

Part I. Multiple Choice (3 pts each)

1. Estuaries
 - a. Are ephemeral and therefore of no biological importance
 - b. Are extremely important as nurseries for many species of fish
 - c. Have salinities too low to support much marine life
 - d. Have relatively low primary production, so species must feed outside the estuary

2. The type of coral reef that surrounds a lagoon is called
 - a. a barrier reef
 - b. an atoll
 - c. a fringing reef
 - d. a fore reef
 - e. a reef flat

3. Suspension-feeders generally do badly in mud because
 - a. Of a very low food supply
 - b. Of anoxic pore water in the sediment
 - c. Of predation
 - d. Of high turbidity near the sediment-water interface

4. The type of estuary formed by an earthquake is called a
 - a. tectonic estuary
 - b. delta estuary
 - c. drowned river valley estuary
 - d. fjord
 - e. coastal plain estuary

5. Minimum species diversity in an estuary is found:
 - a. near the headwater
 - b. near the mouth
 - c. in the shallowest regions
 - d. near the ocean
 - e. in brackish waters

6. Osmoregulators cope with changing salinities by:
 - a. allowing their body fluids to change with the salinity of the water.
 - b. pumping out water and absorbing solutes from the surrounding water
 - c. keeping their body fluids constant despite changing salinities
 - d. developing a high salt tolerance to changes in salinity
 - e. All of the above

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7. In an estuary
 - a. Benthos penetrate not as far upstream as zooplankton
 - b. Benthos live with more salinity variation than zooplankton
 - c. Benthos penetrate just as far upstream as zooplankton
 - d. Benthos penetrate farther upstream than do zooplankton

8. White shells and shell sculpture of snails living in the rocky intertidal zone is an adaptation to
 - a. reduce the effects of desiccation
 - b. reduce the effects of wave shock
 - c. reduce the effects heat loss
 - d. a and b
 - e. None of the above

9. What organism is most commonly associated with the New England low intertidal zone in protected areas:
 - a. littorine snails
 - b. mussels
 - c. *Chondrus*
 - d. furoid algae
 - e. All of the above

10. Which group of marine mammals does not have four appendages comparable to human arms and legs?
 - a. Seals
 - b. Walruses
 - c. Sea Otters
 - d. Whales
 - e. None of the above.

11. Which of the following influence coral reef distribution in the ocean?
 - a. light
 - b. temperature
 - c. immersion
 - d. salinity
 - e. All of the above

12. While of the following statements is FALSE concerning manatees?
 - a. They have rear limbs
 - b. They are not marine mammals
 - c. They are in the order Sirenia
 - d. They are carnivorous
 - e. All the statements are false

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13. Tidal subsidy refers to how
 - a. the salt marsh rids itself of dead organic matter buildup
 - b. the salt marsh maintains high concentrations of nutrients in estuaries
 - c. salt marsh productivity is affected by tidal action
 - d. high primary productivity in estuaries is maintained
 - e. None of the above

14. Trophic group amensalism
 - a. Is a negative effect caused by predators eating prey
 - b. Is a negative effect caused by suspension feeders depleting the water column of food for deposit feeders
 - c. Is a negative effect caused by deposit feeders making the environment unsuitable for suspension feeders
 - d. All of the above
 - e. None of the above

15. Which feeding type is most common for organisms living in soft-sediment habitats?
 - a. Predators
 - b. Scavengers
 - c. Suspension feeders
 - d. Deposit feeders
 - e. All of the above

Part II. Short Answer (6 pts each). Be brief.

1. Name two different mechanisms that marine mammals employ to insulate themselves from heat loss.

2. How can sessile epibenthos reduce pressure drag from wave action?

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3. How does predation alter the course of interactions among major space keepers on a rocky shore?

4. Why are there so few sessile herbivores living in rocky substrate habitats?

5. From the perspective of a deposit-feeding worm, compare the biological significance of the surface area: volume ratio of a sand grain vs. mud particle.

Part III. Long Answer (12 pts each)

1. Beginning with the reasonable assumption that cetaceans have evolved from herbivorous terrestrial ancestors, discuss the **major structural adaptations** that are evident in present-day killer whales which are not present in terrestrial ancestors.

2. What factors contribute to the zonation patterns of plants living in salt marshes? How might these influence the plants during periods of sealevel rise (similar to conditions we are experiencing today)?