DIVERSITY IN LIVING ORGANISM

1. CLASSIFICATION ::

Definition :

The method of arranging organisms into groups on sets on the basis of similarities and differences is called classification.

2. TAXONOMY OR SYSTEMATICS ::

Definition :

The taxonomy or systematics is the study of diversity and kind of organisms and the evolutionary relationship among them.

Importance of Classification :

- It makes the study of wide variety of organisms easy.
- It is essential to understand the interrelationships among different groups of organisms.
- It forms a bone for the development of other biological sciences.
- It projects a picture of all life forms at a glance.

3. HISTORICAL ACCOUNT ::

Aristotale classified animals on basis of habitat (land water and air). He further classified the animals on basis of presence of RBC into Anaima and Ehaima. Enaima was classified into ovipara (egg layers) and vivipara (Dirth to young).

3.1 Two Kingdom Classification :

Father of taxonomy - Carolus Linnaeus. He preposed following kingdoms.

(A) Plantae -

- Which included Bacteria, Fungi, Algae, Mosses, Liverworts, Ferns, Conifers and Flowering plants.

(B) Animalia -

- Included Protozoan, Sponges, Jelly fishes, Worms, Crabs, Insects, Millipedes, Centipedes, Spiders, Snails, Star fishes, Snakes, Frogs, Birds and Mammals.

3.2 Three Kingdom Classification :

- This was suggested by german biologist, **E. Haeckel** in 1866.
- As some microscopic single celled forms were unlike plants or animals altogether and could not be placed in earlier system, thus three kingdom system was proposed. It includes (1) plantae, (2) Animalia, (3) **Protista** ... contained all single celled organisms like protozoans and unicellular algae.

3.3 Four Kingdom Classification :

- This was developed by **Copeland** in 1966.
- As prokaryotes (Organisms without true nucleus) were different from eukaryotes (organism with true nucleus), a new group, **monera** was formed.

3.4 Five Kingdom Classification :

- This most favoured scheme was proposed by **R.H. Whittaker** in 1969. Fungi could not find a suitable place in earlier system of classifications and thus whittaker's five kingdom theory found favour amongst most biologists.
- This classification includes :

  (a) Plantae (b) Animalia

(c) Fungi (d) Protista

(e) Monera.

3.5 Six Kingdom Classification :

➤ It was proposed by Woese, Kandler and Wealis (1990). They divided monera into Archae bacteria and Eubacteria.

(A) Taxonomic Categories :

Kingdom

Subkingdom

Phylum (division in plants)

Class

Order

Family

Genus

Species

❑ Species Concept :

➤ Species is the basic unit of taxonomy.

➤ Mayr defined species as groups of interbreeding natural populations that are reproductively isolated from each other group.

❑ **Sympatric :** Species inhabiting the same geographical area are sympatric.

❑ **Allopatric :** Spcies inhibiting different geographical areas are allopatric.

❑ **Sibling species :** Related species which are reproductively isolated bat morphologically similar.

❑ **Eademic species :** A species restricted to a given area.

(B) Binomial Nomenclature :

➤ Proposed by Carolus Linnaeus.

➤ According to this system of nomenclature, each animal or plant is given two names : the first one is the generic name and the second one is the name of the species.

➤ Scientific names are always in *Latin*.

➤ The first letter of the generic name is always capitalized and that of the specific name is written in small letter. For example, the scientific name of frog is *Rana tigrina*, in which *Rana* is the generic name and *tigrina* is the name of the species.

4. VIRUES ::

➤ The study of viruses is known as virology.

➤ Viruses belong to intermediate zone between living and non-living worlds.

➤ Their size varies from 10-250 nm.

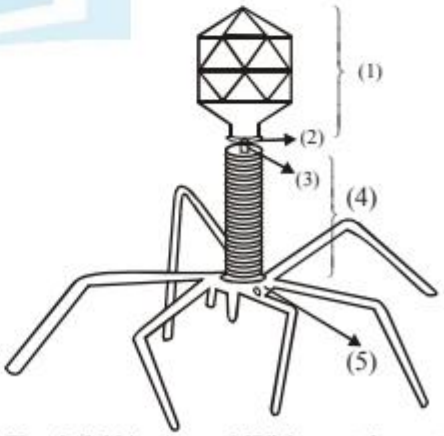
➤ Viruses have an extermely basic structure, made up of a central core of either a **DNA** or **RNA strand**.

➤ This is covered by a protein coat called **capsid**.

➤ The viruses do not have any cytoplasm or other metabolic machinery. They depend entirely on the metabolic enzymes of the host cell. Hence they are termed obligate parasites.

➤ Viruses infect almost every kind of prokaryotic and eukaryotic cells.

➤ Inside the living cells, the viruses behave as living



(1) Head (DNA covered With protein coat)
(2) Collar, (3) Neck, (4) Tail, (5) End plate

FIG - STRUCTURE OF A BACTERIOPHAGE

structures as they multiply and grow.

- Once outside the organisms, viruses behave as non-living entities.
- Viruses infect a variety of organisms. Viruses infecting blue green algae are called **Cyanophages**.
- **Bacteriophages** are viruses that infect bacteria and mycophages infect the fungi.
- Some example are in man, Rhinovirus is the common cold virus. The dreaded AIDS disease is also caused by HIV (Human Immuno Deficiency Virus).

