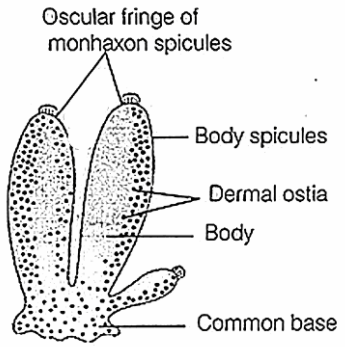
ANIMAL KINGDOM

The fundamental basis of classification

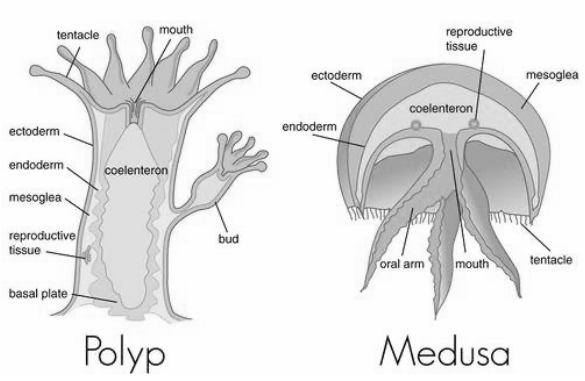
- **Levels of organisation -** It includes cellular level, tissue level, organ level and organ system level of organisation.
- **Symmetry -** The body of animals can be asymmetrical, radially symmetrical, and bilaterally symmetrical.
- **Organisation -** Animals are classified based on the diploblastic or triploblastic organisation.
- **Coelom -** Animals can be classified as acoelomate, pseudocoelomate, or coelomate.
- **Segmentation -** It involves the phenomenon of metamerism.
- **Presence or absence of notochord**

Phylum - Porifera



- Multicellular organisms with a cellular level of organisation
- Water or canal system is present.
- Water enters through the Ostia and goes out through the osculum.
- Skeleton is made of spongin fibres or spicules.
- Choanocytes (collar cells) line the spongocoel and the canal.
- Hermaphrodite
- Fertilization is internal and development is indirect (the larval stage is present).
- Examples: *Sycon, Spongilla*, and *Euspongia*

Phylum - Coelenterata (Cnidaria)

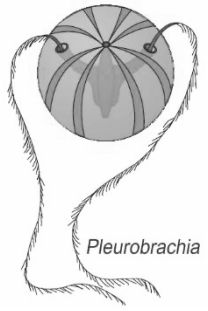


- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- Digestion is intracellular and extracellular.
- Corals have calcium carbonate skeletons.
- Cnidarians exhibit two basic body forms – polyp and medusa.
- Metagenesis is the alternation of generation between polyp and medusa forms.
- Examples: Hydra, *Adamsia*, and *Pennatula*

Phylum - Ctenophora

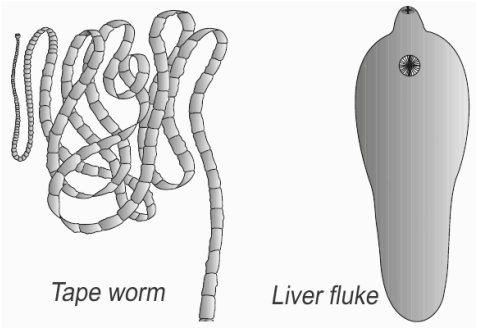
- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- They show the property of bioluminescence.

- Eight external rows of ciliated comb plates are present.
- Examples: *Ctenoplana* and *Pleurobrachia*



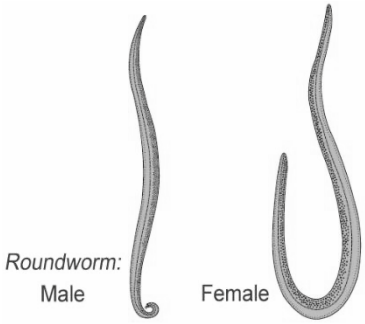
Phylum - Platyhelminthes

- Bilaterally symmetrical organisms with Dorso-ventrally flattened body
- They are triploblastic and acoelomate with organ level of organisation
- They are usually parasitic on other animals.
- Fertilization is internal.
- Hermaphrodite
- Flame cells perform the function of osmoregulation and excretion.
- Examples: *Fasciola* (liver fluke) and *Taenia* (Tapeworm)



