

Animal Kingdom

Case Study Based Questions

Read the following passages and answer the questions that follow:

1. Nereis, an aquatic form is an example of Phylum Annelida. The body surface of annelida is divided into segments or metameres. For osmoregulation and excretion, nephridia are present. For locomotion, longitudinal and circular muscles are present. They are coelomate animals (mesoderm is present between ectoderm and endoderm). Nereis also possess lateral appendages and parapodia which help in swimming. Neural system consists of paired ganglia. Nereis is dioecious but earthworms and leeches are monoecious.

(A) Organisms belonging to Phylum Anneli.....nima...

(B) Which type of muscle is present in annelida for locomotion?

(C) What do you mean by monoecious and dioecious?

Ans. (A) Coelomate: Annelids are coelomate animals (mesoderm is present between ectoderm and endoderm).

(B) Longitudinal and circular muscle. They are the smooth muscles which help in locomotion of animals.

(C) Monoecious means sexes are not separate e.g., Tapeworm and earthworm. Dioecious means sexes are separate, male and female are distinct, e.g., Nereis.

2. Water vascular systems in echinoderms are unique, functional, and play an extremely important role in the functioning of the entire animal. They are composed of hundreds to thousands of tube feet located in the ambulacral grooves. As a result, this system is also known as the ambulacral system. Water-filled canals and reservoirs control the tube feet hydraulically. Tubefeets perform various functions as a result. Echinoderms have special structures for breathing as well.



feeding on green leaves, caused extensive damage to vegetation.

Locust is a large, mainly tropical grasshopper, with strong powers of flight and it migrates in vast swarms causing widespread crop loss. Locusts entered Rajasthan from Pakistan earlier this month and then drifted into other parts of western India.



Locusts aren't dangerous as long as they are individual hoppers/moths or small isolated groups of insects, in what is called the "solitary phase". It is when their population grows to large numbers - the resultant crowding induces behavioural changes and transformation from the "solitary" to "gregarious" phase - then they start forming swarms. A single swarm contains up to 40-80 million adults in one square km and these can travel up to 150 km in one day. Locusts are edible insects. Several cultures throughout the world consume insects, and locusts are considered a delicacy and eaten in many African, Middle Eastern, and Asian countries.

(A) Locust belongs to which phyla of the animal kingdom?

- (a) Insecta
- (b) Arthropoda
- (c) Mollusca
- (d) Cnidaria

(B) Assertion(A): Locust are gregarious

Reason(R): pests. A single swarm contains up to 40-80 million adults in one square km.

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

(C) Read the following statements.

Statement I: The swarms of desert locusts, known for feeding on green leaves and

caused extensive damage to vegetation

Statement II: Locusts are not always dangerous and do not usually attack humans.

- (a) Only I is true.
- (b) I and II are true.
- (c) I is true but II is false.
- (d) I is false but II is true.

(D) Which of the following statements about locust is not true?

- (a) Locusts are not edible insects.
- (b) Locust form swarm.
- (c) Locusts are not harmful in their solitary phase.
- (d) Locust is a large, mainly tropical grasshopper.

Ans. (A) (b) Arthropoda

(B) (a) Both A and R are true and R is the correct explanation of A.

Explanation: Locusts are gregarious. A large swarm can consist of billions of locusts spread out over an area of thousands of square kilometres, with a population of up to 80 million per square kilometre (200 million per square mile).

(C) (b) I and II are true.

(D) (a) Locusts are not edible insects.

Explanation: Locusts are large insects and convenient for research and classroom study of zoology. They are edible by humans. They have been eaten throughout history and are considered a delicacy in many countries.

3. Coral reefs are very beautiful, brightly coloured backgrounds for serene snorkelling experiences. The stunning colours in corals come from a marine alga called zooxanthellae, which live inside them. These algae do photosynthesis for the corals so that the corals get energy to grow and reproduce. When corals get environmental stresses like heat or pollution, they react by expelling these algae, leaving a ghostly, transparent skeleton behind. This is known as 'coral bleaching! Without zooxanthellae, most corals starve and would die. At least a quarter of the world's marine life needs coral reefs around the world are disappearing fast.

