FRAGILE SYSTEM

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | Consider the following three phenomena: 1) a flood caused by a thunderstorm 2) a storm surge caused by a hurricane 3) a tsunami caused by an underwater earthquake  These are ALL directly associated with \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | storms |  | | B. | shorter return periods for more-intense phenomena |  | | C. | geothermal energy |  | | Student Response D. | both the concentration and dilution of energy | Student Response | | E. | solar energy |  | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Gases are the least compressible compared to liquids and solids. |  | | B. | Fluids with low viscosity such as air resist flow more that those with high viscosity such as magma. |  | | C. | Heat of sublimation is released when solids become gases. |  | | Student Response D. | The ability of solids to permanently change shape or deform when forced is called plastic. | Student Response | | E. | Liquids and gases can change their shape easily, thus are not fluids. |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | The common logarithm of 100,000 is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 2 |  | | B. | 3 |  | | C. | 4 |  | | Student Response D. | 5 | Student Response | | E. | 6 |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | An object behaves elastically under strain if it\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | deforms easily and takes on a new shape after the strain is removed |  | | Student Response B. | deforms easily and springs back to its original shape after the strain is removed | Student Response | | C. | is difficult to tear but easy to cut with scissors or a knife |  | | D. | breaks easily when at a cool temperature, but flows under high temperatures. |  | | E. | resists deformation and releases heat when the strain is removed |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Which is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | As disaster prediction improves, property and infrastructure losses will generally decrease. |  | | B. | In developed countries, fatalities due to natural disasters are increasing despite more accurate and timely warnings. |  | | C. | When infrastructure is disrupted by natural disasters, the functionality of human society is rarely affected. |  | | Student Response D. | Damage and loss of life from natural disasters can be minimized. | Student Response | | E. | Natural processes become hazards only near large population centres with fragile infrastructure. |  | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | All of the following are forms of energy EXCEPT: | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | latent heat |  | | B. | work |  | | C. | kinetic energy |  | | Student Response D. | force | Student Response | | E. | sensible heat |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | If you double the distance that you push an object with a constant force, the amount of work \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | quarters |  | | B. | halves |  | | C. | remains constant |  | | Student Response D. | doubles | Student Response | | E. | quadruples |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | The world population DURING THE PAST DECADE has been \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | decreasing linearly |  | | B. | decreasing exponentially |  | | Student Response C. | growing almost linearly | Student Response | | D. | 10 billion |  | | E. | nearly constant |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Over the past several hundred years, the world's population growth curve is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | linear |  | | B. | quadratic |  | | C. | flat |  | | D. | sinusoidal |  | | Student Response E. | exponential | Student Response | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | Of the following natural disasters, which one would cause the greatest number of immediate deaths in Western Canada? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a tornado |  | | B. | a landslide |  | | C. | a major volcanic eruption |  | | Student Response D. | a large-magnitude earthquake |  | | E. | a large-diameter meteor impact | Student Response | | | | Score: | 0/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | The top layer of the earth is called the\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | mesosphere |  | | B. | asthenosphere |  | | C. | mantle |  | | D. | core |  | | Student Response E. | crust | Student Response | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Stress is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | mass times acceleration |  | | B. | 0.5 times mass times velocity squared |  | | C. | the deformation of an object |  | | D. | the viscosity of a fluid |  | | Student Response E. | force per unit area | Student Response | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | The System International (SI) standard units of distance, time and mass are \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | meter, second, and kilogram | Student Response | | B. | kilometer, hour, and gram |  | | C. | centimeter, second, and gram |  | | D. | yard, minute, and pound |  | | E. | kilometer, minute, and kilogram |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | At present the doubling time for the human population on Earth is roughly \_\_\_\_\_\_ years. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 1000 |  | | B. | 500 |  | | C. | 100 |  | | Student Response D. | 50 | Student Response | | E. | 10 |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | A teragram is equal to \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | one millionth of a gram (10-6) |  | | B. | one thousandth of a gram (10-3) |  | | C. | ten grams (101) |  | | D. | one thousand grams (103) |  | | Student Response E. | one trillion grams (1012) | Student Response | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | "Watt" is the unit for \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | energy |  | | Student Response B. | power | Student Response | | C. | force |  | | D. | density |  | | E. | stress |  | | | | Score: | 1/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | If you double the force applied on an object, the amount of work \_\_\_\_\_\_ | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | quarters |  | | B. | halves |  | | C. | remains constant |  | | Student Response D. | doubles | Student Response | | E. | quadruples |  | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Layers