EOSC 114 waves and tsunami multiple choice

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| **1.** |  |
|  | |  |  | | --- | --- | | The restoring force for capillary waves is \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | gravity |  |  | | B. | relaxation |  |  | | C. | Coriolis force |  |  | | D. | density |  |  | | Student Response E. | surface tension | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | Why are tsunami difficult to detect in the open ocean? Choose the BEST reason. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Tsunami usually have only 3-7 wave crests in a row, so are only evident in a small area at any one time. |  |  | | Student Response B. | Tsunami have very long wavelengths and small heights in the open ocean, so changes in the sea surface are very small. | 100% | Student Response | | C. | We don’t yet have any technology that can detect tsunami in the open ocean. |  |  | | D. | Tsunami move at speeds similar to jet planes, so they go by too fast. |  |  | | E. | The technology available can only detect tsunami heights greater than 1 meter in the open ocean. |  |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | If a wave with a wavelength of 100 m travels in a body of water 2 km deep, water particles at a depth of 70 m will \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | move rapidly toward the shore |  |  | | B. | not be affected by the passing wave |  | Student Response | | C. | move in orbits that are 1/23rd of the orbits of water particles in the surface |  |  | | Student Response D. | trace circular orbits | 0% |  | | E. | move in flattened ellipses |  |  | | | | Score: | 0/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE about wave speed? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | The speed of a shallow water wave depends on wavelength and period. |  |  | | B. | The speed of a tsunami depends on wavelength only. |  |  | | C. | At the same depth, shallow water waves with longer L are faster than those with shorter L. |  |  | | Student Response D. | In deep water, longer wavelength waves travel faster than those with shorter wavelengths. | 100% | Student Response | | E. | Shoaling waves speed up as they approach shore. |  |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Which statement is TRUE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | In shallow water, long-period waves travel faster than short-period waves. |  |  | | B. | Deep water waves travel faster at water depth d=1000 meters than at d=1,500 meters. |  |  | | Student Response C. | In shallow water, steeper waves are more stable than lower (less steep) waves. | 0% |  | | D. | In the Atlantic Ocean, most of the waves are generated by gravity. |  |  | | E. | Deep water waves with longer wavelengths travel faster than those with shorter lengths. |  | Student Response | | | | Score: | 0/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Imagine you’re a sailor at sea. You observe the sea state and determine that it is Beaufort Force 5. You record this in the ship’s logbook. The captain has been asleep for the past 8 hours and doesn’t know what’s going on. So you wake her up to report on the conditions. Of the following choices, what’s your most likely message to the captain? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Conditions are very calm and you recommend stopping the ship for a swim. |  |  | | B. | You recommend that everyone be kept inside because the danger of getting swept overboard is high. |  |  | | C. | It’s likely that the ship is headed into a hurricane and it would be wise to change course. |  |  | | Student Response D. | Conditions are fine and you recommend that the ship proceed on course. | 100% | Student Response | | E. | It’s time to consider making an emergency rescue call to the Canadian Coast Guard. |  |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | In the middle of the Southern Ocean, waves with the greatest speed \_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | have the shortest wavelengths |  |  | | B. | maintain their speed as they approach shore |  |  | | Student Response C. | have the longest wavelengths | 100% | Student Response | | D. | are generated by winds blowing over the shortest fetch |  |  | | E. | are shallow water waves |  |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | In the Northern Hemisphere, in which part of the hurricane is storm surge the MOST disastrous for the coastline? Choose the BEST answer. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | to the west of the eye of the hurricane |  |  | | B. | to the north of the eye of the hurricane |  |  | | C. | directly under the eye of the hurricane |  |  | | D. | on the left side of the hurricane (if you’re facing in the direction the hurricane is traveling) |  |  | | Student Response E. | on the right side of the hurricane (if you’re facing in the direction the hurricane is traveling) | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | The following are ways British Columbia residents can protect themselves after a tsunami warning is issued EXCEPT \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | stay away from rivers and streams that lead to the ocean |  |  | | B. | move boats out of harbours into deeper water |  |  | | C. | be aware that the greatest danger is only due to the first wave |  | Student Response | | D. | if you are close to shore, move immediately away from shore to higher ground |  |  | | Student Response E. | if unable to