

Eart 1 - Oceanography
Fall03 Final Exam

100 Multiple Choice and True/False Questions (1 pt each). Fill in the appropriate matching circle on your Parscore form.

1. The hydrogen atoms in a water molecule tend to bond to
 - A. each other.
 - B. oxygen atoms of another water molecule.
 - C. hydrogen atoms of another water molecule.
 - D. all positively charged ions.
 - E. oil droplets in the water.

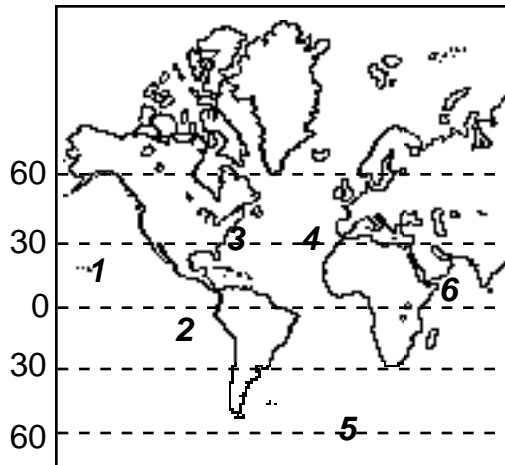
2. The following chemical reaction is very common in the ocean:
$$\text{CH}_2\text{O} + \text{O}_2 \rightleftharpoons \text{CO}_2 + \text{H}_2\text{O}$$
The reaction is often referred to as
 - A. photosynthesis
 - B. hydrolysis
 - C. respiration (oxidation)
 - D. chlorination
 - E. precipitation

3. The physical and chemical properties of deep waters in the world ocean are most similar to those of the
 - A. the tropical mixed layer.
 - B. the sub-tropics
 - C. the polar mixed layer
 - D. deep waters of the Red Sea

4. The speed (velocity) of sound in water increases at
 - A. higher temperatures
 - B. shallower depth
 - C. lower salinities
 - D. lower density
 - E. all the above

5. How much heat is required to evaporate 100 grams of water vapor from the ocean surface.
 - A. 1 calories
 - B. 1000 calories
 - C. 540 calories
 - D. 54000 calories
 - E. heat is released during evaporation, not absorbed.

6. Earth is "tilted" at about $23\frac{1}{2}^{\circ}$ relative to its orbital plane around the sun. This causes
- A. the change in temperature and climate known as the seasons.
 - B. the periods of illumination (or darkness) at the poles that last for six months.
 - C. longer day lengths around here in the summer.
 - D. higher summer temperatures.
 - E. all of the above.
7. In low latitudes ($0-30^{\circ}$), Tropical cyclones tend to slowly move
- A. equatorward in both hemispheres.
 - B. eastward and poleward in both hemispheres.
 - C. westward and poleward in both hemispheres.
 - D. just poleward in both hemispheres.
 - E. in great circles
8. El Ninos are characterized by the following change
- A. decreased intensity of storms along southern California.
 - B. increased upwelling along the coast of Peru.
 - C. weakening of the SE Trades.
 - D. increase in the E-W slope of the sea surface.
 - E. all of the above occur.
9. The excess heating of the Tibetan Plateau during the summer causes air to begin rising over the plateau. This in turn triggers the onset of which of the following climate phenomena?
- A. El Nino
 - B. cyclones
 - C. monsoons
 - D. drought



Hint: Sketch the prevailing wind directions between the latitude bands 0-30, and 30-60.

10. In the world map above, the area where the southwest monsoons drive seasonal upwelling is located at ___?
 - A. 1
 - B. 2
 - C. 4
 - D. 5
 - E. 6

11. Ocean surface currents tend to move in great _____ patterns in the northern hemisphere

A. irregular	B. counterclockwise
C. clockwise	D. random

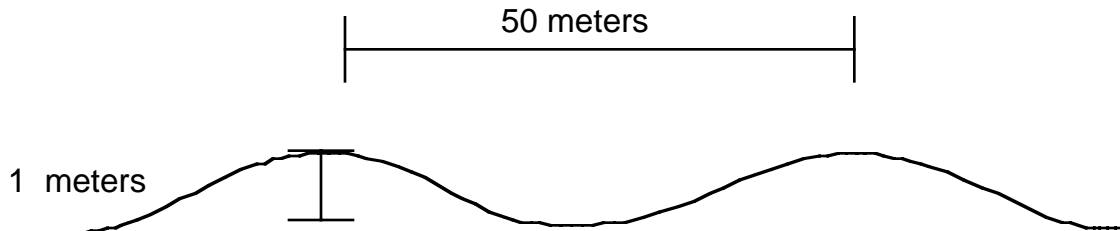
12. Britain's weather is _____ than would be expected at that latitude because of the influence of surface currents.

