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ECHINODERMATA

50 Solved Biology MCQs

Ticked • Highlighted • Fully Explained

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Contents & How to Use

Each question shows four options. The **correct answer is highlighted in green with a tick**, followed by a short explanation. Tap any item below to jump straight to it.

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Quick Answer Key → (last page before the end)

Did you know? Try covering the options first, answer from memory, then check the tick!

Section 1: Core Characteristics

Questions 1 – 10

Q1	The word “Echinodermata” literally means:
○	A. Hollow gut
○	B. Jointed foot
○	C. Star body
✔	**D. Spiny skin**

✔ **Answer: D**
Explanation: From Greek echinos (spiny) and derma (skin), describing the spiny body covering.

Q2	Adult echinoderms show which type of symmetry?
○	A. Bilateral
○	B. Biradial
✔	**C. Pentaradial**
○	D. Spherical

✔ **Answer: C**
Explanation: Body parts occur in fives around a central axis; this symmetry evolved secondarily.

Q3	Echinoderm larvae are:
○	A. Pentaradial
✔	**B. Bilaterally symmetrical**
○	C. Asymmetrical
○	D. Spherical

✔ **Answer: B**
Explanation: Bilateral larvae suggest echinoderms evolved from bilateral ancestors.

Q4	The echinoderm endoskeleton is made of:
○	A. Chitin plates
✔	**B. Calcareous ossicles**
○	C. Keratin scales
○	D. Cartilage rods

✔ **Answer: B**
Explanation: Calcite ossicles of mesodermal origin lie beneath the epidermis.

Q5	Echinoderms are found exclusively in:
✔	**A. Marine habitats**
○	B. Freshwater rivers
○	C. Terrestrial soil
○	D. Parasitic hosts

✔ **Answer: A**
Explanation: No echinoderm lives in fresh water or on land; all are marine.

Q6	Echinoderms belong to which group of coelomates?
○	A. Protostomes
○	B. Acoelomates
○	C. Pseudocoelomates
✔	**D. Deuterostomes**

✔ **Answer: D**
Explanation: The anus forms from the blastopore, with radial cleavage and an enterocoelic coelom.

Q7	Which system is unique to phylum Echinodermata?
○	A. Notochord system
○	B. Nephridial system
✔	**C. Water vascular system**
○	D. Tracheal system

✔ **Answer: C**
Explanation: A hydraulic canal network used for movement, feeding and gas exchange.

Q8	Which structure is absent in echinoderms?
○	A. Coelom
○	B. Nervous system
✔	**C. Head (cephalization)**
○	D. Endoskeleton

✔ **Answer: C**
Explanation: The radial body plan has no distinct head and no true brain.

Q9	Cleavage in echinoderm embryos is:
○	A. Spiral and determinate
✔	**B. Radial and indeterminate**
○	C. Discoidal
○	D. Superficial

✔ **Answer: B**
Explanation: Early cells can each form a whole embryo, a deuterostome trait.

Q10	Which invertebrate phylum is closest to echinoderms?
✔	**A. Hemichordata**
○	B. Mollusca
○	C. Annelida
○	D. Arthropoda

✔ **Answer: A**
Explanation: Both are deuterostomes, and molecular studies group them together.

Did you know? Starfish have no brain and no true blood; seawater circulating in the water vascular system does much of the work!

Section 2: Water Vascular System

Questions 11 – 20

Q11 **The sieve-like opening of the water vascular system is the:**

- ○ A. Ampulla
- ○ B. Pedicellaria
- ○ C. Papula
- ✔ **D. Madreporite**

✔ **Answer: D**
Explanation: Seawater enters the system through this porous plate.

Q12 **In a starfish, the madreporite lies on the:**

- ○ A. Oral surface
- ○ B. Tip of the arm
- ○ C. Tube foot
- ✔ **D. Aboral surface**

✔ **Answer: D**
Explanation: It looks like a small hard disc on the upper side of the central disc.

Q13	The stone canal joins the madreporite to the:
○	A. Radial canal
○	B. Ampulla
✔	**C. Ring canal**
○	D. Gonad

✔ **Answer: C**
Explanation: The ring canal circles the mouth and gives off five radial canals.

Q14	The muscular bulb that extends a tube foot is the:
○	A. Sucker
✔	**B. Ampulla**
○	C. Papula
○	D. Ossicle

✔ **Answer: B**
Explanation: Its contraction pushes fluid into the tube foot, making it extend.

Q15	Tube feet are mainly used for:
✔	**A. Movement, feeding and respiration**
○	B. Excretion only
○	C. Sperm release
○	D. Light detection

✔ **Answer: A**
Explanation: Tube feet grip surfaces, help the animal crawl, handle food and aid gas exchange.

Q16	Tiny pincer-like structures that keep the skin clean are:
✔	**A. Pedicellariae**
○	B. Papulae
○	C. Ampullae
○	D. Gonopores

✔ **Answer: A**
Explanation: They remove debris and small organisms from the body surface.

Q17	Papulae (skin gills) of a starfish mainly help in:
○	A. Locomotion
○	B. Reproduction
○	C. Digestion
✔	**D. Respiration**

✔ **Answer: D**
Explanation: These thin outgrowths allow gas exchange and some waste removal.