5. FIVE KINGDOM CLASSIFICATION ::

(A) Kingdom Monera :

- It consists of unicellular prokaryotic organisms.
- Ex. - blue green algae and bacteria.

(B) Kingdom Protista :

- Kingdom protista include unicellular eukaryotic organisms. Protists are mostly aquatic eukaryotic microorganisms.
- They possess cilia, flagella or pseudopodia for Locomotion.
- Protists have immense reproductive potential. The reproduce asexually or sexually.
- Ex - Diatoms (Navicula), Dinoffagellates (Gonyaulax), Slime moulds (fuligo) and Protozoans (Amoeba, Paramecium etc.)
- It includes multicelled green plants and algae.
- The members of this kingdom are nonmotile, terrestrial, multicellular that contain chlorophyll and produce their own organic compounds.
- All plant cells have a cellulosic cell wall. Ex. Spirogyra, Selaginella, Pinus, dicot or monocot plant, liverworts, mosses.

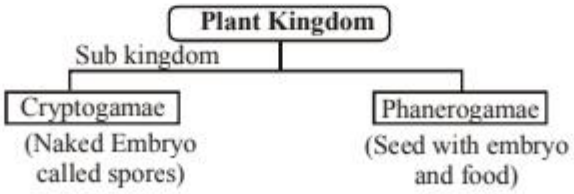
(C) Kingdom Fungi :

- Fungi are multicelled, non photosynthetic organism.
- Some fungi are microscopic while others can be seen with the naked eyes.
- Some fungi are unicellular while others are multicellular consisting of numerous filaments known as hyphae.
- The hyphae branch profusely and from a network called mycelium.
- Since fungi Lack chlorophyll they can't synthesise their own food and therefore they either lead a parasitic or sporophytic life.
- The Parasitic fungi may infect the host superficially or they may penetrate the host tissues (Ectoparasite and endoparasite).
- The fungi develop haustoria which help in absorption of nutrients from the host. Ex. mucor

(D) Kingdom Animalia :

- It includes multicellular animals.
- **Example :** Salpa, doliolum, lamprey, shark, lizard, snake, frog, parrot, whale, bat, man, cow kangaroo.

6. PLANT KINGDOM (KINGDOM PLANTAE) ::



6.1 Sub Kingdom - Cryptogamae :

- It includes - Flowerless, Seedless plants.
- Cryptogamae further divided into **three division -**

Cryptogamae

Thallophyta | Bryophyta | Pteridophyta

(A) Division Thallophyta :

- Most primitive and simple plants. The plant body is not differentiated into stem, root and leaves, but it is in the form of an undivided thallus.
- Mechanical and conducting tissues are absent (i.e., there is no vascular system)
- Sex organs are simple, single-celled and there is no embryo formation after fertilization.

Thallophytes

Algae | Fungi | Lichens

❑ Algae -

- Most algae are water-growing or aquatic, both marine and fresh water, some are terrestrial, i.e. live on land near moist places.
- They are autotrophic, i.e., manufacture their own food. Reserve food is generally starch.
- The plant body may be unicellular (*Chlamydomonas*), colonial (*Volvox*), filamentous (*Ulothrix*, *Spirogyra*).

Chlamydomonas

❑ Fungi -

- Simple non-green plants which are not photosynthetic. They are heterotrophic.
- They may be unicellular (yeast) or filamentous (most fungi). The body of a multicellular and filamentous fungus is called a mycelium.
- Fungi have a cell wall containing a mixture of chitin and cellulose.
- The reserve food is glycogen.
- Slime mold; Bread mould (Rhizopus, Mucor, yeast).

Rhizopus

	ALGAE	FUNGI
1	Cell wall is made up of cellulose.	Cell wall is made up of fungal cellulose and chitin
2	Food material is stored stored usually in the glycogen form of starch.	Food material is in the form of or oil.
3	Members contain chlorophyll.	Chlorophyll is absent
4	Grows fast in bright light.	Grows fast in dark or dim light.

❑ Lichens -


Foliose lichen

- Lichens grow on rocks, tree-trunks, and even on the ground. They are very hardy.
- In lichens, algae and fungi live in symbiosis, (mutualism), i.e., they coexist for mutual benefit.
- The algae component of the lichen is known as phycobiont and the fungal component as mycobiont.
- The fungus absorbs water and mineral matter and supplies it to the algae. The algae, in true, prepares food and supplies it to the fungus.
- Lichen are most sensitive to SO_2 pollution.
- Crustose lichens (e.g. *Rhizocarbon*, *Graphics*); foliose lichens (e.g. *Parmelia*, *Collema*) and fruticose lichens (e.g. *Aletoria*, *Usnea*)

(B) Division Bryophyta :

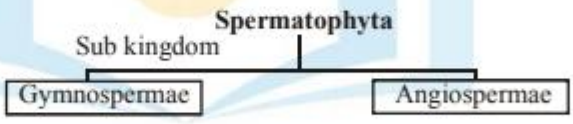

Riccia

- Bryophytes are small multicellular green land plants.
- These simplest land plants are confined to shady damp places.
- They are also called **amphibians of the plant kingdom.**
- Their plant body is a flat, green thallus in liverworts (*Riccia*, *Marchantia*)
- In them a true vascular system is absent.
- **Examples :** *Riccia*, *Marchantia*, *Anthoceros*.