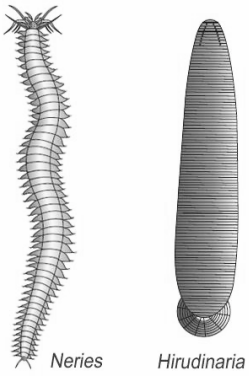
Phylum - Aschelminthes

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.
- They are pseudocoelomate.
- Sexes are separate.
- Fertilization is internal.
- Examples: *Ascaris* (roundworm), *Ancylostoma*, and *Wuchereria*



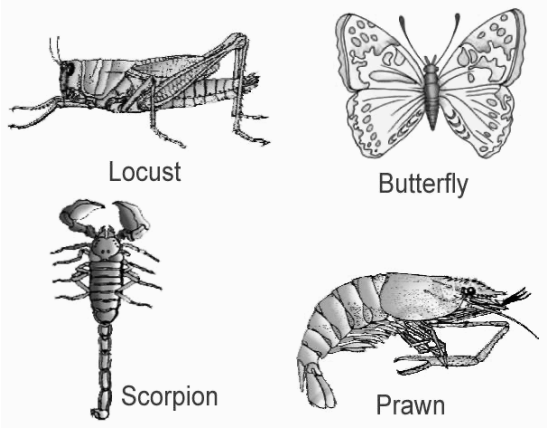
Phylum - Annelida

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.
- They are coelomate.
- They are metamerically segmented.
- Nereis possesses parapodia, which helps in swimming.
- They have nephridia as excretory and osmoregulatory organs.
- Earthworms and leeches are monoecious and Nereis is dioecious.
- Examples: *Pheretima* (earthworm), *Nereis*, and *Hirudinaria*



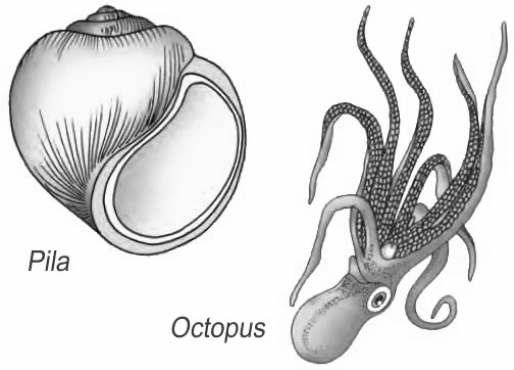
Phylum - Arthropoda

- Largest phylum of kingdom Animalia
- They are triploblastic, bilaterally symmetrical, segmented, and coelomate animals.
- The body is covered by a chitinous exoskeleton.
- They have jointed appendages.
- The circulatory system is open.
- Respiration through book lungs, gills, book gills, or tracheal system
- They have Malpighian tubules as an excretory organ.
- Mostly dioecious and oviparous
- Examples: *Anopheles*, *Aedes*, and *Locusta*
- *Limulus* (King crab) is a living fossil.



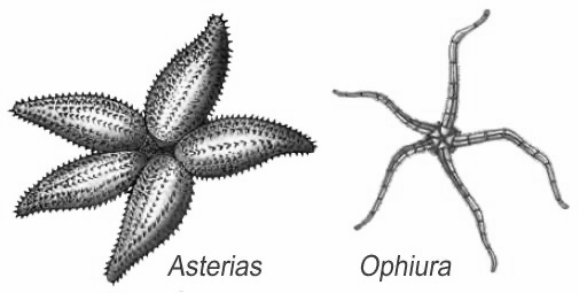
Phylum - Mollusca

- Second largest phylum of the kingdom Animalia
- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- Possess organ system level of organisation
- The body possesses a calcareous shell and is unsegmented having a distinct head, muscular foot, and visceral hump.
- Usually dioecious and oviparous.
- They have a radula (a file-like rasping organ for feeding).
- Examples: *Pila, Pinctada*, and Octopus