move away from shore, evacuate to at least the 5th floor or higher of multi-storey buildings | 0% |  | | | | Score: | 0/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | The distance measured from trough to trough of a wave is the \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | orbital |  |  | | B. | wave height |  |  | | Student Response C. | wavelength | 100% | Student Response | | D. | wave period |  |  | | E. | Amplitude |  |  | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | Which of the following is FALSE about the Pacific Tsunami Warning Center (PTWC)? The PTWC \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | needs about one hour to gather information before they know enough to issue a tsunami warning |  |  | | B. | uses data from DART™ to detect tsunami as small as 1 cm |  |  | | Student Response C. | is directly in charge of alerting populations in the Pacific Northwest for regional tsunami events | 100% | Student Response | | D. | issued a tsunami warning to Indonesia on 26 December 2004 |  |  | | E. | depends on the assistance of government agencies to alert and evacuate coastal communities in the event of a tsunami |  |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | 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** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | It is unlikely because the movement along the fault is horizontal. | 100% | 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 unlikely because the fault is still too close to shore. |  |  | | E. | It is likely because the magnitude of the earthquake is large. |  |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | When waves shoal, all of the following occur EXCEPT \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | wave height increases |  |  | | Student Response B. | wave period decreases | 100% | Student Response | | C. | wavelength shortens |  |  | | D. | the wave steepens |  |  | | E. | wave speed decreases |  |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | Larger wind-driven waves can develop in the North Atlantic Ocean than in the Strait of Georgia. Why? Choose the BEST reason. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Wind speed is faster over the North Atlantic Ocean than over the Strait of Georgia. |  |  | | B. | Low atmospheric pressure over the North Atlantic Ocean tends to amplify large wind-driven waves. |  |  | | C. | The wind blows constantly over the North Atlantic Ocean but only rarely blows hard over the Strait of Georgia. |  |  | | D. | The Strait of Georgia is affected by daily wind reversals due to the proximity of land on all sides. |  |  | | Student Response E. | The fetch is smaller in the Strait of Georgia than in the North Atlantic Ocean. | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | Tsunami can be generated by all of the following EXCEPT \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | hurricanes | 100% | Student Response | | B. | meteor impacts |  |  | | C. | rock falls |  |  | | D. | earthquakes |  |  | | E. | calving icebergs |  |  | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | When waves shoal, all the following occurs EXCEPT \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **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 |  |  | | Student Response D. | the bottom of the wave slows relative to the top, so crests overtake troughs | 0% |  | | E. | the ocean floor interferes with water particle motion, so their orbital motions flatten |  |  | | | | Score: | 0/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | When a tsunami warning is issued after an earthquake occurs off the coast of Alaska, the safest place to be is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | on a beach protected by seawalls in Hilo Bay, Hawaii |  |  | | B. | on a small boat off the coast of Alaska, where the water is at least 2000 meters deep |  | Student Response | | Student Response C. | in Port Alberni, away from the Pacific Ocean coast | 0% |  | | D. | any place along the Pacific coast of North America that has never experienced a tsunami |  |  | | E. | on the second floor of a hotel on the beach in Hilo Bay, Hawaii |  |  | | | | Score: | 0/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | There are more tsunami in the Pacific Ocean because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | it is the largest ocean |  |  | | B. | the trenches are deepest there |  |  | | C. | the fetch is longest, thus waves can travel farthest |  |  | | Student Response D. | there is more seismic activity around it | 100% | Student Response | | E. | it is a shallow ocean |  |  | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | If a wave with a wavelength of 100 m travels in a body of water 1 km deep, water particles at a depth of 55 m will \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | move rapidly toward the shore |  |  | | B. | move in orbits that are 1/23rd of the orbits of water particles in the surface |  |  | | C. | move back and forth |  |  | | Student Response D. | not be affected by the passing wave | 100% | Student Response | | E. | move in flattened ellipses |  |  | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | Which of the following is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Steep waves have V-shaped troughs and broad, rounded peaks. |  | Student Response | | Student Response B. | Waves steepen as the ratio of the wave height to wavelength approaches 1/7. | 0% |  | | C. | Steep waves have peaked and unstable crests. |  |  | | D. | Tsunami steepness is typically 1/200,000. |  |  | | E. | When waves shoal, they become steeper. |  |  | | | | Score: | 0/1 | |  | | |

