scholareye.xyz

BIOLOGY • INVERTEBRATES



ECHINODERMS

50 Solved MCQs

Correct answers ticked • Explanation for every question

Prepared by Scholar Eye

Contents

1. Introduction & Classification	Q1–10
2. Water Vascular System & Body Structure	Q11–20
3. Starfish & Brittle Stars	Q21–30
4. Sea Urchins, Sea Cucumbers & Sea Lilies	Q31–40
5. Reproduction, Development & Ecology	Q41–50
6. Answer Key at a Glance	

How to use this book

Try each question first, then check the **green highlighted option with a ✔ tick**. Read the **explanation** underneath to lock in the concept. Tap any item above to jump straight to it, and use **Contents** in the footer to come back.

Classes at a glance

Asteroidea	Starfish / sea stars
Ophiuroidea	Brittle & basket stars
Echinoidea	Sea urchins, sand dollars
Holothuroidea	Sea cucumbers
Crinoidea	Sea lilies, feather stars

SECTION 1 Q1 – Q10

Introduction & Classification

The big picture of phylum Echinodermata

Question 1

Answer: ✔ D

The name “Echinodermata” literally means:

A Hollow gut

B Jointed foot

C Soft body

D **Spiny skin** ✔

Explanation: It comes from the Greek *echinos* (spiny) and *derma* (skin), pointing to the spiny calcareous skeleton just under the skin.

Question 2

Answer: ✔ B

All echinoderms are:

A Mostly freshwater

B **Exclusively marine** ✔

C Mostly terrestrial

D Found in rivers and lakes

Explanation: They live only in salt water, from tide pools to deep ocean trenches. There are no true freshwater or land echinoderms.

Question 3

Answer: ✔ C

Adult echinoderms typically show which type of symmetry?

A Bilateral symmetry

B Spherical symmetry

C **Pentamerous radial symmetry** ✔

D Complete asymmetry

Explanation: Adult body parts are arranged in fives around a central axis, such as the five arms of a starfish.

Question 4

Answer: ✔ B

Echinoderm larvae are:

A Pentamerous radial

B **Bilaterally symmetrical** ✔

C Spherical

D Completely asymmetrical

Explanation: The bilateral larva shows that echinoderms evolved from bilateral ancestors. Radial symmetry appears later, at metamorphosis.

Question 5

Answer: ✔ B

Echinoderms are classified as:

A Protostomes

B **Deuterostomes** ✔

C Diploblastic animals

D Acoelomates

Explanation: The blastopore becomes the anus and the mouth forms later. The coelom arises by enterocoely, which are deuterostome features.

Question 6

Answer: ✔ B

The endoskeleton of echinoderms is made of:

A Chitin plates

B **Calcareous ossicles** ✔

C Keratin scales

D Cellulose fibres

Explanation: Ossicles of calcium carbonate (calcite) form inside the mesoderm and give the animal support and protection.

Question 7

Answer: ✔ B

Which system is unique to phylum Echinodermata?

A Notochord

B **Water vascular system** ✔

C Gill slits

D Nephridial system

Explanation: This hydraulic system of canals and tube feet is found in no other animal phylum.

Question 8

Answer: ✔ D

Which of the following is NOT an echinoderm?

A Starfish

B Sea urchin

C Sea cucumber

D **Jellyfish** ✔

Explanation: Jellyfish are cnidarians. The other three are echinoderms belonging to different classes.

Question 9

Answer: ✔ C

How many living classes of Echinodermata are traditionally recognised?

A Three

B Seven

C **Five** ✔

D Ten

Explanation: Asteroidea, Ophiuroidea, Echinoidea, Holothuroidea and Crinoidea.

Question 10

Answer: ✔ A

Echinoderms share deuterostome development with which phylum?

- **A** **Chordata** ✔
- **B** Mollusca
- **C** Annelida
- **D** Arthropoda

Explanation: Both are deuterostomes. Molecular studies place echinoderms closest to hemichordates, together forming the Ambulacraria.

SECTION 2 Q11 – Q20

Water Vascular System & Body Structure

Tube feet, canals and the spiny skin

Question 11

Answer: ✔ C

Seawater enters the water vascular system of a starfish through the:

A Anus

B Ocellus

C **Madreporite** ✔

D Pedicellaria

Explanation: The sieve-like madreporite on the aboral surface filters seawater into the stone canal.