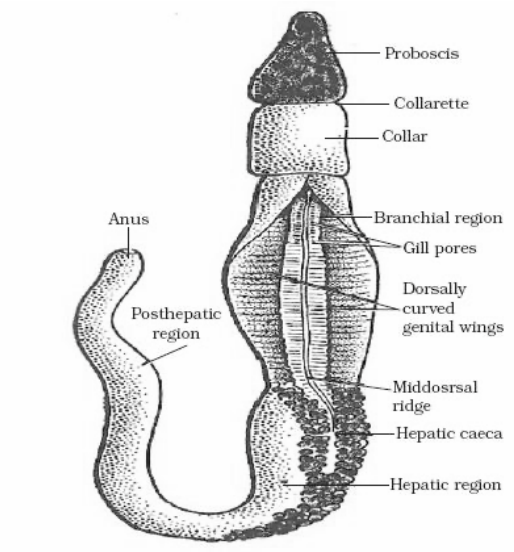
Phylum - Echinodermata

- They are triploblastic and coelomate animals with adult having echinoderms having radial symmetry and larvae bilateral symmetry.
- Endoskeleton is of calcareous ossicles.
- They have a well-developed water vascular system, which is used for locomotion, capture, and transport of food and respiration.
- Examples*: Asterias* (Starfish), *Echinus* (Sea urchin), and *Antedon* (Sea lily)



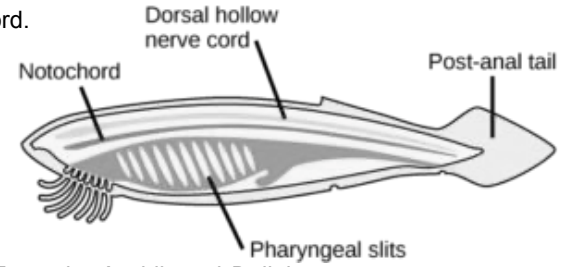
Phylum - Hemichordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- The body is composed of a proboscis, collar, and trunk.
- Respiration through gills; sexes - separate; fertilization - external; development - indirect
- Proboscis gland is excretory organ.
- Example: *Balanoglossus*



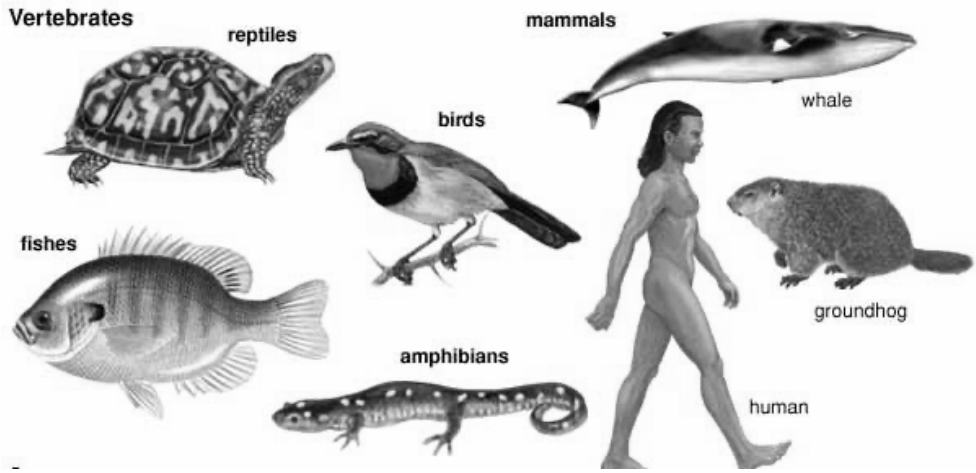
Phylum - Chordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals with organ system level of organisation.
- These animals are characterized by the presence of a notochord.
- They have single, dorsal, and hollow nerve cords.
- Their pharynx is perforated by gill slits.
- The heart is in the ventral part.
- They have a post-anal tail.
- Phylum Chordata is divided into three sub-phyla:
  - Urochordata - Notochord is present only in larval stages. Example: *Ascidia* and *Doliolum*
  - Cephalochordata- Notochord is persistent throughout life. Example: *Branchiostoma*
  - Vertebrata