(C) Division Pteridophyta :


Dryopteris

- They are found mainly in shady or damp places.
- The plant body is made up of root, stem and leaves.
- They have well developed vascular system.
- These plants have no flowers and do not produce seeds.
- Sex organs are multicellular and jacketed by sterile cells.
- Club mosses - *Selaginella*, *Lycopodium* ("ground pine"); horsetails - *Equisetum*; and ferns - *Marsilea*.
- **Sub kingdom-Phanerogamae or Spermatophyta**
- Phanerogamae includes higher plants that bear flowers and seeds.
- The plant body is differentiated into root, stem and leaves.
- Vascular system are well developed.
- Sex organs are multicellular.
- An embryo develops from fertilized egg.




Cycas

(D) Gymnospermae:

- The seeds produced by these plants are naked and are not enclosed within fruits.
  (i) Cycadae, e.g. *Cycas* etc.
  (ii) Coniferae, e.g. *Pinus*, *Cedrus*, *Ginkgo*, etc.

PTERIDOPHYTES	GYMNOSPERMS
1 Vascular tissue are present but secondary growth is absent.	Vascular tissues are present and secondary growth is present.
2 Ovule and seeds are	Ovule and seeds are

(E) Angiospermae :

- Angiosperms are highly evolved plants and they produce seeds that are enclosed within the fruit.
- The reproductive organs are aggregated in a flower.

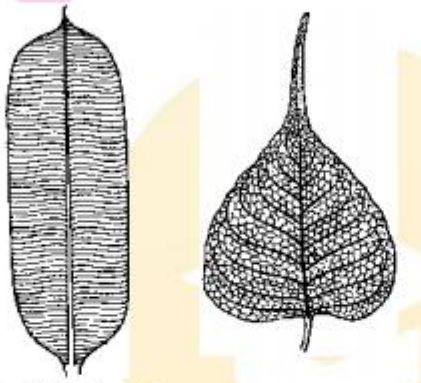
Angiosperms

Dicotyledonae	Monocotyledonae
(Dicots)	(Monocots)

❑ Dicotyledonae -

- The seeds produced by these plants have embryos with two fleshy leaves, the cotyledons.
- Their leaves have reticulate venation, with a network of veins.
- The root system has a prominent tap root.

Examples : Pea (*Pisum sativum*), potato (*Solanum tuberosum*), sunflower (*Helianthus annuus*), rose (*Rosa indica*), banyan (*Ficus religiosa*), neem (*Melia indica*), apple (*Malus silvestris*).



Parallel Pinnate **Reticulate Pinnate**

VENTION IN LEAVES

❑ Monocotyledonae -

- The seeds of these plants have only one cotyledon.
- Their leaves have parallel venation.
- The root system consists of similar fibrous roots.
- The vascular bundles are scattered and closed (i.e. lack cambium). Secondary growth does not occur.
- **Examples :** Maize (*Zea mays*), Wheat (Triticum vulgare), rice (Oryza sativa), onion (Allium cepa), sugarcane (Saccharum officinarum), barley (Hordeum vulgare), banana (Pandanus), Coconut and grasses.

MONOCOTS	DICOTS
1. Parallel venation is present in leaf.	Reticulate venation is present in leaf.
2 Embryo consists of only one cotyledon.	Embryo consists of two cotyledons.
3. Example - **Maize**	Example - **Pea**

7. CLASSIFICATION OF ANIMALS ::

Animal Kingdom

Protozoa (Unicellular or cellular organisms)	Metazoa (Multicellular organisms)

Terms :

Protostomia - Blastopore forms mouth.

Deuterostomia - Blastopore forms anus.

Coelom - Cavity between alimentary canal and body wall.

Pseudocoelom - False coelom

Eucoelom - True coelom lined with mesoderm.

The Salient Features and Common Examples of Certain Main Phyla of Kingdom Animalia are as Follows :

7.1 Phylum - Protozoa :

- Unicellular mostly aquatic animals.
- Solitary or colonial, free living or parasitic or symbiotic.
- Osmoregulation by contractile vacuole.
- Body shape may be irregular, spherical, oval, elongated or flattened.
- Cytoplasm differentiated into outer ectoplasm and inner endoplasm.
- Locomotion by finger-like pseudopodia, flagella or cilia.
- **Examples** - *Amoeba*, *Euglena*, *Paramecium* and *Plasmodium*.

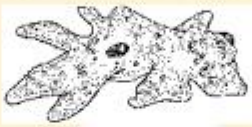


Fig - Amoeba

7.2 Phylum - Porifera :

- Sessile (stalk-less), sedentary (attached to the substratum), and marine except one group that lives in fresh water.
- Simplest multicellular, diploblastic animals.
- Have organisation at cellular colony level. Thus, cells are loosely held together and do not form tissues.
- Asymmetrical or radially symmetrical. Sponges may be vase-like, rounded, sac-like branched.
- Body is perforated by numerous pores, the ostia that open into a canal system having canals and chambers lined with collared flagellated cells or choanocytes.

