

BSc. Biological Chemistry study programme
State exam including Biology of Animals and Physiology of Animals questions
(as compiled/collated on 4.4.2025 – ON)
Students are randomly picking TWO questions.

1. Occurrence of bioluminescence and UV glowing in invertebrates. Names of groups of animals, structure, compound, function.
2. How sharks and bony fishes maintain body density similar to water and other ways of keeping buoyancy.
3. Water loss reduction in terrestrial invertebrates. Names of groups of animals, structures, compounds.
4. Products of hypoxic metabolism. Names of groups of animals, way and place of life.
5. Cryptobiosis (anhydrobiosis, cryobiosis). Which animals, compounds employed.
6. Compare mating and fertilization in sharks (Chondrichthyes), bony fish (Actinopterygii), and frogs (Amphibia). Number and size of progeny.
7. Sperm use and longevity in classes of vertebrates and social insects.
8. Compare nervous systems of Annelida, Arthropoda and Vertebrata.
9. Differences between Cyclostomata (hagfish and lamprey) and aquatic Gnathostomata. Morphology, behaviour.
10. Mouth structure and function of aquatic (water) vertebrates (including young amphibians but not secondary aquatic such as dolphins). Name the classes, their mouth structure (bones, teeth...), how they bite and swallow.
11. Mouth structure and function of terrestrial (land) vertebrates (including adult amphibians). Name the classes, their mouth structure (bones, teeth...) how they bite and swallow.
12. Main classes of tetrapods and their adaptations for life on dry land.
13. Compare breathing in water in lamprey (Cyclostomata), shark (Chondrichthyes), bony fish (Actinopterygii), and sea turtle (Testudinea).
14. Unique features of animals (Metazoa), including formulas or important compounds.
15. Function of gills, one invertebrate and one vertebrate example. Connection to circulation.
16. Eyes and abilities of vision of Arthropoda. Structure, focus, colours.
17. Eyes and abilities of vision of Mollusca. Structure, focus, relation to environment.
18. Common multicellular parasites of people, where they live, what they cause, how to protect against them.
19. Which animals produce slime? Composition, environment, function.
20. Ovoviviparous and viviparous vertebrates, way of nutrition of embryos.
21. Cellulose eating invertebrates. Way of digestion, environment, ecological and safety consequences.
22. Gut parasites of vertebrates, way of feeding, source of infection.
23. Defence mechanisms of Echinodermata.
24. Animals with external digestion, their food.
25. Antioxidants and enzymes destroying reactive oxygen species. In which animals they are common and important.
26. Animal groups recommendable as easy kept pets in our homes, their requirements.

27. Microbial diseases of humans transmitted by invertebrates, name several vectors, name the microbes, explain symptoms of disease.
28. Human life-threatening invertebrates that are not toxic or transmitting microbes; type of danger.
29. Warning colouration of animals: individual representatives, how to produce colouration, who is the recipient of signal.
30. Which cell parts and proteins support muscles with energy for contraction? How the muscles rich in these two supporters look like?
31. In which compounds in animal body there is no oxygen? What are the functions of the compounds?
32. Which are three non-waste nitrogen-containing categories of organic compounds? Their role.
33. In which three categories of compounds in vertebrates we find phosphorus? Their role.
34. Compare variability, specificity and lethal concentrations of some two major classes of animal toxins.
35. Compare properties of urea and ammonia, examples of animals excreting them.
36. In which form by which organs excretion of waste from haemoglobin proceeds?
37. Good and bad functions of cholesterol in humans. What is the main source of blood cholesterol?
38. Main parts of the cat eye. Which part is missing in humans? What is its function?
39. Two examples of animals using carotenoids for their body colouration. Their sources.
40. Compare speed of digestion of carbohydrates, proteins and nucleic acids.
41. What three animal groups are the main producers of glasshouse gases?
42. Which people cannot digest lactose? What happens to them when drinking milk?
43. Which macromolecular nutrients are digested in mouth, in stomach and in small intestine?
44. What will happen if sugar concentration in the blood of a man falls below 5 mM/l; what if it is permanently over 10 mM/l?
45. Compare blood sugar concentrations of cow, duck and man.
46. Give a full list of nitrogen waste compounds produced (where, from what?) and excreted (where or how?) by mammals.
47. Types of sweat glands in mammal skin and their modifications and their products.
48. Three animal groups killing each more than 1000 people a year globally: the mechanism of death.
49. Low molecular organic acids as defence mechanism – by which animals produced?
50. Order the following compounds according to their toxicity to mammals, give details of the intoxication symptoms of one of them: caffeine, ethanol, methanol, nicotine, sucrose, tetrodotoxin.