A. colder	B. drier
C. less humid	D. warmer and wetter

13. Wind blowing from south to north along the west coast of South Africa south of the equator (i.e. Angola) causes water moving along the coast to
 - A. move south.
 - B. move toward shore (east).
 - C. move away from shore (west).
 - D. move north.

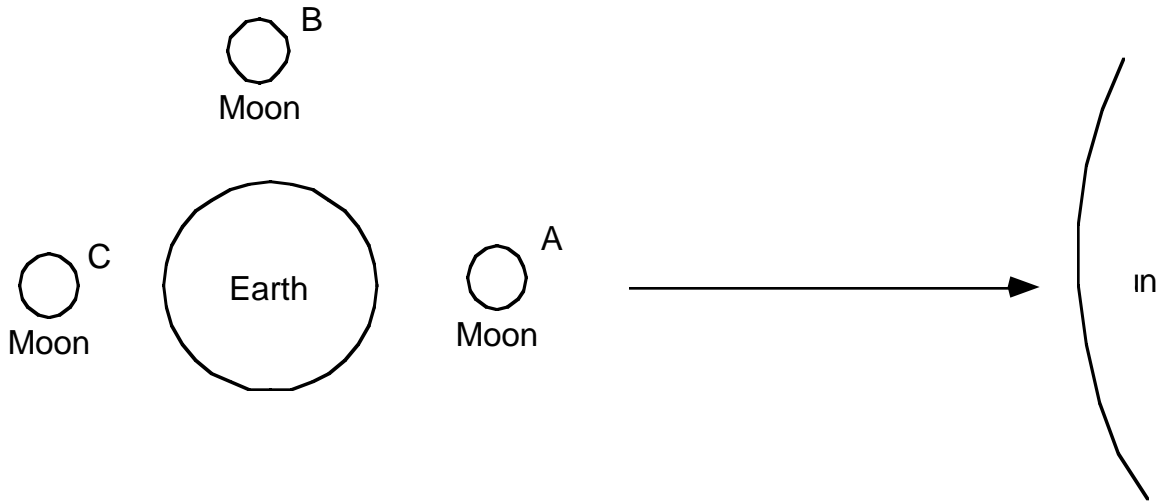
14. Ocean waters are generally stratified, owing to density differences, except in _____ waters.
 - A. polar
 - B. tropical
 - C. sub-tropical
 - D. temperate

15. What happens when warm, humid Pacific air parcels move eastward over the cooler upwelled water along the Central California coast?
- A. the air becomes drier and humidity decreases
 - B. the air mass lifts
 - C. the sky clears
 - D. a thick fog forms
16. Water particles in a deep-water wave
- A. move rapidly toward the shore.
 - B. move in circular orbits.
 - C. do not move: only the wave form moves.
 - D. move in flat elliptical circles.
17. The height of a wind wave will depend on
- A. the fetch.
 - B. the length of time the wind blows.
 - C. the velocity of the wind.
 - D. all of the above.
18. As large oil tankers sail around the tip of South Africa, they can encounter tall waves but with short wave-lengths similar to the length of the ships. These unusual waves are created when south Atlantic storm waves traveling from the southeast collide with
- A. intense polar easterlies
 - B. the eastward flowing equatorial current
 - C. extreme and intense SE trade winds
 - D. the westward flowing Agulhas current



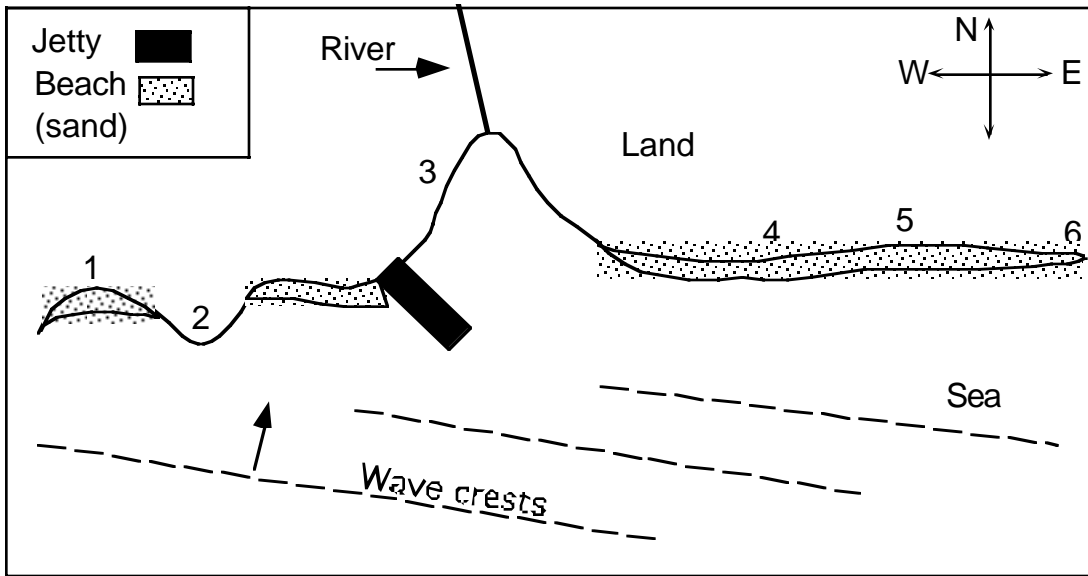
19. As the wave above approached shore, at what water depth would the speed be determined purely by depth? That is, at what depth does the wave become a shallow water wave?
- A. 0.5 meters
 - B. 1.0 meters
 - C. 2.5 meters
 - D. 3.1 meters
 - E. 25 meters