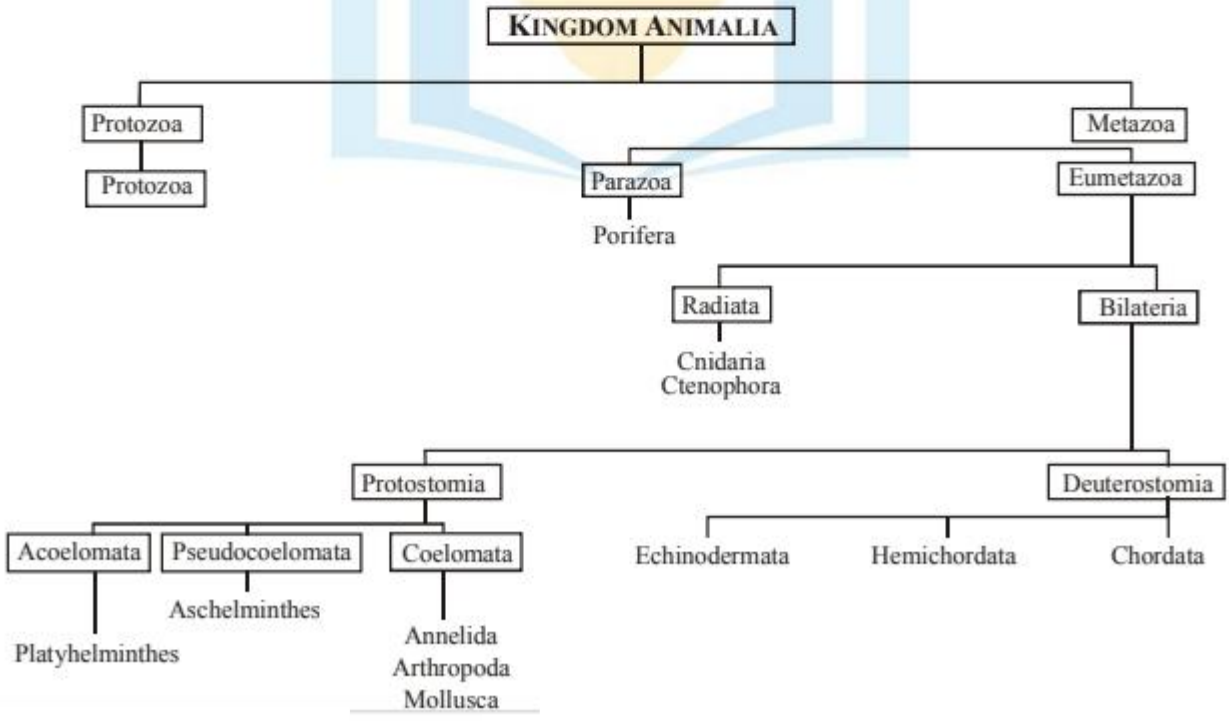


Fig- Sycon

- **Examples** - Sycon, Euplectella, (Venus flower basket) Spongilla (Fresh water sponge).

7.3 Phylum - Cnidaria (Coelenterata) :

- Aquatic, mostly marine, a few such as *Hydra* are fresh water solitary or colonial forms.
- Cnidarians or coelenterates are multicellular, diploblastic animals with tissue grade of organisation.
- Body shows radial symmetry.
- Possese specialized cells (cnidoblasts) bearing stinging organoids called nematocysts. Nematocysts serve the functions of paralysing the prey by injecting poison or to hold the prey.
- Exhibit the phenomenon of polymorphism (Ex- Physalia).
- Body shows two main forms, the polyps and the medusae.
- **Examples** - Hydra, Obelia (sea fur) , Aurelia(jelly fish), Metridium (sea anemone).

7.4 Phylum - Platyhelminthes :

- Bilaterally symmetrical and dorsoventrally flattended animals.
- Body thin, soft, leaf-like or ribbon-like.
- Digestive cavity (when present) with a single opening, the mouth (anus is absent).
- Suckers and hooks are usually present.
- Circulatory and respiratory system and skeleton are absent.
- Excretory system consists of blind tubules called protonephridia.
- **Examples** : *Dugesia* (Planaria), *Fasciola* (liver fluke), *Schistosoma* (Blood fluke), *Taenia solium* (Pork Tape worm).

Fig - Hydra

Fig - Taenia solium

7.5 Phylum - Aschelminthes or nematoda

- They are parasitic or free-living.
- They are triploblastic, unsegmented and show bilateral symmetry.
- Body cavity is not a true coelom.
- Alimentary canal is complete.
- Sexes are separate.
- **Examples** : *Ascaris* (Round worm), *Enterobius* (Pin worm), *Wuchereria* (filaria worm)

7.6 Phylum - Annelida :

- They occur in moist soil, fresh water and sea.
- They are elongated, with segmented body and bilateral symmetry.
- First animals with true body cavity (coelom).
- Body bears lateral appendages for locomotion in the form of chitinous setae or parapodia.