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| **1.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Tsunami with longer wavelengths travel faster. | Student Response | | B. | The speed of a tsunami decreases as it approaches shore. |  | | C. | In the open ocean, tsunami crests are rounded and stable with typical wave heights of 0.5 – 1m. |  | | D. | Restricted bays and harbours intensify the effects of a tsunami. |  | | E. | The arrival of a tsunami can be predicted. |  | | | | Score: | 0/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | 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 |  | | | | Score: | 0/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? At Kitsilano Beach, \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | perfect pipeline (plunging) surf do not happen because the water is cold | Student Response | | B. | as a wave approaches shore, the motion of water particles is affected by friction with the ocean bottom |  | | C. | longer waves become shallow water waves farther offshore than shorter waves |  | | D. | waves form whitecaps when their crests are unstable |  | | E. | water particles move in a back-and-forth motion as a shoaling wave passes |  | | | | Score: | 0/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | 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. | drop your surfboard and run uphill as far as you can | Student Response | | B. | jump in your car and drive to Port Alberni |  | | C. | retreat to the high tide line, marked by driftwood |  | | D. | paddle as far out to sea as you can |  | | E. | wait until you see the water draining away from shore before making a decision |  | | | | Score: | 0/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Assume that the diagram above is drawn to scale. Under what scenario would these waves be breaking? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | When A/D is greater than 1/2. |  | | Student Response B. | When D/B is greater than 1/2. |  | | C. | When E/C is greater than 1/2. |  | | D. | When B/D is greater than 1/7. |  | | E. | When D/A is greater than 1/7. | Student Response | | | | Score: | 0/1 | |

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| **1.** |  |
|  | |  |  | | --- | --- | | A storm surge \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | is a tall mound of water that approaches shore like a wave, in a series of crest and troughs |  | | B. | occurs when a mound of seawater builds-up underneath the low-pressure zone of a storm | Student Response | | Student Response C. | is more dangerous when it hits shore during low tide |  | | D. | causes only minor flooding on land and rarely any deaths |  | | E. | occurs when waves from different storms collide, combining to form an unexpected giant wave |  | | | | Score: | 0/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | Imagine that you live in a house at the beach where longshore drift is from EAST to WEST. Your neighbour to the west builds two groins. The sand on the beach in front of YOUR house will \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | be carried to the WEST and deposited in front of your neighbor’s house |  | | B. | erode completely unless another source of sand contributes to your beach |  | | Student Response C. | be carried around the groins and continue its journey to the WEST |  | | D. | build up gradually as your neighbor’s new groins catch sand | Student Response | | E. | be carried to the EAST and deposited in front of a different neighbor’s house |  | | | | Score: | 0/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | 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. | paddle as far out to sea as you can |  | | B. | wait until you see the water draining away from shore before making a decision |  | | C. | jump in your car and drive to Port Alberni |  | | D. | retreat to the high tide line, marked by driftwood |  | | Student Response E. | drop your surfboard and run uphill as far as you can | Student Response | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | During a storm surge, most deaths occur \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | from injuries from the high winds |  | | B. | from rapid spread of diseases |  | | C. | due to starvation |  | | D. | from lightning |  | | Student Response E. | by drowning | Student Response | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | For a given rise in sea level, the shoreline in low-lying areas typically moves horizontally inland at a rate about \_\_\_\_\_\_ times the vertical sea level rise. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 5 |  | | Student Response B. | 10 |  | | C. | 100 |  | | D. | 500 |  | | E. | 1000 | Student Response | | | | Score: | 0/1 | |  | | |

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| **1.** |  |
|  | |  |  | | --- | --- | | The figure below shows a beach and ocean bathymetry (contours showing ocean depth) just offshore. Depth contours are labeled. At which point would you expect to see the most plunging breakers? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | 1. | A |  | | Student Response 2. | B | Student Response | | 3. | C |  | | 4. | D |  | | 5. | E |  | | | | Score: | 1/1 | |  | | |
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|  |  |
| **3.** |  |