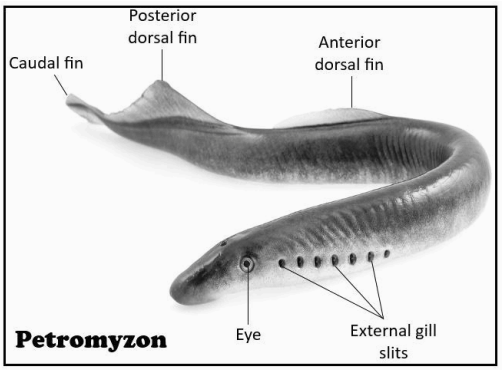


Subphylum Vertebrata

- All vertebrates are chordates, but all chordates are not vertebrates.
- The notochord is replaced by the vertebral column in adults.
- Subphylum Vertebrata is divided into two divisions called Agnatha (which lacks jaws) and Gnathostomata (which bears jaw).
- The division Agnatha contains a single class called Cyclostomata.

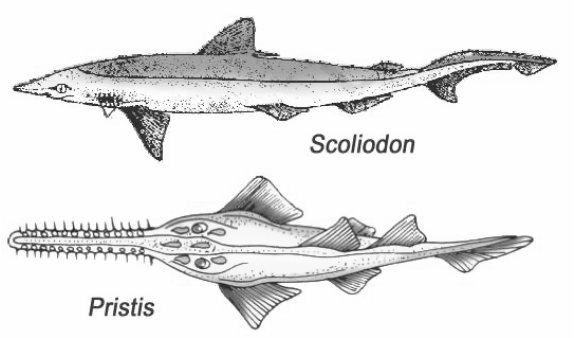


Class- Cyclostomata



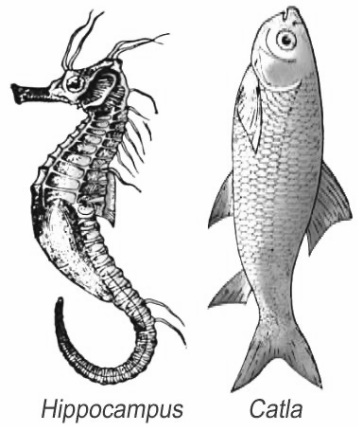
- They are ectoparasites on fishes.
- Jaws are absent.
- Example: *Petromyzon*
- The division Gnathostomata is divided into two superclasses called Pisces (which bear fins) and class Tetrapoda (that bear limbs).
- The superclass Pisces contains two classes - *Chondrichthyes* and *Osteichthyes*.

Class- Chondrichthyes



- Skeleton is cartilaginous.
- The operculum is absent.
- The notochord is persistent.
- The air bladder is absent.
- The heart is two-chambered.
- Poikilothermous i.e., cold-blooded animals
- Skin is covered by placoid scales.
- Fertilization is internal.
- Mostly viviparous
- Example: *Scoliodon* (Dog Fish)

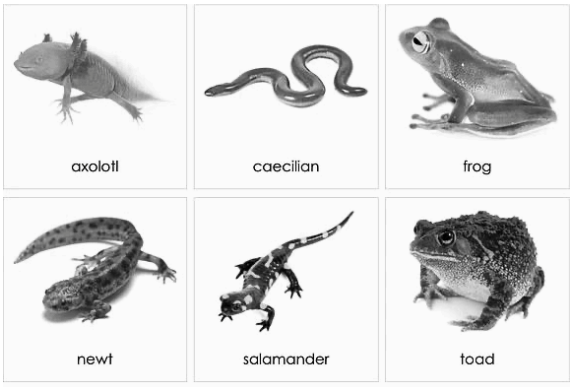
Class- Osteichthyes



- Skeleton is bony.
- Operculum is present.
- The air bladder is present.
- Skin is covered by ctenoid/cycloid scales.
- The heart is two-chambered.
- Poikilothermous i.e., cold-blooded animals
- Fertilization is external.
- Mostly oviparous
- Example: *Hippocampus*, Exocoetus
- The superclass Tetrapoda contains four classes called Amphibia, Reptilia, Aves, and Mammals.