- **Examples :** *Nereis* (sand worm) *Aphrodite* (sea mouse), *Pheretima* (earthworm), *Hirudinaria* (Cattle leech)

7.7 Phylum - Arthropoda :

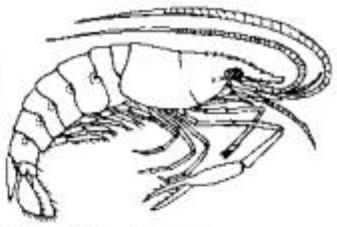


Fig - Prawn

- Body is covered with a thick chitinous covering.
- Respiration through general body surface, by gills, air tubes (tracheae) or l
- Body segments are grouped into two regions-cephalothorax (head and thora: :e regions-head, thorax and abdomen.
- Triploblastic, bilaterally symmetrical and metamerically segmented animals.
- Each body segment usually bears paired lateral and jointed legs or appendages.
- **Example :** *Palemon* (Prawn), *Daphnia* (water flea), *Limulus* (King crab), *Palamnaeus* (Scorpion)

7.8 Phylum - Mollusca :

Fig - Pila

- They have soft, unsegmented body.
- Body is divided into three regions (head visceral mass and ventral foot).
- Outer surface is covered by a hard calcareous shell.
- Respiration is by gills called ctenidia.
- The sexes are usually separate.
- Examples : *Chiton*, *Pila* (Snail), *Unio* (Fresh water mussel), *Octopus* (Devil fish).

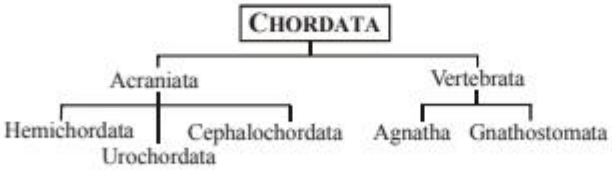
7.9 Phylum - Echinodermata :

Fig- Star fish

- They are marine, gregarious (live in groups) and free-living animals.
- Shape may be star-like, spherical or elongate.
- Body surface is covered all over by calcareous spines.
- Aristotle's lantern for mastication.
- Their symmetry is radial in adults but bilateral in larvae.
- Tube feet for locomotion.
- These are unsegmented.
- Body cavity is modified into a water-vascular systemor ambulacral system with tube like outward extension for locomotion, called tube feet.
- **Examples :** *Asterias* (Star fish), *Echinus* (Sea urchin), *Holothuria* (Sea cucumber), *Antedon* (Feather star)

7.10 Phylum - Chordata

- Chordata are characterized by following basic features :
- A dorsal, hollow, tubular nerve cord.
- Notochord present.
- Gill slits in the pharynx.
- Tail behind the anal opening.
- Ventral heart.



7.11 Phylum Hemichordata :

Fig - Balanoglossus

- Body soft, unsegmented worm-like and bilaterally symmetrical. These animals possess a combination of invertebrate (nonchordate) and chordate characters.
- Body is divided into proboscis, collar and trunk.
- These animals resemble chordates only in having pharyngeal gill-clefts and they lack notochord and true dorsal nerve cord.
- Buccal diverticulum earlier regarded as "notochord" is present in proboscis.

⇒ Exclusively marine, solitary or colonial, mostly tubicolous and detritus feeders like the earthworms.

⇒ **Example :**

Balanoglossus (acorn worm or tongue worm).

7.12 Subphylum - Urochordata :

⇒ Body is unsegmented and usually adults lack tail.

⇒ Body is covered by a tunic. Notochord occurs in tail in larval forms only.

⇒ Pharynx has several gill slit.

⇒ **Examples :** *Herdmania (Sea squirt).*

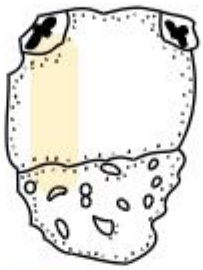


Fig - Herdamania

7.13 Subphylum - Cephalochordata :

➤ Fish-like, metamerically segmented, headless coelomate animals which retain notochord, dorsal tubular nerve cord and pharyngeal gill-slits throughout life.

➤ Notochord and nerve cord (without a distinet brain) extend the entire length of body possess post anal tail.

➤ Exoskeleton, head, jaws and paired fins are absent.

➤ Pharynx large and perforated by numerous gill-slits.

➤ **Examples :** *Amphioxus* or *Branchiostoma* (lancelet)

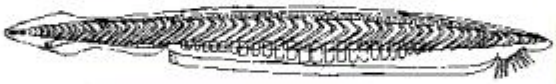


Fig - Amphioxus

9. GROUP - VERTEBRATA ::

➤ It includes the majority of chordates.

➤ Head is well differentiated.

➤ Nervous system and endoskeleton are highly developed.

➤ Notochord is replaced by a jointed vertebral column. There are two pairs of appendages.

➤ Respiration is by gills in aquatic animals and by lungs in land animals.

9.1 Subgroup - Agnatha :

➤ Animals having vertebral column and cranium. Most primitive vetebrates.

➤ No jaws; mouth suctorial.