Question 12

Answer: ✔ B

The stone canal connects the madreporite to the:

A Ampulla

B **Ring canal** ✔

C Radial nerve

D Pyloric caecum

Explanation: The stone canal has calcified walls and leads to the ring canal around the mouth. Radial canals then run into the arms.

Question 13

Answer: ✔ A

The muscular bulb at the inner end of a tube foot is the:

A **Ampulla** ✔

B Madreporite

C Papula

D Cardiac stomach

Explanation: When the ampulla contracts it forces fluid into the tube foot, which extends and grips with its sucker.

Question 14

Answer: ✔ D

Which of these is NOT a function of tube feet?

A Locomotion

B Gas exchange

C Gripping prey

D **Photosynthesis** ✔

Explanation: Tube feet help in walking, attachment, respiration and food handling. Echinoderms are heterotrophs and cannot photosynthesise.

Question 15

Answer: ✔ B

Small pouches on the ring canal that produce coelomocytes are called:

A Pedicellariae

B **Tiedemann's bodies** ✔

C Ampullae

D Gonads

Explanation: Tiedemann's bodies are attached to the ring canal and are thought to produce the amoeboid coelomocytes.

Question 16

Answer: ✔ A

Pedicellariae on a starfish mainly help to:

- **A** **Keep the body surface clean** ✔
- **B** Pump seawater
- **C** Digest food
- **D** Detect light

Explanation: These tiny pincers nip off debris, larvae and small organisms that settle on the skin.

Question 17

Answer: ✔ D

The main nitrogenous waste excreted by echinoderms is:

- **A** Uric acid
- **B** Urea
- **C** Guanine
- **D** **Ammonia** ✔

Explanation: They have no kidneys. Ammonia diffuses out through thin surfaces such as papulae and tube feet.

Question 18

Answer: ✔ B

In starfish, the thin-walled skin gills used for gas exchange are called:

A Book gills

B **Papulae** ✔

C Tracheae

D Spiracles

Explanation: Papulae (dermal branchiae) project from the aboral body wall, and cilia keep water flowing over them.

Question 19

Answer: ✔ A

Wandering amoeboid cells in the coelomic fluid of echinoderms are called:

A **Coelomocytes** ✔

B Choanocytes

C Cnidocytes

D Osteocytes

Explanation: Coelomocytes engulf waste and germs, help in clotting and transport materials.

Question 20

Answer: ✔ A

Which of these is absent in adult echinoderms?

A	**A distinct head**	✔
B	An endoskeleton	
C	A coelom	
D	A water vascular system	

Explanation: The body has a central disc and arms but no head or brain. A nerve ring coordinates the animal.

SECTION 3 Q21 – Q30

Starfish & Brittle Stars

Classes Asteroidea and Ophiuroidea

Question 21

Answer: ✔ A

Starfish belong to class:

- **A** **Asteroidea** ✔
- **B** Ophiuroidea
- **C** Echinoidea
- **D** Holothuroidea

Explanation: Asteroids are sea stars whose broad arms merge gradually into the central disc.

Question 22

Answer: ✔ D

When feeding on a clam, a starfish pushes out its:

A Pyloric stomach

B Intestine

C Rectal caecum

D **Cardiac stomach** ✔

Explanation: The cardiac stomach is everted through the mouth and digests the prey outside the body, then it is pulled back in.

Question 23

Answer: ✔ A

The digestive glands in each arm of a starfish are the:

A **Pyloric caeca** ✔

B Papulae

C Gonads

D Ampullae

Explanation: Each arm has two pyloric caeca that secrete enzymes and absorb and store nutrients.

Question 24

Answer: ✔ C

Casting off an arm to escape a predator is called:

A Autogamy

B Autolysis

C **Autotomy** ✔

D Autophagy

Explanation: Autotomy is self-amputation. The lost arm is later regenerated.

Question 25

Answer: ✔ C

Which class of echinoderms contains the largest number of species?

A Crinoidea

B Echinoidea

C **Ophiuroidea** ✔

D Holothuroidea

Explanation: Brittle stars and their relatives number over 2,000 species, the most of any echinoderm class.

Question 26

Answer: ✔ B

Brittle stars mainly move by:

A Suckered tube feet

B **Flexible arm movements** ✔

C Jet propulsion

D Beating cilia

Explanation: Their slender arms whip and row across the seabed. Their tube feet have no suckers.