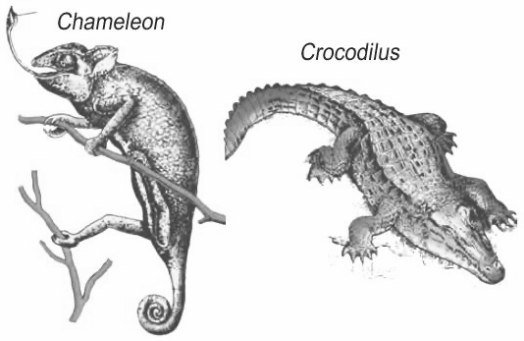
Class- Amphibia

- Cold-blooded animals with two pairs of limbs
- The heart is three-chambered.
- Respiration is through the gills, lungs, and skin.
- Fertilization is external
- Sexes are separate
- Oviparous
- Examples: Frog, toad, and salamander



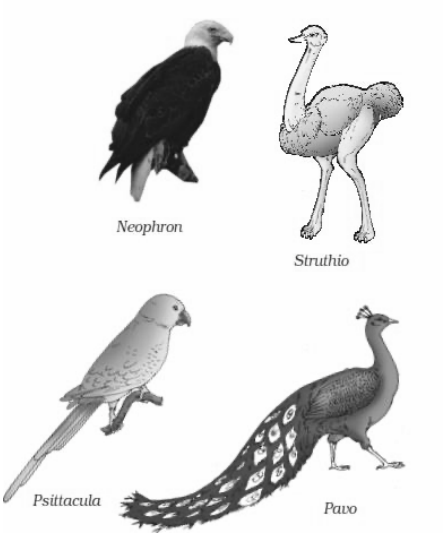
Class- Reptilia

- Cold-blooded animals with two pairs of limbs
- They have dry and cornified skin.
- Mostly, the heart is three-chambered, but it is four-chambered in crocodiles.
- Respiration is through the lungs.
- Fertilization is internal
- Sexes are separate
- Oviparous
- Examples: Snake, lizard, and crocodile



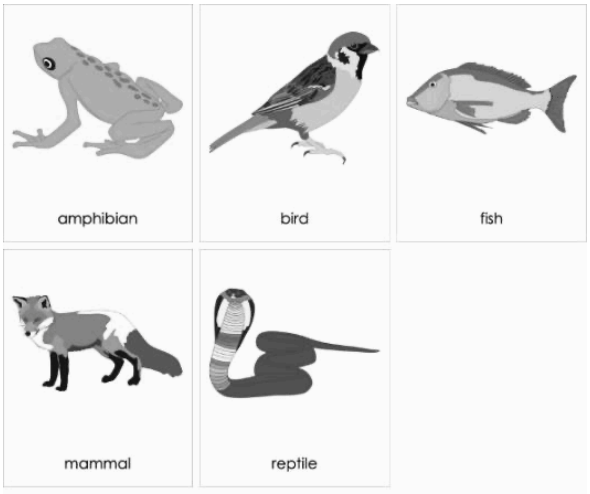
Class- Aves

- Homoeothermic i.e., warm-blooded animals with forelimbs modified into wings
- The heart is four-chambered.
- Respiration is through the lungs.
- Bones are hollow with a pneumatic cavity.
- Fertilization is internal
- Sexes are separate
- Oviparous
- Examples: Crow, Pigeon, and Parrot



Class- Mammalia

- Warm-blooded animals having mammary glands
- Two unique features of mammals are the presence of mammary glands and hairs on skins.
- The heart is four-chambered.
- Respiration is through the lungs.
- Fertilization is internal
- Sexes are separate
- Viviparous with some exceptions such as **Platypus**.
- Examples: Rat, elephant, and kangaroo