form in the Earth, ocean, and atmosphere because \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | heavier objects sink relative to less heavy ones |  | | B. | there is greater pressure acting on the lower layers |  | | C. | of the stress between layers that tends to cause them to deform |  | | D. | the acceleration of gravity decreases with height |  | | Student Response E. | less dense objects float relative to more dense ones | Student Response | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Recall that the units of specific heat (Cp) are J / kg-K and the units of latent heat (L) are J/kg. Suppose that you have a cold glass of water, and that you notice dew forming on the outside of the glass. You know that the dew is from water vapour in the air condensing on the glass. This condensate causes the water in the glass to become warmer. (Assume for simplicity that the mass of water vapor condensing is the same as the mass of liquid water in the glass, and you may neglect the heat capacity of the glass itself.) You would anticipate that the correct relationship between these variables is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | ΔT = Cp x L |  | | B. | ΔT = 1 / (Cp x L) |  | | Student Response C. | ΔT = L / Cp | Student Response | | D. | ΔT = Cp / L |  | | E. | there is not enough information to answer this question |  | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | Consider two countries, each with a population of 1 million in the year 2000. The annual population growth rate of Country X is 1% while that of Country Y is 2%. Assuming that the growth rates remain unchanged, which statement is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | By the year 2070, Country X will have a population of 2 million and Country Y will have 4 million.`` |  | | B. | Both countries are experiencing exponential population growth. |  | | C. | Over a period of 140 years, Country Y will have doubled its population 4 times.` |  | | Student Response D. | The doubling time for the population of Country X is estimated as 1 million divided by 1%. | Student Response | | E. | The population of Country Y is increasing much faster that that of the world. |  | | | | Score: | 1/1 | |  | | |

VOLCANO

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | Compared to shield volcanoes, composite volcanoes are \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | larger (in general), with shallower slopes and more mafic flows |  | | B. | more common at continental intraplate settings |  | | C. | more common at divergent plate margins |  | | D. | not as explosive |  | | Student Response E. | smaller, with steeper slopes and more felsic lavas | Student Response | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | Igneous rock textures (crystal size) are dictated by a magma/lava’s \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | temperature |  | | B. | CO2 gas content |  | | Student Response C. | cooling rate | Student Response | | D. | mineralogy |  | | E. | silica composition |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Which statement is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Only shield volcanoes have a volcanic cone, vent, and crater. |  | | B. | Lava domes form on the flanks of a volcano after extremely explosive eruptions. |  | | Student Response C. | Shield volcanoes are the largest type of volcano by volume. | Student Response | | D. | Composite volcanoes are made only of pyroclastic material. |  | | E. | Large calderas always form from the collapse of a shield volcano. |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | The “resistance to flow” of any liquid is known as its \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | solidification constant |  | | B. | runnability |  | | C. | cooling rate |  | | D. | liquidity factor |  | | Student Response E. | viscosity | Student Response | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Most magma is generated by melting of pre-existing rock through \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | decompression melting | Student Response | | B. | heat transfer |  | | C. | vesiculation |  | | D. | decreasing the H2O content |  | | E. | decreasing the CO2 content |  | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | By volume, the largest type of volcanic landform is a \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | lava dome |  | | Student Response B. | shield volcano | Student Response | | C. | composite cone |  | | D. | stratovolcano |  | | E. | cinder cone |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | The most active Cascade arc volcano over the past 4,000 years is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Mount Baker |  | | B. | Mount Hood |  | | Student Response C. | Mount St. Helens | Student Response | | D. | Mount Shasta |  | | E. | Mount Rainier |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | The occurrence of a lahar is difficult to predict because \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | acoustic flow monitors do not work during eruptions |  | | B. | lahars are not restricted to existing stream drainages |  | | C. | lahars travel long distances |  | | D. | lahars are composed of all sorts of sizes of material |  | | Student Response E. | lahars can occur long after an eruption ceases | Student Response | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | A hazard NOT caused by volcanic ash and ash clouds is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | abrading an airplane engine |  | | B. | scratching an airplane windshield |  | | C. | fast moving mudflows |  | | Student Response D. | causing a tsunami when ash falls into the ocean | Student Response | | E. | collapsing houses in nearby tropical villages |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | All of the following influence volcano explosivity EXCEPT \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | temperature |  | | B. | gas content |  | | C. | viscosity |  | | D. | amount of silica |  | | Student Response E. | magma/lava color | Student Response | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | What is the effect of hydrothermal alteration on a volcano? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | Alteration to clay minerals weakens the volcanic edifice. | Student Response | | B. | Gas seepage increases. |  | | C. | Mudflows form after dome eruptions. |  | | D. | Pyroclastic material becomes welded together and strengthens with time. |  | | E. | Hot springs increase toxic gas emissions. |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | The most LIKELY place to find an ACTIVE volcano is \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | in the center of a continent |  | | Student Response B. | above a subduction zone | Student Response | | C. | in a mountain range where two continents are colliding |  | | D. | on the ocean floor |  | | E. | along a transform plate boundary |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | When considering all the predictive tools you could use to predict an impending eruption, which is considered to be the SINGLE MOST USEFUL? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | LIDAR volume analysis |  | | B. | GPS inflation monitoring |  | | C. | InSAR inflation monitoring |  | | Student Response D. | seismic monitoring | Student Response | | E. | COSPEC gas analysis |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | Which statement is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Most non-explosive volcanoes are found at hot spots and located in plate interiors. |  | | Student Response B. | Most explosive volcanoes are found at oceanic-continental convergent plate boundaries. | Student Response | | C. | An oceanic-oceanic convergent plate boundary will not produce explosive eruptions. |  | | D. | Continental-continental collisions result in both non-explosive and explosive volcanism. |  | | E. | Explosive volcanoes can be found at divergent plate boundaries. |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | Tiltmeters and InSar can help DIRECTLY infer which of the following? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | plate movement |  | | B. | near-surface magma movement | Student Response | | C. | distribution of pyroclastic flow deposits |  | | Student Response D. | build-up of carbon dioxide in the lava dome |  | | E. | earthquake distribution |  | | | | Score: | 0/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Which of these Cascade Range volcanoes do geologists believe has the ability to greatly affect (i.e. be very hazardous) the largest area around it? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Mount Baker |  | | B. | Mount Garibaldi |  | | C. | Crater Lake/Mount Mazama |  | | Student Response D. | Mount Rainier | Student Response | | E. | Mount St. Helens |  | | | | Score: | 1/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | Which is a type of volcanic glass? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a'a |  | | B. | pahoehoe |  | | C. | ash |  | | D. | lapilli |  | | Student Response E. | pumice | Student Response | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Swelling and deflation of active volcanoes is NOT measured by \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | gravity meters | Student Response | | B. | GPS |  | | C. | taped distances between stakes |  | | D. | tiltmeters |  | | E. | satellite interferometry |  | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Which of the following volcanic hazards would NOT likely be associated with a volcano with a lava dome? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | ash |  | | B. | pyroclastic flow |  | | C. | lava flow | Student Response | | D. | lahar |  | | E. | pyroclastic surge |  | | | | Score: | 0/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | During an eruption, gas emissions typically increase by how many orders of magnitude? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 0.1 |  | | B. | 1 - 2 |  | | Student Response C. | 2 - 3 | Student Response | | D. | 3 - 4 |  | | E. | > 5 |  | | | | Score: | 1/1 | |

EARTHQUAKE

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | Which of the following does NOT measure permanent ground motion? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | GPS |  | | B. | tape measure |  | | Student Response C. | Seismometers | Student Response | | D. | Surveying equipment |  | | E. | none of the above |  | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | The figure below shows a typical seismogram. What do A, B, and C represent? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | A = S-wave arrival; B = P-wave arrival; C = reverberation start |  | | B. | A = surface wave arrival; B = S-wave arrival; C = P-wave arrival |  | | C. | A = time of the earthquake; B = building resonance start; C = building destruction |  | | Student Response D. | A = P-wave arrival; B = S-wave arrival; C = surface wave arrival | Student Response | | E. | A = surface wave arrival; B = S-wave arrival; C = P-wave arrival |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Which of the following statements concerning earthquake intensity is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Intensity at a location near an earthquake can be specified by asking people what they saw and felt. |  | | B. | The intensity depends upon type of rock or sediment making up the ground. |  | | C. | Building style affects the felt intensity. |  | | Student Response D. | To determine intensity the type of seismometer recording the waves must be known. | Student Response | | E. | It is possible for two people at the same distance from an earthquake epicentre to report different felt intensities. |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | Which one of the following aspects of earthquakes can be "predicted" most reliably? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | The location on the globe of the next mega-quake. |  | | Student Response B. | The probability that an earthquake of a given magnitude will occur within the next 20 years, at some locations along the San Andreas Fault | Student Response | | C. | The time (to within 24 hours) of earthquake occurrences at locations on the San Andreas Fault near Los Angeles. |  | | D. | The size of the next earthquake that will occur in the Puget Sound area |  | | E. | The time (within a year) when a mega-quake will rock the Cascadia region. |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | You have just heard that a large earthquake occurred 320 kilometres below the surface of the Earth at a spreading zone. Why should you be skeptical? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | No earthquakes ever occur in spreading zones. |  | | B. | Earthquakes only occur at less then 15 km depth. |  | | C. | Only small earthquakes occur below 200km depth. |  | | Student Response D. | Spreading zones are more likely to have shallow, weak earthquakes. | Student Response | | E. | Seismic energy can never escape a soft spreading zone where rocks are deforming plastically. |  | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | At a collisional plate boundary, \_\_\_\_\_ faults are common. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | right-lateral |  | | B. | transform |  | | C. | normal |  | | D. | strike-slip |  | | Student Response E. | thrust (reverse) | Student Response | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | Which recent earthquake is MOST similar to the mega-earthquake that is predicted to occur along the Cascadia subduction zone? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | 2003 Bam, Iran |  | | B. | 2004 Parkfield, California |  | | Student Response C. | 2004 Sumatra, Indonesia | Student Response | | D. | 1999 Izmit, Turkey |  | | E. | 2001 Pacific Northwest |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | The Himalayas formed along what type of tectonic plate boundary? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | extensional |  | | B. | divergent |  | | Student Response C. | convergent | Student Response | | D. | strike-slip |  | | E. | transform |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Which of the following is not an aspect of earthquake prediction? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | Why does an earthquake occur? | Student Response | | B. | Where will an earthquake occur? |  | | C. | When will an earthquake occur? |  | | D. | What will the effects of an earthquake be? |  | | E. | What is the likelihood of a huge earthquake in Cascadia? |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | The process of establishing a model of the Earth by "inverting" seismic data involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | calculating the seismic signals by knowing what’s inside the Earth |  | | B. | finding out where the earthquake occurred using several seismic signals |  | | C. | determining how rapidly seismic wave energy is dissipated within the Earth |  | | Student Response D. | using large quantities of seismic data to figure out details about Earth’s structure | Student Response | | E. | using Earth’s known structure to build a graph showing the travel times of a large number of seismograms |  | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | The ring of fire refers to \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the Hawaiian Islands, which were formed by volcanism | Student Response | | B. | the Japan, Alaska, and Philippine volcanic arcs, which are the most active in the world | Student Response | | Student Response C. | the mid-ocean ridge at the bottom of the Atlantic ocean, which is an active spreading center | Student Response | | D. | the boundaries of the most tectonically active plate, the Pacific Plate | Student Response | | E. | any circular volcanic arc in the Pacific Ocean | Student Response | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | P-waves can travel through \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | solids only |  | | B. | liquids only |  | | C. | solids and liquids only |  | | Student Response D. | gases, liquids, and solids | Student Response | | E. | a vacuum |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | Which of the numbered areas shown in the map experiences ONLY shallow earthquakes? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | 1=the mid-Atlantic ridge | Student Response | | B. | 2=the west coast of South America |  | | C. | 3=the south coast of Alaska |  | | D. | 4=the east coast of Japan |  | | E. | 5=the Fiji Islands region |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | How do seismic waves change as they travel great distances? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | They get stronger. |  | | B. | They accelerate (increase in speed). |  | | Student Response C. | Their high frequencies decay leaving behind slow rolling waves. | Student Response | | D. | Their low frequencies decay leaving behind rapid oscillating waves. |  | | E. | Their energy steadily increases. |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | At a transform plate boundary \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | tensional stress builds up and produces a normal fault |  | | B. | tensional stress builds up and produces a strike slip fault |  | | C. | tensional stress builds up and produces a reverse fault |  | | D. | shear stress builds up and produces a reverse fault |  | | Student Response E. | shear stress builds up and produces a strike slip fault | Student Response | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Which of the following wave types travels slowest through the interior rocks? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | P-waves |  | | B. | S-waves | Student Response | | Student Response C. | Rayleigh waves |  | | D. | Love waves |  | | E. | They all travel with the same velocity |  | | | | Score: | 0/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | The so-called "New Madrid" earthquakes that occur in the central US near the states of Missouri, Arkansas, Kentucky and Tennessee are MOST LIKELY due to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | an ancient, buried subduction zone |  | | B. | slipping at the top of a subducting plate |  | | C. | ancient volcanoes in the area |  | | D. | plate activity along the Mississippi transform zone |  | | Student Response E. | fault motion associated with an ancient, buried, divergent boundary | Student Response | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Which of the statements below BEST describes the relationship between building height and earthquake frequency? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Shorter buildings collapse more easily in a lower frequency earthquake and higher buildings collapse more easily in a higher frequency earthquake. |  | | B. | Both high and short buildings collapse easily in low frequency earthquakes. |  | | Student Response C. | Shorter buildings collapse more easily in a high frequency earthquake and higher buildings collapse more easily in a low frequency earthquake. | Student Response | | D. | No relationship exists between building height and earthquake frequency. |  | | E. | High and low frequency earthquakes do not affect buildings in dry sand. |  | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Both the Richter and Moment Magnitude scales are used to quantify \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the difference in travel time between P- and S-waves |  | | B. | amount of damage to manmade structures |  | | C. | the intensity of ground motion felt as earthquake energy passes a particular location |  | | D. | the extent of disaster (cost in lives and dollars) caused by an earthquake |  | | Student Response E. | energy released at the hypocenter of an earthquake | Student Response | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | \_\_\_\_\_\_ waves are transverse waves that propagate by shearing or shaking particles in their path at right angles to the direction of advance. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Love |  | | B. | Rayleigh |  | | C. | P- |  | | D. | S- |  | | Student Response E. | Both Love and S | Student Response | | | | Score: | 1/1 | |