Question 27

Answer: ✔ C

Which echinoderm class lacks an anus?

A Asteroidea

B Echinoidea

C **Ophiuroidea** ✔

D Holothuroidea

Explanation: Brittle stars have a blind, sac-like stomach and pass waste out through the mouth.

Question 28

Answer: ✔ D

In brittle stars, the madreporite lies on the:

A Aboral surface

B Tip of an arm

C Inside the stomach

D **Oral surface** ✔

Explanation: Unlike starfish, brittle stars carry the madreporite on an oral shield near the mouth.

Question 29

Answer: ✔ A

Among these, open ambulacral grooves on the arms are characteristic of:

A **Asteroidea** ✔

B Ophiuroidea

C Echinoidea

D Holothuroidea

Explanation: Starfish arms have open grooves holding rows of tube feet. In brittle stars the grooves are covered by plates.

Question 30

Answer: ✔ D

Which genus is famous for regrowing a whole body from one detached arm?

A Echinus

B Cucumaria

C Antedon

D **Linckia** ✔

Explanation: A detached *Linckia* arm can grow into a new individual, called a “comet” form.

SECTION 4 Q31 – Q40

Sea Urchins, Sea Cucumbers & Sea Lilies

Classes Echinoidea, Holothuroidea and Crinoidea

Question 31

Answer: ✔ A

The five-toothed scraping apparatus of a sea urchin is called:

- **A** **Aristotle's lantern** ✔
- **B** Radula
- **C** Proboscis
- **D** Gizzard

Explanation: Five jaws with teeth scrape algae off rocks. A radula belongs to molluscs.

Question 32

Answer: ✔ D

The rigid shell of a sea urchin, made of fused plates, is called the:

A Carapace

B Operculum

C Mantle

D **Test** ✔

Explanation: The test is built from interlocking calcareous plates under a thin skin and carries movable spines.

Question 33

Answer: ✔ A

Sand dollars are flattened members of class:

A **Echinoidea** ✔

B Asteroidea

C Crinoidea

D Ophiuroidea

Explanation: They are irregular echinoids, close relatives of sea urchins.

Question 34

Answer: ✔ A

The oral tentacles of a sea cucumber are modified:

- **A** **Tube feet** ✔
- **B** Spines
- **C** Pedicellariae
- **D** Gill slits

Explanation: The branched tentacles around the mouth are modified tube feet that trap and sweep in food.

Question 35

Answer: ✔ B

Which class has elongated, leathery bodies that lie on their sides?

- **A** Echinoidea
- **B** **Holothuroidea** ✔
- **C** Crinoidea
- **D** Asteroidea

Explanation: Sea cucumbers are stretched along the oral–aboral axis, with the mouth at one end and the anus at the other.

Question 36

Answer: ✔ C

Respiratory organs of sea cucumbers are the:

A Papulae

B Book lungs

C **Respiratory trees** ✔

D Gill slits

Explanation: These branching tubes open into the cloaca, and water is pumped in and out through the anus.

Question 37

Answer: ✔ C

Some sea cucumbers defend themselves by shooting sticky threads called:

A Malpighian tubules

B Nephridia

C **Cuvierian tubules** ✔

D Ampullae

Explanation: Cuvierian tubules (for example in *Holothuria*) entangle and confuse predators.

Question 38

Answer: ✔ D

The skeleton of a sea cucumber consists of:

A A rigid test

B A long calcareous stalk

C Large overlapping plates

D Microscopic ossicles in leathery skin ✔

Explanation: Tiny scattered ossicles keep the body wall flexible and soft.

Question 39

Answer: ✔ C

Which class includes sea lilies and feather stars?

A Echinoidea

B Holothuroidea

C Crinoidea ✔

D Asteroidea

Explanation: Sea lilies are attached by a stalk, while feather stars are free-living. Crinoids are considered the most primitive living class.

Question 40

Answer: ✔ C

Crinoids feed mainly by:

A Everting the stomach

B Scraping algae with a lantern

C **Trapping plankton with feathery arms** ✔

D Swallowing sand

Explanation: They are suspension feeders. Particles caught on the arms are carried by cilia along the grooves to the upward-facing mouth.