Exercise

(1) At the tissue level of organisation, the

(A) cells are arranged as loose cell aggregates

(B) tissues are grouped to form organs

(C) cells performing the same function are arranged into groups

(D) tissues are grouped to form systems

(2) Phylum(s) that exhibit radial or radial-like symmetry is/are

(A) Coelenterata (B) Echinodermata

(C) Ctenophora (D) All of these

(3) The term 'bilateral symmetry' refers

(A) when the body can be divided into two unequal halves bypassing the central axis through it

(B) to any plane passing through the centre, which does not divide the body into equal halves

(C) when the body can be divided into identical left and right halves only in one plane

(D) any plane passing through the central axis of the body dividing the organism into two halves

(4) Diploblastic animals belong to the phylum

(A) Protista (B) Protozoa

(C) Ctenophora (D) Platyhelminthes

(5) Higher phylum like echinoderms include

(A) triploblastic animals (B) quadroblastic animals

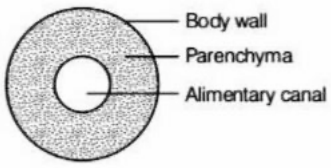
(C) diploblastic animals (D) uniblastic animals

(6) The pseudocoelomate animals are included in the phylum

(A) Porifera (B) Annelida

(C) Aschelminthes (D) Mollusca

(7) The cross-section of the body of an invertebrate is given below. Identify the animal, which has this body plan.



(A) Cockroach

(B) Roundworm

(C) Planaria

(D) Earthworm

(8) Choose the false option.

(A) Amoeba-Asymmetrical

(B) Coelenterates - Diploblastic, radial symmetry, non-chordates

(C) Chordates - Petromyzon, Ornithorhynchus, Equus

(D) Annelid-Pseudocoelomate

(9) The animal with bilateral symmetry in the young stage and radial pentamerous symmetry in the adult stage belongs to the phylum

(A) Annelida (B) Mollusca

(C) Cnidaria (D) Echinodermata

(10) Which one of the following options is incorrect about the occurrence of notochord?

(A) It is present only in the larval tail in ascidian

(B) It is replaced by a vertebral column in adult frog

(C) It is absent throughout life in humans from the very beginning

(D) It is present throughout life in Amphioxus

(11) In the case of poriferans, the spongocoel is lined with flagellated cells called **NEET 2017**

(A) Ostia (B) Oscula

(C) Choanocytes (D) Mesenchymal cells

(12) The skeleton of animals belonging to phylum Porifera is made up of

(A) Spicules (B) Spiracles

(C) Spines (D) Spongocytes

(13) Which of the following is not true regarding phylum Coelenterata?

(A) They are diploblastic animals

(B) They have the cellular level of organisation

(C) They have nematocyte cells present on the tentacles

(D) The gastrovascular opening is called the hypostome

(14) What is the symmetry of medusa? **JIPMER 2018**

(A) Bilateral (B) Radial

(C) Asymmetrical (D) Biradial

(15) Reproduction in Ctenoplana takes place by

(A) Budding (B) Sexual reproduction

(C) Binary fission (D) Multiple fission

(16) Animal of which phylum have hooks and suckers and are endoparasite on other animals?

(A) Platyhelminthes (B) Annelida **AIIMS 2019**

(C) Aschelminthes (D) Arthropoda

(17) Which of the following is true about phylum Platyhelminthes?

(A) Presence of sucking mouth

(B) Mostly free-living

(C) Presence of complete digestive tract

(D) Polyembryony seen in some forms

(18) Trichocyst and nematocyst are meant for

(A) Defence (B) Nutrition

(C) Respiration (D) Excretion

(19) *Wuchereria bancrofti* is a common filarial worm. It belongs to the phylum

(A) Platyhelminthes (B) Aschelminthes

(C) Annelida (D) Coelenterata

(20) *Ascaris* is characterised by

(A) the absence of true coelom, but the presence of metamerism

(B) the presence of neither true coelom nor metamerism

(C) the presence of true coelom, but the absence of metamerism

(D) the presence of true coelom and metamerism

(21) The animals belonging to phylum Annelida use the following in locomotion.

