylous condition.
- (iv) External ears (pinna) are present.
- (v) Mammary glands are present through which females feed milk to their young ones.

OR

(a) Fungi are simple, eukaryotic non-green (lacking chlorophyll) organisms.

Rhizopus and *Penicillium* are the two names of fungi. Cell wall of fungi is made up of chitin.

(b) Characteristics of fungi are:

They are non-photosynthetic. The mode of nutrition is heterotrophic. Most of them are saprophytes as they feed on dead and decaying organic matter. Some of them are parasitic.

Most fungi are multicellular, except yeast, which is the only unicellular fungus. The body of multicellular filamentous fungus is called mycelium, which is composed of several thread-like structures called hyphae. Some fungi live in symbiotic (mutually dependent) relationships with blue-green algae as in lichens. Examples: *Mucor*, *Aspergillus*.

28. (a) The four important features that all chordates possess are as follows:

- (i) They have a **notochord**.
- (ii) **Dorsal hollow nerve cord** is present.
- (iii) **Gill slits** are present in pharyngeal region.
- (iv) They have **closed circulatory system**.

(b) One characteristic each of Amphibia and Aves is given below:

Amphibia – They have **mucous glands** in the skin and a **three-chambered heart**.

Aves – They have an outer covering of **feathers** and two **forelimbs** are modified for flight.

- (c)** (i) Sea horse – Pisces
- (ii) King cobra – Reptilia

OR

No, we will not classify all the given organisms in one group because there are some characteristic features by which these organisms can be separated from each other and placed in two different groups.

Leech and *Nereis* are placed in Phylum Annelida because :

- (i) Both of these have **metamerically segmented body** i.e. body is divided externally and internally into many segments by septa. Body segments are lined up one after the other from head to tail.
- (ii) These animals have **closed circulatory system**.

Scolopendra, Prawn and scorpion are placed in Phylum Arthropoda because :

- (i) Their body is **externally segmented** and consists of head thorax and abdomen.
- (ii) These animals have an **open circulatory system** and the coelomic cavity is blood filled called **haemocoel**.

29. The Subphylum Vertebrata has been classified into Pisces, Amphibia, Reptilia, Aves and Mammalia. The major characteristics used to classify are — the kind of **exoskeleton or endoskeleton**, the kind of **respiratory organs** and the **method of reproduction** and giving birth to young ones **egg laying**. The classification of vertebrata on the basis of given characters is as follows.

- (i) **Exoskeleton of scales; Endoskeleton of cartilage or bones; breathing through gills** – Pisces (fishes).
- (ii) **Breathing through gills only in larva; skin slimy** – Amphibia.
- (iii) **Exoskeleton of scales; laying eggs outside the water** – Reptilia.
- (iv) **Exoskeleton of feathers; lay eggs; flight possible** – Aves (Birds).
- (v) **Exoskeleton of hairs; external ears ; give birth to young ones** – Mammalia.

OR

(a) Algae belongs to the Division Thallophyta. Characteristic of thallophyta are as follows – These are mostly aquatic plants. Body is not well-differentiated into root, stem and leaves e.g., *Cladophora* and *Spirogyra*.

(b) Angiosperms include the most advanced covered seed bearing plants.

(c) *Pinus* and *Cycas* belong to gymnosperms.

(d) Flowering plants are also called as angiosperms. The angiosperms are divided into two groups on the basis of the number of cotyledons present in the seed. These are as follows :

Monocotyledonous : Plants with seed having a single cotyledon, e.g., maize.

Dicotyledonous : Plants with seeds having two cotyledons, *e.g.*, pea.

30. The characteristic features of flat worm, round worm and segmented worms are as follows :

S.No.	Flat worm	Round worm	Segmented worm
(i)	Dorsoventrally flat, <i>i.e.</i> , flat body from top to bottom.	Body is cylindrical.	Body is segmented externally and internally
(ii)	No true body cavity.	Pseudocoelom (Sort of body cavity).	True body cavity.
(iii)	Mostly Hermaphrodite, <i>i.e.</i> , male and female sex organs present in the same individual.	Sexes are separate.	May be unisexual or bisexual.
(iv)	It belongs to Phylum Platyhelminthes.	It belongs to Phylum Aschelminthes.	It belongs to Phylum Annelida.