SECTION 5 Q41 – Q50

Reproduction, Development & Ecology

Larvae, nervous system and echinoderms in nature

Question 41

Answer: ✔ C

Most echinoderms have:

A Both sexes in one body always

B Only asexual budding

C **Separate sexes** ✔

D Only parthenogenesis

Explanation: Most are dioecious, with males and females looking alike. A few species are hermaphrodites.

Question 42

Answer: ✔ D

Fertilisation in most echinoderms is:

A Internal, in a uterus

B Internal, by copulation

C By self-fertilisation in the gonad

D **External, in seawater** ✔

Explanation: Males and females release gametes into the sea (broadcast spawning), where eggs and sperm meet.

Question 43

Answer: ✔ D

The first free-swimming larva of a starfish is the:

A Auricularia

B Doliolaria

C Echinopluteus

D **Bipinnaria** ✔

Explanation: Bipinnaria has ciliated bands. It develops into a brachiolaria, which then settles and metamorphoses.

Question 44

Answer: ✔ B

Auricularia larva is found in:

A Sea urchins

B **Sea cucumbers** ✔

C Brittle stars

D Sea lilies

Explanation: Sea urchins have echinopluteus, brittle stars have ophiopluteus and crinoids have doliolaria.

Question 45

Answer: ✔ A

Dried, processed sea cucumber sold as food in Asia is called:

A **Trepang (bêche-de-mer)** ✔

B Surimi

C Nori

D Agar

Explanation: Trepang is a prized delicacy and an important fishery product.

Question 46

Answer: ✔ D

The nervous system of a starfish consists of:

A A large brain with cranial nerves

B A dorsal hollow nerve cord

C A ventral ganglionated cord

D A nerve ring and radial nerves ✔

Explanation: A circumoral nerve ring sends a radial nerve into each arm. There is no brain.

Question 47

Answer: ✔ D

The light-sensitive ocelli of a starfish are located at the:

A Centre of the aboral disc

B Base of the madreporite

C Edge of the mouth

D Tip of each arm ✔

Explanation: An eyespot sits at the base of the terminal tentacle at each arm tip and senses light and shade.

Question 48

Answer: ✔ C

Which echinoderm is notorious for devouring coral reefs when its numbers explode?

A Sand dollar

B Feather star

C **Crown-of-thorns starfish** ✔

D Sea cucumber

Explanation: *Acanthaster planci* feeds on living coral and can wipe out large areas of reef during outbreaks.

Question 49

Answer: ✔ B

Paine's intertidal experiment showed that removing the starfish *Pisaster* caused:

A Species diversity to rise sharply

B **Mussels to dominate and diversity to fall** ✔

C No change in the community

D Sea urchins to take over

Explanation: *Pisaster* is a keystone predator. Without it, mussels crowded out other species.

Question 50

Answer: ✔ A

Which of these is an extinct class of echinoderms known only from fossils?

A **Blastoidea** ✔

B Crinoidea

C Echinoidea

D Holothuroidea

Explanation: Blastoids were bud-shaped echinoderms of the Paleozoic. The other three classes still have living members.

Answer Key at a Glance

Tap a question to jump back to it.

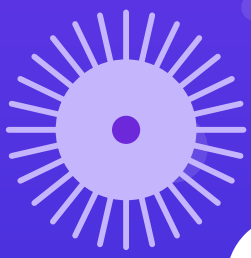
1 – D	2 – B	3 – C	4 – B	5 – B
6 – B	7 – B	8 – D	9 – C	10 – A
11 – C	12 – B	13 – A	14 – D	15 – B
16 – A	17 – D	18 – B	19 – A	20 – A
21 – A	22 – D	23 – A	24 – C	25 – C
26 – B	27 – C	28 – D	29 – A	30 – D
31 – A	32 – D	33 – A	34 – A	35 – B
36 – C	37 – C	38 – D	39 – C	40 – C
41 – C	42 – D	43 – D	44 – B	45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

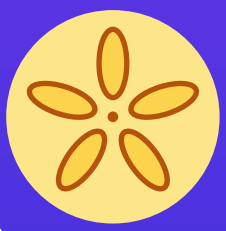


Well Done!

You finished all 50 MCQs

Echinoderms: marine, spiny-skinned, pentamerous radial adults with a water vascular system and a calcareous endoskeleton.





Visit scholareye.xyz