➤ No lateral appendages or fins.

9.2 Subgroup - Cyclostomata :

➤ Body long, elongated and eel-like.

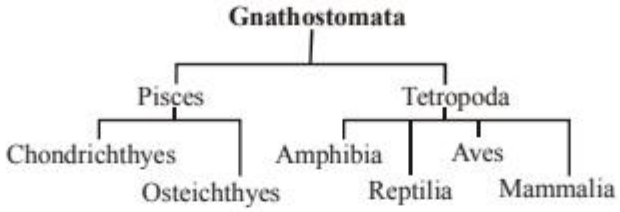
➤ Skin, soft, slimy, smooth and scaleless.

➤ Mouth round, suctorial and without jaws. They are ectoparasites and use mouth to stick to the back of the other fish.

➤ Single and median nostril present.

➤ **Examples** : *Petromyzon* (lamprey), *Myxine* (hagfish).

Fig - Myxine



10. PISCES ::

- Aquatic vertebrates which respire by gills and move with help of fins. Heart 2 chanbered.

10.1 Class - Chondrichthyes :

- Marine fishes with completely cartilaginous endoskeleton. They are generally large in size (up to 10-20 meters long)
- Body is either laterally compressed and spindle-shaped or dorsoventrally flattened and disc shaped.
- Mouth ventral in position.
- Skin is tough and covered with minute placoid scales.
- Respiration by gills. Five or seven pairs of gills open outside by means of gill-slits. The gill-slits are not covered by gill-cover or operculum.
- **Example :** *Scoliodon* (dog-fish, Indian shark), *Sphyrna* (hammer-headed shark), *Torpedo* (electric ray), *Trygon* (sting ray), *Pristis* (saw-fish)

Fig - Scoliodon

10.2 Class - Osteichthyes :

- Marine and fresh-water fishes with partly or wholly bony endoskeleton.
- Size varies from 10 mm to 4 meters.
- Body is generally spindle-shaped.
- Skin is either naked or covered with cycloid or ctenoid scales.
- Mouth is usually terminal (anterior) in position.
- **Example :** *Labeo* (rohu, carp), *Catla* (katla), *Hilsa*, *Ophiocephalu* (channa or snakeheads), *Clarias* (mangri)

Fig - Clarias

10.3 Class - Amphibia :

- In evolutionary terms, amphibians form the first group among the chordates to live out of water and to comprise first four-legged (tetrapod) land vertebrates. They live on land but lay their eggs in water. Amphibians are vertebrates leading two lives.
- These cold blooded animals live partly in fresh water and partly on land (moist places).
- Skin is smooth or rough, moist, slimy, glandular and mostly without scales.
- Heart 3 chambered.
- Body with distinct head and trunk, no neck.

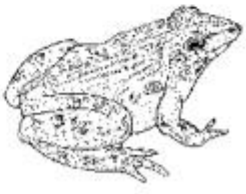


Fig - Bufo

- Two pairs of pentadactyl (five digit) limbs are present. Digits or toes without claws. Limbs may be absent in some cases.
- **Example :** *Ichthyophis*, *Amphiuma (congo ell)*, *Salamandra*, *Ambystoma*, *Necturus*, *Rana* (bull frog), *Bufo* (toad), *Hyla* (tree-frog).

10.4 Class - Reptilia :

- Cold-blooded, terrestrial or aquatic vertebrates with body covered with dry water-proof skin having horny scales or scute plates.
- Heart 3½ chambered. Crocodyles have 4 chambered heart.
- Body varies in form and is usually divided into head, neck, trunk and tail.
- Limbs tetrapodous pentadacytle (five-toed) type with clawed digits (limbs are absent snakes and some lizards).
- Tympanum small and depressed.
- Teeth are present in all reptiles except in tortoises and turtles.
- **Example :** *Kachuga* (roofed-terrapin), *Testudo* (land-tortoise), *Uromastix* (sand-lizard), *Hemidactylus* (wall lizard), *Calotes* (garden-lizard), *Draco* (flying-lizard) *Chamaeleon*, Cobra etc.

Fig - Cobra

10.5 Class - Aves :

- Warm-blooded, tetrapodous vertebrates (birds) with various flight adaptations.
- Size ranges from smallest humming bird to largest ostrich.
- Heart 4 chambered.
- Horny scales persist on the feet but feathers cover most of the body. Cutaneous glands are absent.
- Boat-shaped body is divisible into head, neck, trunk and tail.
- Fore-limbs modified into wings for flight. Kiwis have vestigial wings.
- **Example :** *Gallus* (chicken), *Passer* (house sparrow), *Corvus* (crow), *Columba* (pigeon), *Psittacula* (parrot), *Pavo* (peafowl peacock), *Eudynamys* (koel), *Bubo* (owl)

Fig - Passer (house sparrow)

10.6 Class - Mammalia :

- Mammals are warm-blooded and most evolved animals of Animal kingdom.
- Heart 4 chambered.
- Hairs and subcutaneous fat form an insulating layer. Cutaneous glands such as sweat glands and sebaceous (oil) glands are abundant.
- Diapharg present.
- Females have milk-producing mammary glands which secrete milk for the nourishment of the young.
- 7 servical vertebrae (except whale, dolphin).
- External ear (pinnae) present.
- **Example :** *Macropus* (kangaroo), *Erinaceous* (hedgehog), *Talpa* (mole), *Sorex* (shrew), *Pteropus* (flying fox), *Bat*, *Manis* (scaly ant-eater), *Hystrix* (porcupine), *Funambulus* (squirrel) *Rattus* (rat), *Oryctolagus* (rabbit), camel (ship of dbert).

