Shores and Coastal Process and Glaciers – Chapter Questions (2 Chapters)

1. **Diagram and explain wave components (wave height, crest, trough, wavelength, and wave base). For wave base, be sure to give equation and depth from which it is measured.
2. Explain the behavior of a floating object when an ocean (oscillatory) wave moves through it. What happens to the wave? What's the motion of the object? Why?
3. What is wave period? How would you measure it?
4. When do waves feel bottom? What happens to their speed, height, length, period, and motion when they do? *(*NOTE: Book errors in saying that period decreases as waves approach the shore. Period stays the same!)*
5. **The main effect of waves hitting shore at an angle is the movement of sand and water along a beach. What is the name given to the sand movement? Water movement? How does it happen?
6. What general (most probable) direction does beach sand move on North American beaches? Why?
7. **What are the causes and effects of rip currents?
8. How does sand movement vary seasonally and why?
9. All beach sand **ultimately** comes from two sources: rivers (90%) and local beach erosion (minor amounts come from local reef erosion, if a reef exists). All beach sand **ultimately** ends up in two sinks: sucked down submarine canyons (sometimes by turbidity currents, sometimes through rip currents and just gradual raining down the canyon walls) where it lies in a pile at the base of the canyon or blown on land as a sand dune where it is later buried and turned to sandstone. In between source and sink, the longshore current distributes sand along the beaches. Be sure you understand these ultimate sources and sinks.
10. Relate the damming of rivers to the shrinking of beaches at locations along the West Coast of the U.S.
11. **Describe and list erosional features of a shoreline. What causes each?
12. **Describe and list depositional features of a shoreline. What causes each?
13. Compare and contrast the East and West coasts of the U.S. and relate those differences to plate tectonics.
14. Through what methods do humans attempt to interfere with natural coastal processes?

Structure	Groin	Jetty	Seawall	Breakwater
Picture or description	Wall running perpendicular to beach, extending off beach	Two parallel walls running alongside harbor mouth, perpendicular to beach	Wall running parallel to beach, on the beach	Wall running parallel to beach, but offshore
Why used?	Create a beach	Prevent mouth closing	Prevent homes, roads, etc. from erosion	Create a gentle water region for boats to anchor
Results?	Another beach is eroded to compensate; wall must be maintained.	Sand builds up in harbor mouth eventually and must be dredged. Beach forms in one location at expense of another. Jetty must be maintained.	Sand on local beach diminishes; erosion increases elsewhere; rip rap must be added.	Sand on local beach grows, eventually requiring dredging; erosion increases downcurrent; wall must be maintained.

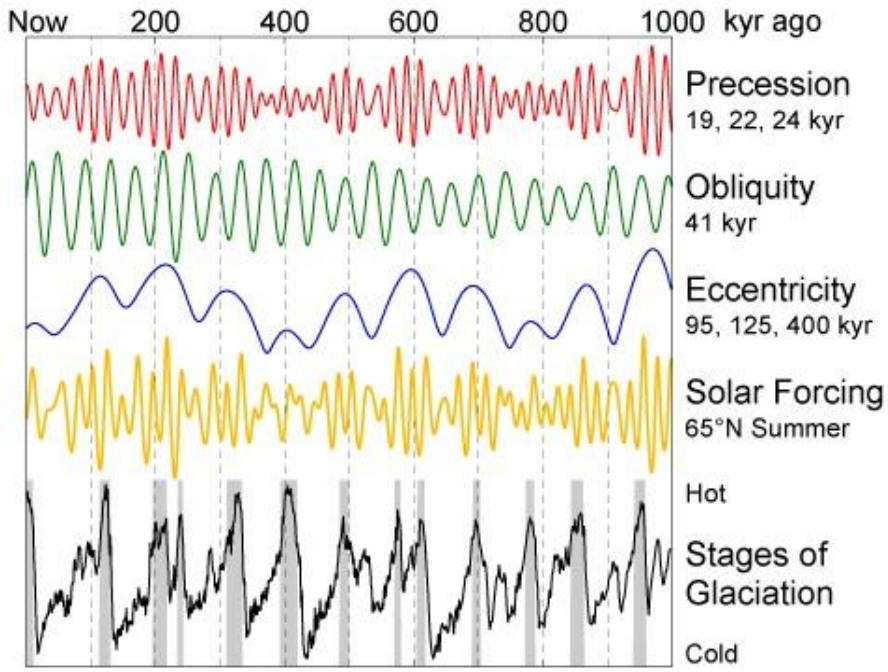
The cause of the ocean tides: (Be sure you understand and can explain this cause:)
Ocean tides are caused by the differences in the gravitational pull between the moon and the Earth. Gravitational force is stronger on the side of the Earth nearer to the moon and is weaker on the side farthest from the moon. Why? Because Gravitational Force weakens as distance increases.

15. Using the above definition, explain what is a high and low tide? What are flood and ebb currents (or tides)?
16. What's the period of a tidal wave?
17. Describe all the ways in which sea level can rise and fall globally (be sure you understand how).

18. What is a glacier?
19. **What are the two main types of glaciers? Where do you find each?
20. Describe the budget of a glacier. Under what circumstances will the front of a glacier advance? Retreat?
21. At what rates do glaciers move? What is a surge?
22. **List and describe erosional features that you'd see in an area where glaciers exist or have recently existed.
23. Compare and contrast the two types of glacial drift (deposits): till and outwash. What types of sediment does each contain? What is a glacial erratic?
24. **List and describe depositional features that you'd see in an area where glaciers exist or have recently existed.
25. What are ice ages? **What percentage of Earth's land area do glaciers cover today? 20,000 years ago?
26. 75% of the world's freshwater supply is held, currently in glaciers. (This value is still only 2.15% of the world's total water supply.) What would happen if all the planet's ice melted?
27. How was California affected during the last ice age?

- Describe the effects of glaciers on sea level.
- Describe the effects of glaciers on flora and fauna.
- Describe other indirect effects of glaciers on the landscape (to land not covered by glaciers).

Based on all we've learned, the source of Ocean Beach sand remains a mystery. Ocean Beach has no local rock to erode and has no upcurrent river to distribute sand to it. Longshore current cannot cross over the Golden Gate entrance, because of deep channels carved by tidal currents. Where does Ocean Beach sand come from? It comes from offshore sand deposits, left during the last ice age, when the Sacramento River flowed all the way to the beach (15 miles west of its current location). The Sacramento River, during an ice age, would have contained large quantities of water and sand, making for a large sand delta at the Pacific Ocean. Winds blew this sand onshore, where it covered large expanses of continental shelf, including most of the San Francisco Peninsula. These sands formed a massive sand dune province. Since the ice age, sea level has risen. The current Sacramento River dumps its load in a delta far inland, in Sacramento. Only muds stay suspended in this water as it mingles with the seawater entering San Francisco Bay. Ocean Beach's only source of sand are these offshore dunes that are now underwater and are picked up daily by incoming waves and pushed onto Ocean Beach.



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