

MARINE BIOLOGY 1999
Examination #1

NAME _____

Part I. Multiple Choice (3 pts each)

1. The steepest part of the continental margin is the:
 - a. Abyssal plain
 - b. Continental rise
 - c. Continental slope
 - d. Continental shelf
 - e. None of the above

2. The abyssal plain
 - a. Lies at an average depth of about 4,000 m (13,000 ft)
 - b. Rises toward the mid-ocean ridges at a very gentle slope
 - c. Is dotted by submarine volcanoes called seamounts
 - d. Is almost flat
 - e. All of the above

3. The density of water is greatest at
 - a. 100° C (212° F)
 - b. 4° C (39° F)
 - c. 0° C (32° F)
 - d. -100°C (-212° F)
 - e. None of the above

4. The ocean is most transparent to light of what color?
 - a. Red
 - b. Blue
 - c. Violet
 - d. Orange
 - e. Black

5. Gyres rotate counterclockwise
 - a. In the Northern hemisphere only
 - b. In the Southern hemisphere only
 - c. In both hemispheres
 - d. In the Atlantic Ocean only
 - e. In the Pacific Ocean only

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6. The most important nutrients for plant growth in the ocean are:
 - a. Sodium and chloride
 - b. Nitrogen and oxygen
 - c. Carbon dioxide and oxygen
 - d. Nitrogen and phosphorous
 - e. Oxygen and phosphorous

7. Which of the following is **not** true of bacteria called decomposer?
 - a. They break down waste products and dead organic matter.
 - b. They are photosynthetic
 - c. They are heterotrophs
 - d. They ensure the recycling of essential nutrients
 - d. They are especially abundant below the euphotic zone
 - e. All the above statements are not true.

8. Dinoflagellates
 - a. Reproduce by simple cell division
 - b. May produce blooms known as red tides
 - c. May bioluminesce
 - d. All of the above
 - e. None of the above

9. The purpose of the lateral line in fishes is
 - a. To perceive sound waves
 - b. To regulate the internal conditions of the body
 - c. To detect vibrations in the water
 - d. To detect weak electrical fields
 - e. To smell

10. Anadromous fishes follow what type of migration pattern?
 - a. They migrate up and down the water column
 - b. They spend most of their lives at sea but migrate to freshwater to breed
 - c. They spend most of their lives in freshwater, but return to the sea to breed
 - d. They are able to migrate back to a home area
 - e. None of the above

11. The use of color that allows fish to blend in with the environment is called
 - a. Cryptic coloration
 - b. Warning coloration
 - c. Disruptive coloration
 - d. Countershading
 - e. Mimicry

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12. Marine mammals have many adaptations that allow them to spend much time underwater. All of the following are examples of these underwater adaptations except for:

- a. They have more red blood cells, and thus more hemoglobin, in which to store oxygen
- b. The heart rate can be slowed
- c. Blood flow is shifted from the brain and heart to the gut and extremities
- d. Their muscles have a lot of myoglobin, and can thus store oxygen
- e. All of the above are true.

13. The amount of carbon fixed under a square meter of sea surface in a day or in a year is known as

- a. The standing stock
- b. Biomass
- c. Primary productivity
- d. Resource partitioning
- e. None of the above

14. To measure primary productivity, scientists place water samples in two bottles, one light and one dark. Changes in the oxygen or carbon dioxide level in the light bottle indicates:

- a. The rate of photosynthesis and respiration
- b. The rate of photosynthesis only
- c. The rate of respiration only
- d. The concentration of chlorophyll
- e. The standing stock

15. Nitrogen fixation is important because:

- a. It deposits nitrogen in the sediments and coral reefs
- b. It uses up excess nitrogen
- c. It passes nitrogen down the food chain
- d. It converts atmospheric nitrogen to a form organisms can use
- e. None of the above

Part II. Short answer (6 pts each). Please be brief.

1. Many species of whale have been hunted to the brink of extinction. Many people think that we do not have the right to kill whales and that all whaling should cease. On the other hand, in many cultures whales have been hunted for centuries and still have great cultural importance. People from such cultures argue that limited whaling should be allowed to continue. What is the role that science can play in deciding who is right? What questions cannot be answered by science?

2. Spiny species of diatoms are found in warm subtropical waters and in colder areas. Since warm water is less dense than cold water, would you predict any differences between the spines of warm water individuals and those of cold water individuals? Why?

3. What adaptations of planktonic organisms may retard sinking from the surface water?

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4. What is the best body form for a fish that must maneuver among rocky crags in a coral reef?

5. Why is there a hydrodynamic conflict between feeding and rapid movement through the water column in baleen whales?

Part III. Long answer (12 pts each)

1. Suppose surface circulation of the ocean ceased to take place. How would climate and near shore oceanic life be affected?

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2. Why are there no equivalents of oak trees in the ocean?