At the local level, water pollution, overfishing and coastal development are taking their toll on coral reefs. At the worldwide level, carbon pollution is warming our oceans and causing corals releases carbon pollution into the air, which is heating our planet and warming our oceans. If we continue to pollute the air and the ocean with carbon

emissions at our high rate, coral reefs around the world will face a catastrophic future in the coming decades - in our lifetime.

(A) To which of the following phylum do coral reefs belong?

- (a) Echinodermata
- (b) Platyhelminthes
- (c) Cnidaria
- (d) Porifera

(B) Corals are made by deposition of:

- (a) endoskeleton made up of silica
- (b) exoskeleton made of protein fibre
- (c) exoskeleton made up of calcium carbonate
- (d) endoskeleton made up of protein fibres

(C) Which one of the following could not be a possible reason for coral bleaching?

- (a) Water pollution
- (b) Carbon pollution
- (c) Soil pollution
- (d) Overfishing and coastal development

(D) The type of association shown by zooxanthellae and corals is known as:

- (a) Commensalism
- (b) Symbiotic
- (c) Predation
- (d) Parasitism

(E) Assertion(A): Coral reefs are very beautiful, brightly coloured backgrounds for serene

Reason(R): A marine algae zooxanthellae live inside them and do photosynthesis.

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

Ans. (A) (c) Cnidaria

(B) (c) Exoskeleton made up of calcium carbonate

Explanation: Coral animals secrete an exoskeleton, which is composed of calcium carbonate. Massive reef structures are formed when each individual stony coral

organism-or polyp-secretes a skeleton of calcium carbonate.

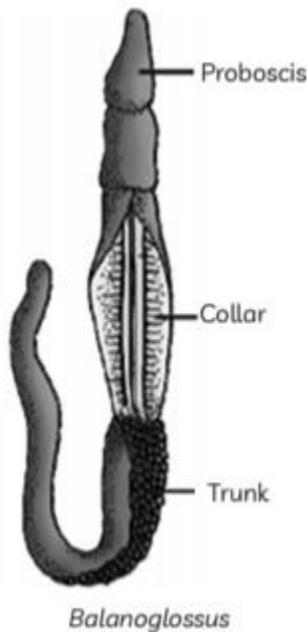
(C) (c) Soil pollution

(D) (b) Symbiotic

Explanation: Most reef-building corals contain photosynthetic cells, called zooxanthellae, that live in their tissues. The corals and these special cells have a mutualistic relationship.

(E) (a) Both A and R are true and R is the correct explanation of A.

4. The diverse array of codon reassignments demonstrate that the genetic code is not universal in nature. Exploring mechanisms underlying codon reassignment is critical for understanding the evolution of the genetic code during translation. Hemichordata, comprising worm-like Enteropneusta and colonial filter-feeding Pterobranchia, is the sister taxon of echinoderms and is more distantly related to chordates. Observe the following diagram and answer the following questions.



(A) From which subphylum this organism belongs to?

(B) Hemichordata, Chordata and Echinodermata are

(C) (i) Why is it not a true chordata?

(ii) These animals are also known as?

- Ans.** (A) Balanoglossus belongs to Hemichordata which means half cord.
(B) Hemichordata, Chordata Echinodermata are Deuterostomes. and
(C) (i) Hemichordata is not considered as chordata because they do not possess true characteristics of Phylum Chordata as they lack true notochord.
(ii) These animals are also known as acorn worms.

5. Ramesh was amazed after observing the following picture of a snake, which was shedding its skin. He confirmed this phenomenon from his teacher, who explained to him about reptiles. He said reptiles are also called creeping vertebrates. They show crawling movements, their body is covered with dry and rough skin without glands and contains horny epidermal scales which sloughed off periodically. They have a well-developed digestive system, respiration takes place through lungs, heart is mostly three chambered but in some, it's four-chambered. They are oviparous and development is direct.