Q18	The stomach a starfish pushes out over its prey is the:
○	A. Pyloric stomach
○	B. Intestine
✔	**C. Cardiac stomach**
○	D. Rectal sac

✔ **Answer: C**
Explanation: It digests prey such as clams outside the body, then withdraws.

Q19	Digestive glands present in each starfish arm are the:
○	A. Malpighian tubules
✔	**B. Pyloric caeca**
○	C. Green glands
○	D. Nephridia

✔ **Answer: B**
Explanation: Each arm holds a pair that secrete enzymes and store food.

Q20	The starfish nervous system consists of:
○	A. A dorsal hollow cord
✔	**B. A nerve ring and radial nerves**
○	C. A brain and ventral cord
○	D. Ladder-like ganglia

✔ **Answer: B**
Explanation: It is a decentralized network without a brain.

Did you know? Aristotle was the first to describe the sea urchin's jaw apparatus, which is why it is called Aristotle's lantern.

Section 3: Classes & Examples

Questions 21 – 30

Q21	Sea stars belong to class:
✔	**A. Asteroidea**
○	B. Ophiuroidea
○	C. Echinoidea
○	D. Holothuroidea

✔ **Answer: A**
Explanation: Their arms merge gradually into the central disc.

Q22	Brittle stars belong to class:
○	A. Asteroidea
○	B. Crinoidea
○	C. Echinoidea
✔	**D. Ophiuroidea**

✔ **Answer: D**
Explanation: The name means “snake-tail”, referring to their slender arms.

Q23	Sea urchins and sand dollars belong to class:
○	A. Crinoidea
○	B. Holothuroidea
✔	**C. Echinoidea**
○	D. Asteroidea

✔ **Answer: C**
Explanation: They have no free arms and a rigid globular or flattened test.

Q24	Sea cucumbers are placed in class:
○	A. Echinoidea
○	B. Ophiuroidea
✔	**C. Holothuroidea**
○	D. Crinoidea

✔ **Answer: C**
Explanation: They have soft, elongated, cucumber-shaped bodies.

Q25	Sea lilies and feather stars belong to class:
○	A. Asteroidea
✔	**B. Crinoidea**
○	C. Holothuroidea
○	D. Echinoidea

✔ **Answer: B**
Explanation: Crinoids are an ancient group with feathery arms.

Q26	Which class has the largest number of species?
✔	**A. Ophiuroidea**
○	B. Asteroidea
○	C. Crinoidea
○	D. Echinoidea

✔ **Answer: A**
Explanation: Brittle stars exceed 2,000 species, the most of any echinoderm class.

Q27	Aristotle’s lantern is found in:
○	A. Sea star
○	B. Sea cucumber
○	C. Sea lily
✔	**D. Sea urchin**

✔ **Answer: D**
Explanation: It is a five-toothed scraping jaw used to graze algae.

Q28	Which animal shoots sticky Cuvierian tubules for defence?
○	A. Brittle star
○	B. Feather star
○	C. Sea urchin
✔	**D. Sea cucumber**

✔ **Answer: D**
Explanation: The tubules entangle predators, as in Holothuria.

Q29	Which echinoderm has long snake-like arms sharply set off from a central disc?
○	A. Sea star
○	B. Sea urchin
✔	**C. Brittle star**
○	D. Sea cucumber

✔ **Answer: C**
Explanation: Its flexible arms act like limbs to wriggle over the sea floor.

Q30	Which genus is a common starfish?
○	A. Antedon
✔	**B. Asterias**
○	C. Echinus
○	D. Cucumaria

✔ **Answer: B**
Explanation: Antedon is a feather star, Echinus a sea urchin, Cucumaria a sea cucumber.

Did you know? Sea cucumbers are sold dried as “trepang” or “bêche-de-mer” in parts of Asia.

Section 4: Physiology & Development

Questions 31 – 40

Q31	The first free-swimming larva of a starfish is:
✔	**A. Bipinnaria**
○	B. Pluteus
○	C. Auricularia
○	D. Trochophore

✔ **Answer: A**
Explanation: It later becomes a brachiolaria larva and then settles down.

Q32	Echinopluteus larva belongs to:
✔	**A. Sea urchin**
○	B. Sea cucumber
○	C. Sea lily
○	D. Starfish

✔ **Answer: A**
Explanation: The larva has long ciliated arms supported by calcareous rods.

Q33 **Auricularia larva is characteristic of:**

- ○ A. Sea urchins
- ○ B. Brittle stars
- ○ C. Starfish
- ✔ **D. Sea cucumbers**

✔ **Answer: D**
Explanation: Auricularia is ear-shaped with a continuous ciliated band.

Q34 **Ophiopluteus larva belongs to:**

- ○ A. Sea cucumbers
- ○ B. Sea stars
- ✔ **C. Brittle stars**
- ○ D. Sea lilies

✔ **Answer: C**
Explanation: It resembles the echinopluteus but belongs to class Ophiuroidea.