LANDSLIDE

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | In the diagram (to the right) of forces on a hill slope, which letter refers to the shear stress? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. |  |  | | B. |  |  | | C. |  |  | | Student Response D. |  | Student Response | | E. |  |  | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | The ‘prime mover’ of landslides is \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | earthquakes |  | | Student Response B. | gravity | Student Response | | C. | deforestation |  | | D. | heavy rainfall |  | | E. | u-hauls |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Shear strength directly depends on which of the following? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | slope composition | Student Response | | B. | slope gradient |  | | C. | shear stress |  | | D. | earthquake frequencies |  | | E. | gravity |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | Which of the following was NOT a factor that contributed to the debris slide at Vaiont Dam, Italy in 1963? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the presence of limestone and clay |  | | B. | fractured bedrock |  | | C. | an earthquake | Student Response | | Student Response D. | changes in water pressure due to filling/draining of dam |  | | E. | anthropogenic (human) activity |  | | | | Score: | 0/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | The NUMBER ONE underlying cause of landslides is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | global warming |  | | B. | rock composition |  | | Student Response C. | amount of precipitation |  | | D. | gravity | Student Response | | E. | vegetation |  | | | | Score: | 0/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Which of the following statements is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Shear strength counteracts shear stress. |  | | B. | The term landslide is a generic term and can include mass movements of varying velocities and types. |  | | Student Response C. | The factor of safety is the ratio of shear stress to shear strength. | Student Response | | D. | Shear stress acts perpendicular to normal stress. |  | | E. | Slope failure will occur when the factor of safety is less than 1.0. |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | Most landslides on record in this province are located in southern British Columbia because \_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the population density is much higher in southern B.C. and so landslides are considered natural disasters | Student Response | | B. | landslides are uncommon in northern B.C. |  | | C. | southern B.C. is more at risk from landslides associated with subduction zone earthquakes |  | | D. | southern B.C. receives more precipitation than the rest of the province |  | | Student Response E. | southern B.C. has steeper slopes than the rest of the province |  | | | | Score: | 0/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | Which of the following slopes is LEAST likely to fail? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a quick clay slope at 5 degrees |  | | B. | a sand slope at 40 degrees |  | | Student Response C. | a rock slope at 40 degrees | Student Response | | D. | a rock slope at 90 degrees |  | | E. | a clay slope at 70 degrees |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | The difference between an earth fall and a debris fall is that: | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | an earth fall is made of sorted soil and a debris fall is made of unsorted material | Student Response | | B. | an earth fall is made of bedrock and a debris fall is made of sorted soil |  | | C. | an earth fall is made of both bedrock and unsorted soil and a debris fall is made only of sorted soil |  | | D. | an earth fall requires that material free-falls and a debris fall requires that material bounces down a slope |  | | E. | an earth fall requires a shallow slope while a debris falls require very steep slopes |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | Tensioning a rock anchor helps to stabilize a slope by\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | reducing gravity |  | | B. | preventing rain water from infiltrating into the slope and reducing the effective stresses |  | | C. | breaking the rock, allowing it to be easily removed |  | | Student Response D. | increasing the normal stress and therefore increasing the frictional strength | Student Response | | E. | increasing the tensile strength of the slope |  | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | In the Vaiont Dam disaster, \_\_\_\_\_\_\_\_ was both a cause and a trigger for the slide. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | overloading |  | | Student Response B. | water | Student Response | | C. | inherently weak materials in the slope |  | | D. | adverse bedding orientation |  | | E. | removal of vegetation |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Lion’s Bay debris retention structure is designed to \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | stop the water and debris in a debris flow |  | | B. | stop the water in a debris flow |  | | C. | slow the water in debris flow |  | | Student Response D. | stop the debris in a debris flow | Student Response | | E. | lower property values downslope |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | What is the MOST important function of water in a debris flow? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | freeze/thaw within rock fractures initiates a debris flow |  | | B. | water is quite dense and adds weight to the flow |  | | Student Response C. | a fully saturated debris flow is able to flow like a fluid | Student Response | | D. | trees are more easily added to the flow if they are wet |  | | E. | water molecules hold the particles of the flow together |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | Erosion will affect both shear stress and shear strength. |  | | Student Response B. | The likelihood of a landslide is increased when material is added to the resisting mass. | Student Response | | C. | The composition of a slope determines its internal shearing resistance. |  | | D. | The presence of water in varying amounts can either increase OR decrease shear strength. |  | | E. | Vegetation on a slope can increase shear strength. |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | For the valley shown in the diagram (right), the MOST LIKELY slope failure modes originating from the western (W) and eastern (E) slopes would be \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | topples (W) and translational slides (E) | Student Response | | B. | spreads (W) and rockfalls (E) |  | | C. | translational slides (W) and topples (E) |  | | D. | rockfalls (W) and rotational slides (E) |  | | E. | translational slides (W) and rotational slides (E) |  | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Increased vulnerability to landslide hazards may result from all of the following EXCEPT \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | logging on unstable slopes |  | | B. | deep infiltration of water |  | | C. | clearcutting |  | | Student Response D. | legislation | Student Response | | E. | urbanization |  | | | | Score: | 1/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | The 1963 Vaiont landslide disaster \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | represents a strong case against the use of hydroelectric power |  | | B. | occurred despite a detailed investigation and analysis of the slope and its stability state |  | | C. | balanced public safety with the economics of constructing the dam |  | | D. | occurred with very little warning |  | | Student Response E. | represents a series of lessons that must be learned and taken very seriously by future dam builders | Student Response | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Landslides are most likely to occur if \_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | the factor of safety goes below 1.0 | Student Response | | B. | the shear stress is exceeded by the shear strength |  | | C. | the water is evacuated from a slope |  | | D. | the weather has been dry for an extended period of time |  | | E. | vegetation is covering the slope |  | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Quick clays often lead to what type of landslide? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | rotational slides |  | | B. | translational slides |  | | Student Response C. | spreads | Student Response | | D. | flows |  | | E. | topples |  | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | A slump \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | is a translational slide |  | | B. | is a faster version of rock creep |  | | C. | is characterized by the forward rotation of material about a pivot point on a slope |  | | D. | requires that materials behave in a fluid-like manner |  | | Student Response E. | occurs along a concave surface | Student Response | | | | Score: | 1/1 | |

STORM

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | Energy in the form of hot humid air reaches storms through \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | transpiration |  |  | | B. | conduction |  |  | | Student Response C. | advection | 100% | Student Response | | D. | downdrafts |  |  | | E. | condensation |  |  | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | The longest lived storm is a \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | tornado |  |  | | B. | supercell thunderstorm |  |  | | Student Response C. | multicell thunderstorm | 0% |  | | D. | hurricane |  | Student Response | | E. | hailstorm |  |  | | | | Score: | 0/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | The most likely time of day for thunderstorm formation is late afternoon and early evening because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the warmest time of the day is at noon |  |  | | B. | solid Earth surfaces cool faster than oceanic surfaces |  |  | | Student Response C. | it is when the maximum amount of heat has accumulated | 100% | Student Response | | D. | trigger mechanisms are more frequent at this time |  |  | | E. | the Earth surfaces cool in the evening. |  |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | Tornado translation speeds are \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | between 0 and 100 km/h | 100% | Student Response | | B. | between 100 and 200 km/h |  |  | | C. | between 200 and 300 km/h |  |  | | D. | between 300 and 400 km/h |  |  | | E. | between 400 and 500 km/h |  |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Which of the following is NOT a hazard of thunderstorms? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | lightning |  |  | | B. | downbursts |  |  | | C. | gustfronts |  |  | | Student Response D. | storm surge | 100% | Student Response | | E. | hail |  |  | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | The flat top of a thunderstorm is called a/an \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | wall cloud |  |  | | B. | flanking line |  |  | | C. | beavers tail |  |  | | Student Response D. | anvil cloud | 100% | Student Response | | E. | mushroom cloud |  |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | Given the saturation vapour pressure curve below, an air parcel at 20 °C and vapour pressure 6 kPa is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | supersaturated | 100% | Student Response | | B. | saturated |  |  | | C. | unsaturated |  |  | | D. | dry |  |  | | E. | insufficient information to determine |  |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | Mammatus clouds \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | are an indicator of tornadic thunderstorms |  |  | | B. | form on top of the anvil |  |  | | C. | form on the wall cloud |  |  | | Student Response D. | form on the bottom of the anvil | 100% | Student Response | | E. | are an indicator of hail storms |  |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | A measure of the total amount of latent heat released in a thunderstorm is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | storm depth |  |  | | B. | storm diameter |  |  | | Student Response C. | rainfall rate | 100% | Student Response | | D. | tornado wind speed |  |  | | E. | amount of lightning |  |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | At equilibrium, air that holds all the water vapour that it can is called \_\_\_\_\_\_ | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | warm |  |  | | B. | cold |  |  | | C. | sinking |  |  | | D. | aspirated |  |  | | Student Response E. | saturated | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | The exhaust of air from the top of the hurricane occurs because \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | as air gets closer to the eye, strong winds push the warm column of air up through the core |  |  | | B. | the buoyancy force between the core at the top of the hurricane and the surrounding cold air pushes air outward away from the warm core |  |  | | C. | warm air is more dense than cold air |  |  | | Student Response D. | the pressure gradient force between the warm core at the top of the hurricane and the surrounding cold air pushes air outward from the core | 100% | Student Response | | E. | warm air always rises |  |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Dust storms are called \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | tornadoes |  |  | | B. | derechos |  |  | | C. | gust fronts |  |  | | Student Response D. | haboobs | 100% | Student Response | | E. | downbursts |  |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | In visible-light weather satellite images, thunderstorms are recognizable by their \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | well-defined eye |  |  | | B. | wave-like appearance |  |  | | Student Response C. | tops casting shadows on the ground | 100% | Student Response | | D. | lightning causing the whole cloud to glow during the daytime |  |  | | E. | thunder that creates sound waves that propagate to the satellite |  |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | In North America most thunderstorms form \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | on the Canadian prairies |  |  | | Student Response B. | in the southeast US | 100% | Student Response | | C. | near the east coast |  |  | | D. | on the west coast |  |  | | E. | in Oklahoma |  |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | Thunderstorm tops often reach an altitude of roughly \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 10 m |  |  | | B. | 100 m |  |  | | C. | 1000 m |  |  | | Student Response D. | 10 km | 100% | Student Response | | E. | 100 km |  |  | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Which disaster scale is used to classify the intensity of tornadoes in North America? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | linear |  |  | | B. | Richter |  |  | | Student Response C. | Saffir-Simpson | 0% |  | | D. | Torro |  |  | | E. | Fujita |  | Student Response | | | | Score: | 0/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | Storms get most of their energy from \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | sensible heat |  |  | | Student Response B. | latent heat | 100% | Student Response | | C. | radioactive decay |  |  | | D. | Coriolis force |  |  | | E. | wind shear |  |  | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | When water condenses in an air parcel, it \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | increases the static potential of an air parcel |  |  | | B. | takes heat from the surrounding air |  |  | | C. | increases the mixing ratio (r) |  |  | | D. | decreases the saturation mixing ratio rs |  |  | | Student Response E. | releases heat to the surrounding air | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Which statement is TRUE about thunderstorms? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | The cumulus stage consists of updrafts and downdrafts. |  |  | | Student Response B. | The mature stage consists of updrafts and precipitation. | 100% | Student Response | | C. | The cumulus stage usually has an anvil. |  |  | | D. | The dissipating stage consists of only updrafts. |  |  | | E. | The heaviest rain is likely during the dissipating stage. |  |  | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | Name the grey-shaded cloud shown in this sketch. Hint: it is sometimes seen before tornadoes form. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | flanking line |  |  | | B. | funnel |  |  | | C. | anvil |  |  | | Student Response D. | wall | 100% | Student Response | | E. | haboob |  |  | | | | Score: | 1/1 | |  | | |

WAVES /TSUNAMI

|  |  |
| --- | --- |
| **1.** |  |
|  | |  |  | | --- | --- | | Based on the diagram above, the wave height is represented by line \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | A |  |  |  | | B. | B |  |  |  | | C. | C |  |  |  | | Student Response D. | D | 100% | Student Response |  | | E. | E |  |  |  | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | If you were the captain of a submarine, to what minimum depth would you submerge your vessel in order to avoid the effects of waves with wavelengths of 200 m? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | 5 m |  |  |  | | B. | 10 m |  |  |  | | C. | 30 m |  |  |  | | D. | 50 m |  |  |  | | Student Response E. | 100 m | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | A wave is a mechanical expression of moving \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | water |  |  |  | | B. | particle |  |  |  | | C. | force |  |  |  | | D. | wind |  |  |  | | Student Response E. | energy | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | The best place to observe a SEICHE is \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | 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 lake | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Maximum wave heights are highest in the Antarctic Ocean because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | wind duration is typically days to weeks |  |  |  | | B. | waves travel faster in colder waters |  |  |  | | C. | winds are strongest in the Antarctic Ocean |  |  |  | | D. | all waves are deep water waves |  |  |  | | Student Response E. | the fetch is very long | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | 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 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | Which of the following is FALSE about tsunami? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | The trough of a tsunami can arrive first, sucking the ocean water out away from land. |  |  |  | | B. | The crest of a tsunami can arrive first, giving little warning to people near the coastline. |  |  |  | | Student Response C. | The second tsunami wave to arrive is larger than the first one. | 100% | Student Response |  | | D. | Tsunami are difficult to detect in water greater than 3000 meters depth. |  |  |  | | E. | Tsunami can travel about the speed of a jet plane. |  |  |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | Imagine a huge earthquake occurs off the coast of Vancouver Island, like the one that occurred in 1700. People in Japan would like to know something about the tsunami risk from the earthquake. Which ASPECT OF PREDICTION can we be most confident about (before the tsunami arrives in Japan)? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | arrival time |  | Student Response |  | | B. | destruction potential |  |  |  | | C. | wave period |  |  |  | | Student Response D. | wave height | 0% |  |  | | E. | wave energy |  |  |  | | | | Score: | 0/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Which does NOT contribute to the generation of a fully developed sea? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | fetch |  |  |  | | Student Response B. | constructive interference | 100% | Student Response |  | | C. | wind speed |  |  |  | | D. | wind duration |  |  |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | Which of the following phrases will make this a TRUE statement?  "When a tsunami alert is issued after an earthquake occurs off the Alaskan coastline, \_\_\_\_\_\_\_\_." | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | boats must be securely anchored in harbors to avoid destruction |  |  |  | | B. | residents living near protected inlets and harbors on the west coast of Vancouver Island do not have to evacuate |  |  |  | | Student Response C. | residents may retreat to higher floors of buildings if evacuation from the coastline is impossible | 100% | Student Response |  | | D. | residents on the west coast of Vancouver Island should wait for the typical sea level drawdown before evacuating |  |  |  | | E. | coastlines are safe after the fourth wave has arrived |  |  |  | | | | Score: | 1/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | When a wave with L=200 meters passes over water with d=10 meters, the motion of the water particles at a depth of 8 meters \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | tends to form ripples on the seafloor |  |  |  | | B. | traces circular orbits |  |  |  | | C. | causes water to move rapidly towards the shore |  |  |  | | Student Response D. | will be in flattened ellipses | 100% | Student Response |  | | E. | will be minimal or cease entirely |  |  |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Which of the following is TRUE about wave speed? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | 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 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | If you were sitting in a kayak (NOT paddling) in the middle of Burrard Inlet (average depth=25 m) on a day when the wind had generated 1-metre long waves, what motion would you and your kayak undergo as the waves pass by? Assume there is no current. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | You would bob straight up and down. |  |  |  | | B. | You would move back and forth horizontally. |  |  |  | | Student Response C. | You would describe a circular orbital motion, without net displacement. | 100% | Student Response |  | | D. | You would move along in the same direction as the wave is traveling, at the same speed as the wave. |  |  |  | | E. | You would describe a circular orbital motion, slowly advancing in the direction of the wave. |  |  |  | | | | Score: | 1/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | 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** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | southwest to northeast |  |  |  | | B. | northwest to southeast |  |  |  | | C. | south to north |  |  |  | | D. | north to south |  |  |  | | Student Response E. | southeast to northwest | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | There are more tsunami in the Pacific Ocean because \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | 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 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | 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** | **Feedback** | | --- | --- | --- | --- | --- | | A. | Conditions are very calm and you recommend stopping the ship for a swim. |  |  |  | | Student Response B. | Conditions are fine and you recommend that the ship proceed on course. | 100% | Student Response |  | | C. | It’s likely that the ship is headed into a hurricane and it would be wise to change course. |  |  |  | | D. | You recommend that everyone be kept inside because the danger of getting swept overboard is high. |  |  |  | | E. | It’s time to consider making an emergency rescue call to the Canadian Coast Guard. |  |  |  | | | | Score: | 1/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | The restoring force for capillary waves is \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | gravity |  |  |  | | B. | relaxation |  |  |  | | C. | Coriolis force |  |  |  | | D. | density |  |  |  | | Student Response E. | surface tension | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Waves in the ocean typically have \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | 200 km/hour wave speeds |  |  |  | | B. | 10 – 15 m wave heights |  |  |  | | C. | 2 to 3 second periods |  |  |  | | D. | 8 m significant wave heights |  |  |  | | Student Response E. | 60 – 150 m wavelengths | 100% | Student Response |  | | | | Score: | 1/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | In the world’s oceans, waves with the highest significant wave heights can be found in the \_\_\_\_\_\_ | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | largest ocean in the world, the Pacific Ocean |  |  |  | | Student Response B. | ocean with the longest fetch, the Southern Ocean | 100% | Student Response |  | | C. | ocean with wide and shallow margins, the Atlantic Ocean |  |  |  | | D. | ocean that circumnavigates the Arctic, the Arctic Ocean |  |  |  | | E. | ocean off the Cape of Good Hope, where rogue waves are common |  |  |  | | | | Score: | 1/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | When a beachfront property has a flat, wide, sandy beach year-round, it is located in an area \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | **Feedback** | | --- | --- | --- | --- | --- | | A. | where sediment erosion processes dominate |  |  |  | | B. | behind a groin which faces the wave front |  |  |  | | C. | with plunging waves |  |  |  | | D. | with high wave energy |  |  |  | | Student Response E. | where the material removed by the backwash equals that delivered by the swash. | 100% | Student Response |  | | | | Score: | 1/1 | |