|  | |  |  | | --- | --- | | As surface waves travel across an ocean, they carry \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | matter |  | | Student Response B. | energy | Student Response | | C. | both matter and energy |  | | D. | neither energy or matter |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | The figure below shows a beach and approaching waves (wave normals are grey arrows). In which direction will**littoral drift** occur? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | 1. | East to West |  | | Student Response 2. | West to East | Student Response | | 3. | North to South |  | | 4. | South to North |  | | 5. | Southwest to Northeast |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Although the period of a wave changes as waves approach the shore, the speed of the wave remains constant. | | |  | | | | **Student Response** | **Correct Answer** | | --- | --- | | False | False | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Current changes in sea level are attributed to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | the melting of glaciers |  | | B. | the warming, and subsequent expansion, of ocean water |  | | C. | the slow readjustment of land following the melt of the Laurentide ice sheet (10 000 years ago). |  | | D. | all of the above | Student Response | | E. | none of the above; there is no evidence that sea level is changing. |  | | | | Score: | 0/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | A tsunami can be triggered by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | an earthquake |  | | B. | a volcanic eruption |  | | C. | underwater landslides |  | | Student Response D. | all of the above | Student Response | | E. | none of the above |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | Which of the following waves has the most energy? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response 1. | L=10m, T=10s, H=2m |  | | 2. | L=20m, T=50s, H=1m |  | | 3. | L=30m, T=50s, H=2m |  | | 4. | L=10m, T=50s, H=3m | Student Response | | 5. | L=30m, T=1 minute, H=2m |  | | | | Score: | 0/1 | |  | | |

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| 1. |  |
|  | |  |  | | --- | --- | | Longshore drift is \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | the transport of sediment along the shoreline | 100% | Student Response | | B. | the zone of loose particles covering part or all of the shore |  |  | | C. | the straightening of the shoreline by wave action |  |  | | D. | water brought up by waves at an angle to the shoreline |  |  | | E. | water returned to the sea perpendicular to the shore |  |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | Rogue waves are best described as \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the third highest wave in a group |  |  | | Student Response B. | a single massive wave that develops and disappears in the open ocean | 100% | Student Response | | C. | a strong rocking motion within a harbour |  |  | | D. | waves rapidly approaching shallow water that grow to great heights |  |  | | E. | abrupt bulge of water driven ashore by hurricanes |  |  | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Where is the safest place for a ship to be during a tsunami? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | out in the open ocean |  | Student Response | | B. | anchored in a harbor with a narrow opening |  |  | | C. | in a drydock at least 10 meters above sea level |  |  | | Student Response D. | anchored in a harbor on the opposite side of an island from the direction of tsunami approach | 0% |  | | E. | tied securely to a dock |  |  | | | | Score: | 0/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | If a wave with a wavelength of 100 m travels in a body of water 2 km deep, water particles at a depth of 70 m will \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | move rapidly toward the shore |  |  | | B. | not be affected by the passing wave |  | Student Response | | C. | move in orbits that are 1/23rd of the orbits of water particles in the surface |  |  | | Student Response D. | trace circular orbits | 0% |  | | E. | move in flattened ellipses |  |  | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | Eustatic changes refer to \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the advance and retreat of polar ice caps |  |  | | B. | the increase in ocean surface temperature due to greenhouse warming |  |  | | Student Response C. | variations in sea level that can be measured all over the world’s ocean | 100% | Student Response | | D. | the subsidence of low-lying islands and coasts |  |  | | E. | the increased use of man-made structures to protect the coast |  |  | | | | Score: | 1/1 | |  | | |
| 6. |  |
|  | |  |  | | --- | --- | | Which of the following is FALSE about the Pacific Tsunami Warning Center (PTWC)? The PTWC \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | needs about one hour to gather information before they know enough to issue a tsunami warning |  |  | | B. | uses data from DART™ to detect tsunami as small as 1 cm |  |  | | Student Response C. | is directly in charge of alerting populations in the Pacific Northwest for regional tsunami events | 100% | Student Response | | D. | issued a tsunami warning to Indonesia on 26 December 2004 |  |  | | E. | depends on the assistance of government agencies to alert and evacuate coastal communities in the event of a tsunami |  |  | | | | Score: | 1/1 | |  | | |
| 7. |  |