Fig - Camel

EXERCISE - 1

A. VERY SHORT ANSWER TYPES QUESTIONS

Q.1 Name the kingdoms according to the Linnaeus classification ?

Q.2 Who introduced the Five-kingdom classification ?

Q.3 What is the causal agent of AIDS ?

Q.4 Who proposed Binomial nomenclature ?

Q.5 What type of animals are included in monera ?

Q.6 Name two Gymnosperm plants ?

Q.7 Give two example of Arthropoda ?

B. SHORT ANSWER TYPES QUESTIONS
(About 30–40 words)

Q.8 What are bryophytes ?

Q.9 Write important characters of viruses ?

Q.10 What are lichens ?

Q.11 Differentiate between dicotyledonae and monocotyledonae plants ?

Q.12 What are the sub phyllum of chordata ? Give examples.

C. LONG ANSWER TYPES QUESTIONS
(More than 60–70 word)

Q.13 Write down the main characters of the kingdom monera or protista ?

Q.14 List the distinguishing features of the phylum chordata ? Mention its classes with one example each.

Q.15 Write down important characters of the phylum-Platyhelminthes ?

Q.16 Give the general characters and classification of Phanerogames ?

Q.17 Distinguish pteridohytes and Gymnopserms with exaples ?

D. FILL IN THE BLANKS

Q.18 Virus is connecting link between ..... and .....

Q.19 ..... is remembered as the father of taxonomy.

Q.20 Ambulacral system is characteristic of .....

Q.21 Non-seed bearing vascular plant are .....

Q.22 Protozoa are ..... and ..... animals.

E. TRUE OR FALSE

Q.23 Viruses do not have an independent metabolism.

Q.24 Aves are cold - blooded animals.

Q.25 Kiwis is flightless birds.

Q.26 Hedgehog belongs to class mammalia.

Q.27 In thallophyta mechanical and conducting tissues are absent.

Q.28 Fungi are Autotropic.

Q.29 Pteridophyta plants have no flowers and do not produce seeds.

F. SINGLE CHOICE QUESTIONS

Q.30 Whittaker failed to give any place to one of the following in his classification -
(a) Cyanobacteria
(b) Virus
(c) Slime moulds
(d) all above

Q.31 Parazoa of includes -
(a) Protozoans
(b) Porifera
(c) Parasites of invertebrates (mosozoa)
(d) None above

Q.32 Viruses are essentially made up of -
(a) Proteins and nucleic acid
(b) Proteins and carbohydrates
(c) Lipids and nucleic acids
(d) Starch, proteins and lipid

Q.33 Prokaryotes are included in the group -
(a) Monera (b) Basidiomycetes
(c) Bryophytes (d) Tracheophyta

Q.34 Four kingdom system of classification was given by -
(a) Copeland (b) Whittaker
(c) Linnoeus (d) Von mohl

Q.35 Which group of plants are called "Amphibians of plant world" -
(a) Bryophyta (b) Gymnosperms
(c) Algae (d) Fungi

Q.36 Which of the following organism has characters of both animals and plants -
(a) Blue-green algae (b) Euglena
(c) Moss (d) Cycas

Q.37 Vascular bundle are found in -
(a) Thallophyta (b) Bryophyta
(c) Pteridophyta (d) Lichens

Q.38 A branch of biology which deals with the identification, nomenclature and classification of organisms is called -
(a) Morphology (b) Ecology
(c) Taxonomy (d) Phytogeography

Q.39 Binomial nomenclature was introduced by -
(a) John Ray (b) A. P. deCandolle
(c) A. L. de Jussion (d) Carolus Linnaeus

G. MATCH THE COLUMNS

Q.40

Column - I	**Column - II**
1. Limbless reptile	a. Lamprey
2. Jawless vertebrate	b. Salamander
3. Amphibian	c. Salmon
4. Cartilaginous fish	d. Snake
5. Flightless bird	e. Shark
	f. Ostrich

H. FILL THE BOX WITH APPROPRIATE WORD

Q.41 Agnatha has no - ☐

Q.42 Segmented worms with complete digestive tract originated in phylum - ☐

Q.43 Petromyzon is example of - ☐

Q.44 Kiwi is found in - ☐

I. ASSERTION-REASON TYPE QUESTIONS

The following questions consist of two statement each : assertion (A) and reason (R). To answer these questions, mark the correct alternative as described below :

(a) If both **A** and **R** are true and **R** is the correct explanation of **A**.
(b) If both **A** and **R** are true but **R** is not correct explanation of **A**.
(c) If **A** is false but **R** is true.
(d) If both **A** and **R** are false.