(A) Nephridia and nephridial pores (B) Longitudinal and circular muscles

(C) Organs of bursa (D) Spicules and ostia

(22) Which of the following contains all members of the phylum Annelida?

(A) *Hirudinaria, Nereis and Wuchereria* (B) *Earthworms, Aphrodite, and Pila*

(C) *Pheretima, Tubifex and Nereis* (D) *Aplysia, Nereis and Dentalium*

(23) Which one of the following animals is called a living fossil?

(A) King locust (B) *Limulus*

(C) *Bombyx* (D) *Balanoglossus*

(24) The second largest number of species containing phylum after phylum-Arthropoda in the animal kingdom is

(A) Annelida (B) Cnidaria

(C) Mollusca (D) Chordata

(25) The animal's body belonging to phylum Mollusca is divided into

(A) head, thorax, and abdomen

(B) head, muscular foot and abdomen

(C) head, thorax, and visceral hump

(D) head, muscular foot and visceral hump

(26) The development of Mollusca is like annelids. This can be concluded as both have

(A) larvae named trochophore

(B) direct development without larval stages

(C) the larval stage called glochidium only

(D) the larval stage called wriggler

(27) The scientific name of starfish is

(A) Echinus (B) Limulus

(C) Echidna (D) Asterias

(28) Choose the animals that belong to phylum Echinodermata from the options.

(A) Sea urchin, cuttlefish, and sea lily

(B) Echinus, sea hare and sea cucumber

(C) Antedon, Ophiura and Echinus

(D) Ophiura, Chaetopleura and Echinus

(29) An important characteristic that hemichordates share with chordates is **NEET 2017**

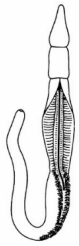
(A) absence of notochord

(B) a ventral tubular nerve cord

(C) pharynx with gill slits

(D) pharynx without gill slits

(30) The correct classification of a given animal is



(A) Chordata-Vertebrata - Craniata

(B) Chordata - Craniata

(C) Chordata - Acraniata

(D) Non-chordata – Hemichordata

(31) All chordates have the following characteristics.

(A) Bilaterally symmetrical, presence of coelom, triploblastic, open circulatory system

(B) Bilaterally symmetrical, presence of coelom, diploblastic or triploblastic

(C) Open circulatory system, diploblastic or triploblastic, coelom and bilaterally symmetrical

(D) Bilaterally symmetrical, coelom present, triploblastic with the closed circulatory system

(32) Choose the incorrect vertebrate character.

(A) Ventral muscular heart

(B) Kidneys for excretion and osmoregulation

(C) Paired appendages which may be fins or limbs

(D) None of the above

(33) Which of the following is not a characteristic feature of class-Chondrichthyes?

(A) Gill slits are separate and without operculum

(B) Predaceous with powerful jaws

(C) Notochord is persistent throughout life

(D) Air bladder present

(34) Which features are common to the animals belonging to class Amphibia and class Reptilia?

(A) The presence of scales with internal fertilisation and a usually four-chambered heart

(B) The presence of tympanum, poikilotherms and usually three-chambered heart

(C) The presence of cloaca, oviparous and external fertilisation

(D) Skin is moist

(35) Which one of the following is incorrect for Aves?

(A) Heart is four-chambered, and animals are oviparous

(B) The presence of air cavities in bones and the presence of feathers on the body

(C) Digestive tract has additional chambers and animals are homeotherms

(D) The forelimbs are not modified into wings

(36) Which one of the following is an exclusive character of class-Mammalia?

(A) Homeothermy

(B) Internal fertilisation

(C) The presence of a four-chambered heart

(D) The presence of a muscular diaphragm

Direction (Q. xxxviii to xl) In each of the following questions, a statement of Assertion (A) is given by the corresponding statement of Reason (R). Of the statements, mark the correct answers as

(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 the correct explanation of A

(c) If A is true, but R is false

(d) If A is false, but R is true

(37) **Assertion (A)** In many gastropods, the anus and the mantle cavity are placed anteriorly above the head.

Reason (R) During embryonic development in many gastropods, one side of the visceral mass grows faster than the other side. This uneven growth rotates the visceral organs up to 180^{o} in many gastropods.