|  | |  |  | | --- | --- | | The restoring force for capillary waves is \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | gravity |  |  | | B. | relaxation |  |  | | C. | Coriolis force |  |  | | D. | density |  |  | | Student Response E. | surface tension | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 8. |  |
|  | |  |  | | --- | --- | | Rogue waves are notorious off the Cape of Good Hope in South Africa because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the Cape causes waves to constantly refract and reflect resulting in constructive interference |  |  | | Student Response B. | of the constructive interference between strong currents and large wind waves | 100% | 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) |  |  | | | | Score: | 1/1 | |  | | |
| 9. |  |
|  | |  |  | | --- | --- | | The most influential agent that changes the shape of the coast is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | freezing and thawing of coastal cliffs |  |  | | Student Response B. | wave action | 100% | Student Response | | C. | prevailing winds |  |  | | D. | hurricanes and storm surges |  |  | | E. | the tidal range |  |  | | | | Score: | 1/1 | |  | | |
| 10. |  |
|  | |  |  | | --- | --- | | Surging breakers occur \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | on mudflats |  |  | | Student Response B. | on beaches with very steep slopes | 100% | Student Response | | C. | on flat, sandy beaches |  |  | | D. | on sandy beaches with average slopes |  |  | | E. | where the local wind is offshore |  |  | | | | Score: | 1/1 | |  | | |
| 11. |  |
|  | |  |  | | --- | --- | | A wave with a wavelength of 30 meters is a deep water wave in water greater than \_\_\_\_\_ meters depth. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | 15 | 100% | Student Response | | B. | 23 |  |  | | C. | 30 |  |  | | D. | 60 |  |  | | E. | 300 |  |  | | | | Score: | 1/1 | |  | | |
| 12. |  |
|  | |  |  | | --- | --- | | 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** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Yes, but only by waves with wavelengths longer than 80 meters. |  | Student Response | | B. | Yes, but only by waves with periods longer than 20 seconds. |  |  | | Student Response C. | Yes, but only by waves with wavelengths shorter than 80 meters. | 0% |  | | D. | No, because the whale is below the depth of no motion for all surface waves. |  |  | | E. | Yes, but only by waves with periods shorter than 20 seconds. |  |  | | | | Score: | 0/1 | |  | | |
| 13. |  |
|  | |  |  | | --- | --- | | Waves at the shore will start to break when the \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | wave height is about 7 times the wavelength |  |  | | Student Response B. | wave height is about 3/4 the water depth | 100% | Student Response | | C. | crests smooth into a rounded shape |  |  | | D. | wave period increases to 15 seconds |  |  | | E. | water depth is about 2 times the wavelength |  |  | | | | Score: | 1/1 | |  | | |
| 14. |  |
|  | |  |  | | --- | --- | | The speed of a shallow water wave depends only on one variable, which is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | slope of the bottom |  |  | | B. | Wavelength |  |  | | Student Response C. | wave period | 0% |  | | D. | water depth |  | Student Response | | E. | wave frequency |  |  | | | | Score: | 0/1 | |  | | |
| 15. |  |
|  | |  |  | | --- | --- | | At which location would you be most concerned about the danger of a tsunami? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the Mediterranean coast |  |  | | B. | The Hamptons, on Long Island, New York |  |  | | Student Response C. | Hilo Bay, Hawaii | 100% | Student Response | | D. | the Seychelles, off eastern Africa |  |  | | E. | White Rock, B.C |  |  | | | | Score: | 1/1 | |  | | |
| 16. |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE? | | |  | | | |  | **Student Response** | **Value** | **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. |  |  | | Student Response C. | People living close to shore can prepare for a tsunami by evacuating to higher ground immediately after an earthquake is felt. | 100% | 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. |  |  | | | | Score: | 1/1 | |  | | |
| 17. |  |
|  | |  |  | | --- | --- | | The best place to observe a seiche is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | in the open sea |  |  | | B. | on a shallow beach at the edge of the Pacific |  |  | | C. | near tropical islands in the Indian or Atlantic Oceans |  |  | | D. | in the coastal area near UBC |  |  | | Student Response E. | in a harbour or lake | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 18. |  |
|  | |  |  | | --- | --- | | Which of the following is FALSE about rogue waves? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | Rogue waves only occur in the open ocean and do not impact shorelines. | 100% | Student Response | | B. | Rogue waves are common where strong winds blow against ocean currents. |  |  | | C. | Rogue waves are hard to predict. |  |  | | D. | Rogue waves result from constructive interference between two or more wave trains. |  |  | | E. | Rogue waves are particularly hazardous for large vessels because the ends of the ship can be on adjacent wave crests leaving the middle of the ship unsupported. |  |  | | | | Score: | 1/1 | |  | | |
| 19. |  |
|  | |  |  | | --- | --- | | For a given rise in sea level, the shoreline in low-lying areas typically moves horizontally inland at a rate about \_\_\_\_\_\_ times the vertical sea level rise. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 5 |  |  | | B. | 10 |  |  | | C. | 100 |  |  | | D. | 500 |  |  | | Student Response E. | 1000 | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 20. |  |