20. In the open, deep sea, tsunamis
- A. are giant breaking waves that are dangerous to ships.
 - B. are slow-moving waves, slower than the swell.
 - C. are long-period waves, often of 15-20 minutes.
 - D. have short wavelengths of 100-200 feet, similar to wind waves.
21. The tide patterns characteristic of Monterey Bay are
- A. semidiurnal mixed tides.
 - B. diurnal tides.
 - C. reversing tides.
 - D. amphidromic tides.
 - E. semidiurnal tides.



22. The diagram above shows the Earth (view of the rotation axis), Sun and the moon in 3 different configurations. In which configuration would the daily tidal range be smallest?
- A. A
 - B. B
 - C. C
 - D. A & C
 - E. Same at all 3.
23. The process of mixed interference of wind waves of differing wave lengths leads to the formation
- A. wave sets
 - B. wave trains
 - C. tsunamis
 - D. a completely flat sea

24. The origin of sea cliffs, sea stacks, sea caves, blowholes, and arches is related to
- A. longshore currents. B. high tides.
 C. human activities. D. erosion by waves.
25. The large waves of late summer modify the shape of sandy beaches. Huge "bites" of beach are removed from the exposed beach and end up in offshore sand bars. These "bites" are most evident in the form of a very large and high
- A. berm.
 B. shore face, or beach scarp.
 C. foreshore.
 D. backshore.
 E. cusp.



26. The diagram above represents a coast with cliffs and sandy beaches. A river empties into a bay along the coast. A jetty protects the bay from waves. For most of the year, waves approach the shore from the southeast. In which direction does the long-shore current flow?
- A. north
 B. south
 C. east
 D. west

27. In the diagram above, which of the following would tend to increase beach erosion at location 5?
- A. the construction of a groin at the beach between locations 5 & 6.
 - B. the construction of a seawall at beach 6
 - C. the construction of a dam across the river that empties into the bay.
 - D. a decrease in wave energy.
 - E. both A & B
28. Which of the following statements about sea ice is NOT true:
- A. it is less dense than seawater
 - B. it has a lower salt content than seawater
 - C. it originates from glaciers
 - D. it's creation increases the density of seawater
29. Which of the following factors does NOT contribute to the hazards of shipping in the north Atlantic
- A. ice-bergs
 - B. fog
 - C. powerful storms
 - D. tsunamis
 - E. rogue waves
30. In lecture, we examined methods of extraction of petroleum (fossil fuels) from beneath the seafloor. How are these products transferred to Louisiana from the *Mars* offshore platform in the gulf of Mexico over 50 miles away?
- A. by tankers
 - B. by trains
 - C. by pipe line
 - D. by seaplanes
31. In the Bahamas and other caribbean islands, the following mineral resource is dredged from nearshore shoals
- A. calcite
 - B. quartz
 - C. silver
 - D. iron
32. The evaporation (brine) pans in the South Bay are used to concentrate salt primarily for the extraction of
- A. nutrients such as phosphate (PO_4)
 - B. calcium carbonate ($CaCO_3$)
 - C. organic matter (CH_2O)
 - D. iron oxide (FeO_2)
 - E. Magnesium Chloride ($MgCl$)
33. T F At the current rates of consumption, global fossil fuel reserves of oil and gas should last roughly another 1000 years.

34. T F Generally speaking, a spill of crude oil is more dangerous to marine life than a spill of refined oil.
35. The Santa Cruz Water treatment facility was designed to treat influent from the following source(s)?
- A. home and industry
 - B. storm drain runoff
 - C. agriculture
 - D. all the above
36. Which of the following metals is NOT considered to be a toxic marine pollutant?
- A. Mercury (Hg)
 - B. Copper (Cu)
 - C. Lead (Pb)
 - D. Iron (Fe)