|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | All of the following wave types are restored by gravity EXCEPT \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | tide |  | | B. | seiche |  | | C. | wind wave |  | | D. | tsunami |  | | E. | capillary wave | Student Response | | | |  |  | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | When waves shoal, all the following occurs EXCEPT \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | waves bunch up as they slow down |  | | B. | successive waves constructively interfere and energy increases | Student Response | | C. | water becomes packed in shallower depths, thus wave height increases |  | | D. | the bottom of the wave slows relative to the top, so crests overtake troughs |  | | E. | the ocean floor interferes with water particle motion, so their orbital motions flatten |  | | | |  |  | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | A wave is a mechanical expression of moving \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | water |  | | B. | particle |  | | C. | force |  | | D. | wind |  | | E. | energy | Student Response | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | The depth below which there is essentially no water particle movement caused by the passing of a deep water wave is called the \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | wavelength |  | | B. | wave bottom |  | | C. | wave base | Student Response | | D. | wave height |  | | E. | amplitude |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | In the Antarctic Ocean, waves can grow to tremendous heights because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the sea state is commonly a Beaufort 9, when seas begin to roll |  | | B. | the Ocean is bounded by all the other oceans |  | | C. | wind duration is longest compared to the North Atlantic or the South Pacific |  | | D. | the wind can blow in one direction in an endless circle around Antarctica without any barriers | Student Response | | E. | of the combined effects of strong winds and strong currents |  | | | | Score: | 0/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | When a wave passes, water particles at the sea surface trace the largest orbitals. |  | | B. | For a shallow water wave with wavelength=20 meters, orbitals at depth=0.5 meter are flattened. |  | | C. | When a deep water wave passes, water particles at the wave base "feel" the bottom. | Student Response | | D. | The net distance traveled by water particles as a wave passes is zero. |  | | E. | When a shallow water wave passes, water particles near the bottom of the ocean only move back and forth. |  | | | | Score: | 0/1 | |  | | | For a shallow water wave with wavelength=20 meters, orbitals at depth=0.5 meter are flattened. |
| **7.** |  | When a deep water wave passes, water particles at the wave base "feel" the bottom. |
|  | |  |  | | --- | --- | | Waves in the ocean typically have \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 200 km/hour wave speeds |  | | B. | 10 – 15 m wave heights |  | | C. | 2 to 3 second periods |  | | D. | 8 m significant wave heights |  | | E. | 60 – 150 m wavelengths | Student Response | | | |  |  | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | The San Andreas Fault extends offshore under water in some sections to the north of San Francisco. Imagine that a magnitude 8.5 earthquake occurs along an underwater section of the fault. Is it likely or unlikely to generate a large tsunami? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | It is unlikely because the movement along the fault is horizontal. | Student Response | | B. | It is likely because most underwater earthquakes generate tsunami. |  | | C. | It is likely because earthquakes along the San Andreas fault are typically shallow. |  | | D. | It is likely because the magnitude of the earthquake is large. |  | | E. | It is unlikely because the fault is still too close to shore. |  | | | |  |  | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Seiche can occur in all of the following places EXCEPT \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Hilo Bay, Hawaii |  | | B. | Lake Tahoe |  | | C. | reservoirs |  | | D. | western Pacific Ocean | Student Response | | E. | your coffee cup |  | | | |  |  | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | If the waves are approaching Vancouver Island from the south and the Island lies on a northwest to southeast direction, the longshore transport will be directed from \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | southwest to northeast |  | | B. | northwest to southeast |  | | C. | south to north |  | | D. | north to south |  | | E. | southeast to northwest | Student Response | | | |  |  | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | The restoring force for rogue waves is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | tidal friction |  | | B. | atmospheric pressure at sea level |  | | C. | surface tension |  | | D. | constructive interference |  | | E. | gravity | Student Response | | | |  |  | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Artificial barriers damage, rather than protect, a coastline because \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | normal sediment transport is interrupted | Student Response | | B. | the erosion and deposition of sediments is balanced |  | | C. | wave energy is dissipated over a wider area |  | | D. | eroded sand is transported offshore to a sandbar |  | | E. | sediments with large sediment grain size pile up on the beach |  | | | |  |  | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | Tsunami can be generated by \_\_\_\_\_\_ and restored by \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a change in atmospheric pressure/surface tension |  | | B. | wind/gravity |  | | C. | earthquakes/surface tension |  | | D. | landslides/wind |  | | E. | landslides/gravity | Student Response | | | |  |  | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | At which location would you be most concerned about the danger of a tsunami? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the Mediterranean coast |  | | B. | The Hamptons, on Long Island, New York |  | | C. | Hilo Bay, Hawaii | Student Response | | D. | the Seychelles, off eastern Africa |  | | E. | White Rock, B.C |  | | | |  |  | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | Why are there more devastating tsunami in the Pacific than in the Atlantic? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | The biggest tsunami are in the Indian Ocean, not the Atlantic or Pacific. |  | | B. | The shapes of harbors around the Pacific amplify the effects of tsunami. |  | | C. | Most major tsunami in the Pacific end up hitting Hawaii where more people are likely to be near the coast. |  | | D. | The Atlantic is smaller, so tsunami energy dissipates more quickly. |  | | E. | The Pacific is surrounded by subduction zones, which produce large earthquakes, which generate tsunami. | Student Response | | | |  |  | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Which lists waves in order from shortest to longest wavelength? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | wind waves, tsunami, seiches, tides |  | | B. | wind waves, tides, tsunami, seiches |  | | C. | seiches, tsunami, wind waves, tides |  | | D. | wind waves, seiches, tsunami, tides | Student Response | | E. | tides, seiches, tsunami, wind waves |  | | | |  |  | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | If a gray whale dove to 40 meters water depth (which it could easily do), would its motion be affected by waves at the surface of the ocean? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Yes, but only by waves with periods shorter than 20 seconds. |  | | B. | No, because the whale is below the depth of no motion for all surface waves. |  | | C. | Yes, but only by waves with wavelengths shorter than 80 meters. |  | | D. | Yes, but only by waves with periods longer than 20 seconds. |  | | E. | Yes, but only by waves with wavelengths longer than 80 meters. | Student Response | | | |  |  | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Where in the world’s oceans do the tallest waves develop? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | in Hawaii |  | | B. | off the coast of Greenland |  | | C. | off the coast of Japan |  | | D. | near South Africa |  | | E. | around Antarctica | Student Response | | | |  |  | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Let’s say you’re standing on the beach at Tofino on the west coast of Vancouver Island, with your surfboard, just about to paddle out to catch some waves. You feel a very strong earthquake. If you’re interested in survival, you \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | wait until you see the water draining away from shore before making a decision |  | | B. | retreat to the high tide line, marked by driftwood |  | | C. | jump in your car and drive to Port Alberni |  | | D. | drop your surfboard and run uphill as far as you can | Student Response | | E. | paddle as far out to sea as you can |  | | | |  |  | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | With the advances of tsunami preparedness, people living on the Pacific rim are safe from tsunami, regardless of its origin 10,000 km or 8 km offshore. |  | | B. | Ships in the middle of the Pacific rely on the International Tsunami Warning System to warn them of passing tsunami. |  | | C. | People living close to shore can prepare for a tsunami by evacuating to higher ground immediately after an earthquake is felt. | Student Response | | D. | According to historical accounts, only people living close to shore in the Pacific rim are in danger of a tsunami. |  | | E. | People living along sheltered bays and inlets are less likely to be affected by tsunami. |  | | | |  |  | |  | | |
| **21.** |  |
|  | |  |  | | --- | --- | | When waves approach shore where the bottom is very steep, the WAVES will \_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | spill |  | | B. | plunge |  | | C. | reflect |  | | D. | surge | Student Response | | E. | refract |  | | | |  |  | |  | | |
| **22.** |  |
|  | |  |  | | --- | --- | | Rogue waves are notorious off the Cape of Good Hope in South Africa because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the Cape causes waves to constantly refract and reflect resulting in constructive interference |  | | B. | of the constructive interference between strong currents and large wind waves | Student Response | | C. | the large Antarctic Ocean waves approach the Cape very rapidly, thus growing to great heights |  | | D. | hurricane-generated storm surges constructively interfere with the currents |  | | E. | of the high energy waves from the Antarctic Ocean (Southern Ocean) |  | | | |  |  | |  | | |
| **23.** |  |
|  | |  |  | | --- | --- | | Which event did NOT generate a tsunami? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | The great 1906 earthquake that caused extensive damage in San Francisco. | Student Response | | B. | A massive subduction zone earthquake in the Indian Ocean in 2004. |  | | C. | An explosive volcanic eruption by Krakatoa Volcano in Indonesia. |  | | D. | A rockfall into an inlet feeding Lituya Bay, Alaska. |  | | E. | A massive landslide into the Vaiont Dam in the Italian Alps. |  | | | |  |  | |  | | |
| **24.** |  |
|  | |  |  | | --- | --- | | Consider waves with different wavelengths (L): wave A has L = 10 m, B has L = 20 m, C has L = 40 m, D has L = 60 m. Knowing that the water depth is 0.5 m, arrange the waves according to wave speed | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | D > C > B > A |  | | B. | A > B > C > D |  | | C. | D = C = B = A | Student Response | | D. | D > C > B = A |  | | E. | D = C > B = A |  | | | |  |  | |  | | |
| **25.** |  |
|  | |  |  | | --- | --- | | The celerity of a wave is equal to \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | its steepness |  | | B. | the number of crests passing through a point over a period of time |  | | C. | half of its wavelength |  | | D. | its speed | Student Response | | E. | the distance times the wavelength |  | | | |  |  | |