|  | |  |  | | --- | --- | | Waves at the shore will start to break when \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the ratio of water depth to wavelength is about 4:3 |  |  | | B. | the ratio of the wave height to wavelength is 7 |  |  | | C. | the ratio of water depth to the wavelength is 2 |  |  | | D. | crests peak |  |  | | Student Response E. | the ratio of the wave height to the water depth is about 3:4 | 100% | Student Response | | | | Score: | 1/1 | |
| 1. |  |
|  | |  |  | | --- | --- | | What local conditions can make storm surge worse? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | high, steep cliffs that reflect the wave energy |  | | Student Response B. | high tide | Student Response | | C. | lots of vegetation |  | | D. | protective dikes |  | | E. | Seawalls |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | Which lists waves in order from SHORTEST to LONGEST wavelength? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | wind waves, tides, tsunami, seiches |  | | B. | seiches, tsunami, wind waves, tides |  | | C. | wind waves, tsunami, seiches, tides |  | | Student Response D. | wind waves, seiches, tsunami, tides | Student Response | | E. | tides, seiches, tsunami, wind waves |  | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Which statement is TRUE about the tsunami generated by the 1964 Good Friday Earthquake? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | The town of Tofino suffered as much damage from the tsunami as the nearby town of Port Alberni. |  | | B. | It took an hour for the tsunami to arrive at Port Alberni from Tofino because it was not a fast wave. |  | | C. | Port Alberni would have suffered significantly less damage had a warning system been in place. |  | | D. | The tsunami-associated damage were all caused by the first wave, the largest wave. |  | | Student Response E. | The shape and configuration of Alberni Inlet magnified the destructive effect of the tsunami. | Student Response | | | | Score: | 1/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | 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 wavelengths shorter than 80 meters. |  | | Student Response B. | Yes, but only by waves with periods shorter than 20 seconds. |  | | C. | Yes, but only by waves with periods longer than 20 seconds. |  | | D. | No, because the whale is below the depth of no motion for all surface waves. |  | | E. | Yes, but only by waves with wavelengths longer than 80 meters. | Student Response | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | When a large earthquake occurs, people want to know whether or not it generated a tsunami, and therefore whether or not evacuation is needed. What measurements can we collect with TODAY'S technology that would directly help determine whether a tsunami is on its way, before it arrives? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | earthquake magnitude and location |  | | Student Response B. | pressure changes in the deep ocean | Student Response | | C. | displacement along the fault that ruptured |  | | D. | sea level heights observed from airplanes |  | | E. | sea level heights observed from ships |  | | | | Score: | 1/1 | |
| 1. |  |
|  | |  |  | | --- | --- | | The most influential agent that changes the shape of the coast is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | freezing and thawing of coastal cliffs |  | | Student Response B. | wave action | Student Response | | C. | prevailing winds |  | | D. | hurricanes and storm surges |  | | E. | the tidal range |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | Longshore drift is \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | the transport of sediment along the shoreline | Student Response | | B. | the zone of loose particles covering part or all of the shore |  | | C. | the straightening of the shoreline by wave action |  | | D. | water brought up by waves at an angle to the shoreline |  | | E. | water returned to the sea perpendicular to the shore |  | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Imagine that you live in a house at the beach where longshore drift is from EAST to WEST. Your neighbour to the west builds two groins. The sand on the beach in front of YOUR house will \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | be carried to the WEST and deposited in front of your neighbor’s house |  | | B. | erode completely unless another source of sand contributes to your beach |  | | Student Response C. | build up gradually as your neighbor’s new groins catch sand | Student Response | | D. | be carried around the groins and continue its journey to the WEST |  | | E. | be carried to the EAST and deposited in front of a different neighbor’s house |  | | | | Score: | 1/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | If you observe wave crests in the Pacific Ocean that are 60 meters apart and behave as deep water waves, you know that the water must be at least \_\_\_\_\_\_ meters deep. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 90 |  | | B. | 60 |  | | Student Response C. | 30 | Student Response | | D. | 15 |  | | E. | 5 |  | | | | Score: | 1/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | If a wave with a wavelength of 100 m travels in a body of water 1 km deep, water particles at a depth of 55 m will \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | move rapidly toward the shore |  | | B. | move in orbits that are 1/23rd of the orbits of water particles in the surface |  | | C. | move back and forth |  | | D. | not be affected by the passing wave | Student Response | | Student Response E. | move in flattened ellipses |  | | | | Score: | 0/1 | |