(A) Which of the following reptiles is with a four-chambered heart?

- (a) King Cobra
- (b) Crocodile
- (c) Turtle
- (d) Chameleon

(B) Which of the following classes have scutes and scales on their skin?

- (a) Mammals
- (b) Birds
- (c) Reptiles
- (d) Amphibians

(C) What do you mean by moulting in reptiles?

- (a) Shedding of skin
- (b) Shedding of hairs

- (c) Shedding of tail
- (d) Both (b) and (c)

(D) What is the common feature between amphibians and insects?

- (a) Larval form
- (b) Metamorphosis
- (c) Both (a) and (b)
- (d) Metagenesis

(E) What is the difference between the epidermis of vertebrates and invertebrates?

	Vertebrates	Invertebrates
(a)	Stratified	Simple
(b)	Simple	Stratified
(c)	Stratified	Stratified
(d)	Simple	Simple

Ans. (A) (b) Crocodile

Explanation: Only crocodiles contain four-chambered hearts with two auricles and two ventricles but most reptiles have a three-chambered heart.

(B) (c) Reptiles

Explanation: Reptiles have a remarkable feature of having dry and rough skin with scales and scutes present on them.

(C) (a) Shedding of skin

Explanation: All reptiles shed their skin periodically throughout their life and this process is known as moulting or sloughing.

(D) (c) Both (a) and (b)

Explanation: The common common feature between amphibians and insects are larval forms and metamorphosis.

(E)

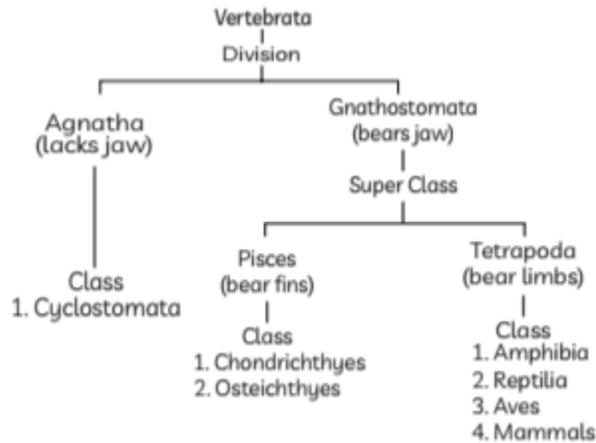
(a)	Vertebrates	Invertebrates
	Stratified	Simple

Explanation: Epidermis is stratified epithelium in vertebrates and a simple epithelium in invertebrates.

6. Vertebrates are animals that have a spine. They share common characteristics, including bone structure and major parts of the skeleton, and that vertebrates can be

organised into five classes: mammals, birds, fish, reptiles, and amphibians. Each class of vertebrates can be distinguished from the others by its its common characteristics, including body covering, body temperature, means of breathing, birth method, and other distinguishing features.

The Subphylum Vertebrata is further divided as follows:



- (A) Why are all vertebrates chordates?
 (B) Name one organism which belongs to Class Cyclostomata.
 (C) Give two differences between Agnatha and Gnathostomata.

Ans. (A) The fundamental characteristic of Phylum Chordata is the presence of notochord, a dorsal nerve cord, pharyngeal gill slits and a tail and the animal belongs to vertebrates possess notochord during embryonic stage which is then replaced by vertebral column in adult form. Hence, all vertebrates are chordates.

- (B) Petromyzon, the lamprey belongs to Class Cyclostomata.
 (C) Two differences between Agnatha and Gnathostomata:

Agnatha	Gnathostomata
Mouth is circular and jawless.	Mouth is present with the jaws.
Notochord is persistent.	Notochord is replaced by a vertebral column.