Q35	Most echinoderms have:
○	A. Both sexes in one body
✔	**B. Separate sexes**
○	C. Only parthenogenesis
○	D. Sex that alternates yearly

✔ **Answer: B**
Explanation: Sexes are separate, though males and females look alike.

Q36	Fertilization in most echinoderms is:
○	A. Internal in a uterus
✔	**B. External, in seawater**
○	C. Through copulation
○	D. By budding

✔ **Answer: B**
Explanation: Gametes are shed into the water where they fuse.

Q37	Expelling internal organs as a defence, as in sea cucumbers, is called:
✔	A. Evisceration
○	B. Autolysis
○	C. Ecdysis
○	D. Metamorphosis

✔ **Answer: A**
Explanation: The animal later regenerates the lost organs.

Q38	Gas exchange in sea cucumbers occurs mainly through:
○	A. Book lungs
○	B. Papulae
○	C. Bursae
✔	D. Respiratory trees

✔ **Answer: D**
Explanation: Water is pumped in and out through the cloaca into branching tubes.

Q39	Gas exchange in brittle stars occurs through:
○	A. Respiratory trees
○	B. Tracheae
✔	**C. Bursae**
○	D. Papulae

✔ **Answer: C**
Explanation: Bursae are sacs at the arm bases, ventilated by cilia and body movement.

Q40	Echinoderms excrete nitrogenous waste mainly as:
○	A. Urea by kidneys
○	B. Uric acid crystals
✔	**C. Ammonia by diffusion**
○	D. Bile pigments

✔ **Answer: C**
Explanation: No special excretory organs exist; wastes diffuse through thin surfaces.

Did you know? Some starfish, such as Linckia, can grow a whole new individual from a single detached arm.

Section 5: Ecology & Special Features

Questions 41 – 50

Q41	Which starfish is notorious for feeding on coral polyps?
○	A. Brittle star
✔	**B. Crown-of-thorns starfish**
○	C. Feather star
○	D. Sand dollar

✔ **Answer: B**
Explanation: Outbreaks of Acanthaster planci can destroy large areas of coral reef.

Q42	Robert Paine’s keystone species study used the starfish:
✔	**A. Pisaster**
○	B. Antedon
○	C. Ophiura
○	D. Holothuria

✔ **Answer: A**
Explanation: Removing Pisaster let mussels take over and lowered diversity.

Q43 In which class does the oral surface face upward?

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

✔ **Answer: D**
Explanation: In sea lilies the mouth faces up, opposite to starfish.

Q44 Which structure is absent in brittle stars?

- ○ A. Mouth
- ○ B. Arms
- ○ C. Skeleton
- ✔ **D. Anus**

✔ **Answer: D**
Explanation: Their gut ends blindly and waste leaves through the mouth.

Q45	In sea cucumbers, tube feet around the mouth are modified into:
○	A. Spines
○	B. Pedicellariae
✔	**C. Tentacles**
○	D. Gills

✔ **Answer: C**
Explanation: Branched tentacles trap food particles.

Q46	The rigid shell of a sea urchin is called the:
○	A. Carapace
✔	**B. Test**
○	C. Frustule
○	D. Theca

✔ **Answer: B**
Explanation: It is made of tightly fused calcareous plates covered by spines.

Q47	Open ambulacral grooves with visible tube feet occur in:
✔	**A. Sea stars**
○	B. Sea urchins
○	C. Sea cucumbers
○	D. Sand dollars

✔ **Answer: A**
Explanation: In echinoids the ambulacra are closed beneath the test.

Q48	Brittle stars move mainly by:
✔	**A. Whip-like arm movements**
○	B. Jet propulsion
○	C. Ciliary gliding
○	D. Sucker feet only

✔ **Answer: A**
Explanation: Their tube feet lack suckers; arm muscles do the pushing.

Q49	Echinoderms first appeared in the fossil record during the:
○	A. Jurassic
○	B. Cretaceous
○	C. Permian
✔	**D. Cambrian period**

✔ **Answer: D**
Explanation: This lineage dates back over 500 million years.

Q50	Which of these is NOT an echinoderm?
○	A. Sea urchin
○	B. Sea cucumber
✔	**C. Jellyfish**
○	D. Brittle star

✔ **Answer: C**
Explanation: Jellyfish are cnidarians and have no water vascular system.

Did you know? About 7,000 living species of echinoderms are known, plus roughly 13,000 fossil species!

Quick Answer Key

Tap a question to jump back to its explanation.

Q1 → D	Q11 → D	Q21 → A	Q31 → A	Q41 → B
Q2 → C	Q12 → D	Q22 → D	Q32 → A	Q42 → A
Q3 → B	Q13 → C	Q23 → C	Q33 → D	Q43 → D
Q4 → B	Q14 → B	Q24 → C	Q34 → C	Q44 → D
Q5 → A	Q15 → A	Q25 → B	Q35 → B	Q45 → C
Q6 → D	Q16 → A	Q26 → A	Q36 → B	Q46 → B
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Q9 → B	Q19 → B	Q29 → C	Q39 → C	Q49 → D
Q10 → A	Q20 → B	Q30 → B	Q40 → C	Q50 → C



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