| 3. |  |
|  | |  |  | | --- | --- | | As surface waves travel across an ocean, they carry \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | matter |  | | B. | energy | Student Response | | Student Response C. | both matter and energy |  | | D. | neither energy or matter |  | | | | Score: | 0/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | The figure below shows a beach and approaching waves (wave normals are grey arrows). In which direction will**littoral drift** occur? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | 1. | East to West |  | | 2. | West to East | Student Response | | 3. | North to South |  | | 4. | South to North |  | | Student Response 5. | Southwest to Northeast |  | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | Although the period of a wave changes as waves approach the shore, the speed of the wave remains constant. | | |  | | | | **Student Response** | **Correct Answer** | | --- | --- | | True | False | | | | Score: | 0/1 | |  | | |
| 6. |  |
|  | |  |  | | --- | --- | | Current changes in sea level are attributed to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the melting of glaciers |  | | B. | the warming, and subsequent expansion, of ocean water |  | | C. | the slow readjustment of land following the melt of the Laurentide ice sheet (10 000 years ago). |  | | Student Response D. | all of the above | Student Response | | E. | none of the above; there is no evidence that sea level is changing. |  | | | | Score: | 1/1 | |  | | |
| 7. |  |
|  | |  |  | | --- | --- | | A tsunami can be triggered by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | an earthquake |  | | B. | a volcanic eruption |  | | C. | underwater landslides |  | | Student Response D. | all of the above | Student Response | | E. | none of the above |  | | | | Score: | 1/1 | |  | | |
| 8. |  |
|  | |  |  | | --- | --- | | Which of the following waves has the most energy? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | 1. | L=10m, T=10s, H=2m |  | | 2. | L=20m, T=50s, H=1m |  | | Student Response 3. | L=30m, T=50s, H=2m |  | | 4. | L=10m, T=50s, H=3m | Student Response | | 5. | L=30m, T=1 minute, H=2m |  | | | | Score: | 0/1 | | **GROUP QUIZES** | | |
| 1. |  |
|  | |  |  | | --- | --- | | Why are tsunami so common in the Pacific? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the Pacific is the largest ocean, so there is more chance of a tsunami occurring |  |  | | Student Response B. | there is a large amount of tectonic and earthquake activity around the Pacific | 100% | Student Response | | C. | the Pacific is the deepest ocean, allowing a tsunami to become larger |  |  | | D. | Pacific coastlines are the most heavily populated, so Pacific tsunami are more likely to be observed |  |  | | E. | the Pacific has the only Tsunami Warning Centre in the world, thus more tsunami are observed and monitored |  |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | If you’re at the beach and you notice the ocean water receding to an unusually low level, you should \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | climb a tree at least 5 m high |  |  | | B. | follow the receding water and bag all the stranded fish |  |  | | C. | jump on a boat and head offshore fast |  |  | | Student Response D. | run for higher ground and take your friends with you | 100% | Student Response | | E. | wait for any hazard warnings |  |  | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | What aspect of a tsunami is the most predictable? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | its speed 100% |  | Student Response | | B. | its wave height |  |  | | Student Response C. | its period | 0% |  | | D. | its wavelength |  |  | | E. | its steepness |  |  | | | | Score: | 0/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | In an open ocean, tsunami have a typical wavelength of \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 3,000 km |  |  | | B. | 300 km 100% |  | Student Response | | C. | 30 km |  |  | | D. | 3 km |  |  | | Student Response E. | 300 m | 0% |  | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | Seiches are generated by \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Tsunami |  |  | | B. | Earthquakes |  |  | | C. | Landslides |  |  | | D. | strong winds |  |  | | Student Response E. | All of the above | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 6. |  |
|  | |  |  | | --- | --- | | Which of the following are the most hazardous for ships at sea? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Tsunami |  |  | | Student Response B. | rogue waves | 100% | Student Response | | C. | Seiches |  |  | | D. | storm surges |  |  | | E. | none of above are a significant risk to ships at sea |  |  | | | | Score: | 1/1 | |  | | |
| 7. |  |
|  | |  |  | | --- | --- | | When a tsunami hits a bay or a harbor, its effects can be amplified by \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | destructive interference with tides |  |  | | B. | the higher concentration of people and buildings along the Bay |  |  | | Student Response C. | concentration of wave energy along headlands | 0% |  | | D. | dispersion of wave energy in an embayment |  |  | | E. | resonance, if the tsunami has the right frequency 100% | % | Student Response | | | | Score: | 0/1 | |  | | |