(38) **Assertion (A)** Animals that have an exoskeleton, always lack an endoskeleton.

Reason (R) Skeleton cells in the embryonic stage migrate to produce an exoskeleton and endoskeleton.

(39) **Assertion (A)** Aves must feed more often than reptiles.

Reason (R) Birds are homeotherms and this consumes more energy than reptiles that are poikilotherms.

(40) **Assertion (A)** Duck-bill platypus is not a true mammal.

Reason (R) True mammals are all viviparous, while platypus lays eggs.

(41) Consider the following features.

(A) Organ system level of organisation

(B) Bilateral symmetry

(C) True coelomates with the segmentation of the body

Select the correct option of animal groups which possess all the above characteristics.

(A) Annelida, Mollusca, and Chordata

(B) Annelida, Arthropoda, and Chordata

(C) Annelida, Arthropoda, and Mollusca

(D) Arthropoda, Mollusca, and Chordata

(42) Which of the following animals are true coelomates with bilateral symmetry?

(A) Adult Echinoderms (B) Aschelminthes

(C) Platyhelminthes (D) Annelids

(43) Bilaterally symmetrical and acoelomate animals are exemplified by

(A) Ctenophora (B) Platyhelminthes

(C) Aschelminthes (D) Annelida

(44) Which of the following statements is true for the Phylum Chordata?

(I) In Urochordata, notochord extends from head to tail and it is present throughout their life.

(II) In Vertebrata, the notochord is present during the embryonic period only.

(III) Central nervous system is dorsal and hollow.

(IV) Chordata is divided into 3 subphyla: Hemichordata, Tunicata and Cephalochordata.

(A) (IV) and (III) (B) (III) and (I)

(C) (I) and (II) (D) (II) and (III)

(45) Which of the following animals does not undergo metamorphosis?

(A) Earthworm (B) Tunicate

(C) Moth (D) Starfish

(46) Which of the following represents order of 'Horse'?

(A) Perissodactyla (B) Caballus

(C) Ferus (D) Equidae

(47) Choose the correct statement.

(A) All mammals are viviparous.

(B) All cyclostomes do not possess jaws and paired fins.

(C) All reptiles have a three-chambered heart.

(D) All Pisces have gills covered by an operculum.

(48) Metagenesis refers to

(A) occurrence of a drastic change in form during post-embryonic development

(B) presence of a segmented body and parthenogenetic mode of reproduction

(C) presence of different morphic forms

(D) alternation of generation between the asexual and sexual phases of an organism.

(49) One of the following is a unique feature of the mammalian body

(A) Homeothermy (B) Presence of diaphragm

(C) Four chambered hearts (D) Rib cage.

(50) Aquatic reptiles are

(A) Ureotelic (B) Ureotelic in water

(C) Ammoniotelic (D) Ureotelic over land.

Answer Key

(1)	(C)	**(11)**	(C)	**(21)**	(B)	**(31)**	(D)	**(41)**	(B)
(2)	(D)	**(12)**	(A)	**(22)**	(C)	**(32)**	(D)	**(42)**	(D)
(3)	(C)	**(13)**	(B)	**(23)**	(B)	**(33)**	(D)	**(43)**	(B)
(4)	(C)	**(14)**	(B)	**(24)**	(C)	**(34)**	(D)	**(44)**	(D)
(5)	(A)	**(15)**	(B)	**(25)**	(D)	**(35)**	(D)	**(45)**	(A)
(6)	(C)	**(16)**	(A)	**(26)**	(A)	**(36)**	(A)	**(46)**	(A)
(7)	(C)	**(17)**	(A)	**(27)**	(D)	**(37)**	(D)	**(47)**	(B)
(8)	(D)	**(18)**	(A)	**(28)**	(C)	**(38)**	(A)	**(48)**	(D)
(9)	(D)	**(19)**	(B)	**(29)**	(C)	**(39)**	(A)	**(49)**	(B)
(10)	(C)	**(20)**	(B)	**(30)**	(D)	**(40)**	(A)	**(50)**	(B)