Q.45 **A :** Scoliodon is called dog fish.
R : It has a developed sense of smell.

EXERCISE - 2

A. SINGLE CHOICE QUESTIONS

Q.1 Algae are -
(a) Autotropic (b) Heterotropic
(c) Both (d) None

Q.2 Chlamydomonas is the example of -
(a) Algae (b) Fungi
(c) Lichens (d) None

Q.3 Which class is called amphibians of the plant kingdom -
(a) Thallophyta (b) Bryophyta
(c) Pteridophyta (d) Gymnosperm

Q.4 Example of pteridophyta is -
(a) Selaginella (b) Cycas
(c) Pinus (d) None

Q.5 Cnidoblasts is characterstic feature of -
(a) Coelenterata (b) Porifera
(c) Protozoa (d) Arthropoda

Q.6 Palemon (prawn) is the example of -
(a) Arthropoda (b) Annelida
(c) Coelenterata (d) Protozoa

Q.7 Four chambered heart is found in -
(a) Draco
(b) Hemidactylus
(c) Tortoises and turtles
(d) Rocodyle

Q.8 In mollusca respiratory organ is called -
(a) Ctenidia
(b) Lungs
(c) Book-lungs
(d) All the above

Q.9 In larval stage which symmetry is present in echinodermata -
(a) Radial (b) Biradial
(c) Bilateral (d) None of these

B. MULTIPLE CHOICE QUESTIONS

Q.10 Which of the following groups of animals is found in marine habitat -
(a) Some fishes (b) Echinoderms
(c) Whale (d) None of these

Q.11 Which statement is correct -
(a) Thallophyta has no vascular system
(b) Fungi have a cell wall containing a mixture of chitin and cellulose
(c) Cycas is the example of pteridophyta
(d) Rose is the example of monocotyledonae

Q.12 True coelon is found in -
(a) Annelida (b) Nematoda
(c) Cnidaria (d) All above

Q.13 In the five kingdom system of classification developed by Robert Whittaker, members of the kingdom animalia are heterothophic, eukaryotic and -
(a) Multicellular
(b) Motile
(c) Either unicellular and multicellular
(d) None of these

Q.14 Which mammal can fly -
(a) Bat (b) Lizard
(c) Sparrow (d) None

Q.15 Which does not belong to class coelenterata -
(a) Hydra (b) Aurelia
(c) Metridium (d) Euplectella

Q.16 Which animal is included Aves -
(a) Kangroo (b) Hedgehog
(c) Penguin (d) Bat

Q.17 Warm - blooded animals are -
(a) Reptilia (b) Fish
(c) Aves (d) Amphibia

Q.18 Example of Amphibia is -
(a) Amphioxus (b) Myxine
(c) Amphicma (d) Ambyostoma

Q.19 Respiration in arthropods occurs through -

(a) Body surface (b) Booklungs

(c) Gill (d) Lungs

C. PASSAGE BASED QUESTIONS

PASSAGE 1 (Q.20 TO Q. 23)

An amimals are marine and have tube feet for locomotion. A well developed system of camals is present for movement of water in the body. Larva and adult have different symmetry.

Q.20 Animals with alive character belong to which phylum ?

Q.21 What is name of the system of canals ?

Q.22 What is the symmetry in larva and adult of such animals ?

Q.23 Name two examples and their common names ?

ANSWER
EXERCISE -1

A. VERY SHORT ANSWER TYPES QUESTIONS

1. Plant kingdom, Animal kingdom.
2. Robert H. Whittaker
3. AIDS is caused by Human Immuno-deficiency virus (HIV).
4. Monera
5. Plantae
6. Unicellular, eukaryotic organisms
7. Cycas, Pinus
8. Palemon (Prown), Limulus (King crab)

D. FILL IN THE BLANKS

18. An living world, non-living world.
19. Carolus linnaeus
20. Echinodermata
21. Pteriophyte
22. Unicellular and aquatic.

E. TRUE OR FALSE

23. True **24.** False **25.** True
26. True **27.** True **28.** False
29. True

F. SINGLE CHOICE QUESTIONS

30. b **31.** b **32.** a **33.** a
34. a **35.** a **36.** b **37.** c
38. c **39.** d

G. MATCH THE COLUMNS

40. 1-d, 2-a, 3-b, 4-e, 5-f

H. FILL THE BOX WITH APPROPRIATE WORD

41. Jows **42.** Annelida
43. cyclostomata **44.** New Zealand

I. ASSERTION-REASON TYPE QUESTIONS

45. a

EXERCISE -2

A. SINGLE CHOICE QUESTIONS

1. a **2.** a **3.** b **4.** a **5.** a

6. a **7.** d **8.** a **9.** c

B. MULTIPLE CHOICE QUESTIONS

10. a, b, c **11.** a, b **12.** a **13.** a, b
14. a **15.** d **16.** c **17.** c
18. c **19.** a, b, c

C. PASSAGE BASED QUESTIONS

PASSAGE 1 (Q.21 TO Q. 24)

20. Echinodermata
21. Ambulacral system or water vascular system.
22. Larva - Bilateral and
Adult - Radially symmetrical.
23. Asterias (star fish)
Echinus (sea urchin)