| 8. |  |
|  | |  |  | | --- | --- | | What happens when two different surface waves run into each other? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | This cannot happen because ocean waves all move in the same direction. |  |  | | Student Response B. | The bigger wave absorbs the smaller wave’s energy, and gets even bigger. | 0% |  | | C. | The smaller wave removes some of the bigger wave’s energy. |  |  | | D. | The effect of the two waves is added together, making a more complex wave.100% |  | Student Response | | E. | The waves crash together and break. |  |  | | | | Score: | 0/1 | |  | | |
| 9. |  |
|  | |  |  | | --- | --- | | Same beach and neighbors as shown in the figure below. Now neighbor #1 acted first and built a groin at position C. What should you do in response to protect the beach in front of your house? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | nothing, because the beach will build up there anyway |  |  | | Student Response B. | build a groin at position E | 100% | Student Response | | C. | build a breakwater between B and D positions |  |  | | D. | build a breakwater between D and F positions |  |  | | E. | build a seawall between C and E positions |  |  | | | | Score: | 1/1 | |  | | |
| 10. |  |
|  | |  |  | | --- | --- | | Same beach and neighbors as shown in the figure below. This time your neighbor tells you that instead of an ugly groin on the beach, he would prefer that you build a breakwater. Where would you build this breakwater to protect ONLY your beach? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | at position A |  |  | | B. | at position B |  |  | | C. | at position C |  |  | | Student Response D. | at position D | 100% | Student Response | | E. | at position E |  |  | | | | Score: | 1/1 | |  | | |
| 11. |  |
|  | |  |  | | --- | --- | | You have a house on a beach where waves typically arrive from the northwest, as illustrated in the figure below. If you intend to protect the beach in front of your house ONLY, where would you build a groin? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | at position A |  |  | | B. | at position C |  |  | | Student Response C. | at position E | 100% | Student Response | | D. | at position G |  |  | | E. | somewhere else |  |  | | | | Score: | 1/1 | |  | | |
| 12. |  |
|  | |  |  | | --- | --- | | Waves are the result of energy traveling across the ocean, but what ultimately happens to that energy? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | The energy reflects off coasts, creating a new wave traveling in the opposite direction. | 0% |  | | B. | The energy is absorbed by the coast. |  |  | | C. | Friction causes the waves to slowly lose energy and die. |  |  | | D. | Waves grow until they break in the open ocean. |  |  | | E. | All of above. 100% |  | Student Response | | | | Score: | 0/1 | |  | | |
| 13. |  |
|  | |  |  | | --- | --- | | A wave with a frequency of 100 Hz is traveling across the ocean. The probable generating force for this wave was \_\_\_\_\_\_ and the restoring force will be \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | wind, gravity |  |  | | Student Response B. | wind, surface tension | 100% | Student Response | | C. | an earthquake, gravity |  |  | | D. | gravity, friction |  |  | | E. | wind, friction |  |  | | | | Score: | 1/1 | |  | | |
| 14. |  |
|  | |  |  | | --- | --- | | Three waves are traveling through 5m deep water; one has a wavelength of 100m, another has a wavelength of 120m, and the third one has a wavelength of 140m. Which of the following is TRUE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | The 100m wave is moving faster than the others. |  |  | | B. | The 120m wave is moving faster than the others. |  |  | | C. | The 140m wave is moving faster than the others. |  |  | | Student Response D. | All three of these waves travel with the same speed. | 100% | Student Response | | E. | There is not enough information to answer this question. |  |  | | | | Score: | 1/1 | |  | | |
| 15. |  |
|  | |  |  | | --- | --- | | A fully developed sea state occurs when \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | winds have been blowing steadily for at least 4 hours |  |  | | B. | the energy from the winds disturbs the ocean surface and forces it into motion |  |  | | Student Response C. | the sea state has reached 12 on the Beaufort scale | 0% |  | | D. | energy added to the ocean by wind equals energy lost by waves breaking 100% |  | Student Response | | E. | never – the fully developed state is a theoretical "worst case scenario" that never occurs in the real ocean |  |  | | | | Score: | 0/1 | |  | | |
| 16. |  |
|  | |  |  | | --- | --- | | Waves \_\_\_\_\_\_ on headlands releasing \_\_\_\_\_\_ wave energy than in embayments. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | diverge, more |  |  | | Student Response B. | converge, more | 100% | Student Response | | C. | diverge, less |  |  | | D. | converge, less |  |  | | E. | break, less |  |  | | | | Score: | 1/1 | |  | | |
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|  | |  |  | | --- | --- | | Which of the following artificial barriers do NOT modify sediment transport? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Seawall |  |  | | B. | Jetty |  |  | | C. | Groin |  |  | | D. | Tethered-float breakwater 100% |  | Student Response | | Student Response E. | Headland | 0% |  | | | | Score: | 0/1 | |