EOSC 114  
 LANDSLIDES

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| **1.** |  |
|  | |  |  | | --- | --- | | Which would NOT cause a landslide? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Adding material to the driving mass relative to the resisting mass. |  |  | | Student Response B. | Removing material from the resisting mass relative to the driving mass. | 0% |  | | C. | Saturating only the driving mass. |  |  | | D. | Removing material from the resisting mass and adding the same amount of material to the driving mass. |  |  | | E. | Adding the same amount of material to the driving mass and the resisting mass. 100% |  | Student Response | | | | Score: | 0/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | A landslide trigger \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | can be anthropogenic in origin 100% | 100% | Student Response | | B. | is the same thing as a landslide cause |  |  | | C. | in British Columbia is commonly a very large earthquake (> M 9.0) |  |  | | D. | rarely involves water |  |  | | E. | is defined as the frequency a landslide occurs |  |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Quick clays can liquefy only after significant shaking such as during an earthquake. 100% |  | Student Response | | B. | The shear strength of sediments is lower than that of rocks. |  |  | | Student Response C. | The area within and near UBC is in danger of landslides. | 0% |  | | D. | Landslide velocities can range from a few millimeters/year to a few meters/second. |  |  | | E. | Gravity is the ultimate cause of all landslides. |  |  | | | | Score: | 0/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | With regard to landslides, shear strength is \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the cohesion between grains in a rock or sediment sample |  |  | | B. | the degree to which the surface tension of water holds material together |  |  | | C. | a combination of all the factors causing geologic materials to resist shear stress 100% |  | Student Response | | D. | a combination of composition, density, and electromagnetic attraction within geologic materials |  |  | | Student Response E. | slope steepness plus composition | 0% |  | | | | Score: | 0/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Compared to developed countries, countries in the developing world are likely to have \_\_\_\_\_ due to landslides. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | higher property damage and lower death counts | 0% |  | | B. | lower property damage and higher death counts 100% |  | Student Response | | C. | higher property damage and higher death counts |  |  | | D. | lower property damage and lower death counts |  |  | | E. | about the same property damage and lower death counts |  |  | | | | Score: | 0/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | Calculate the return period of a debris flows in British Columbia using the following data:  1930: Meager Creek/Pemberton 1957: Prince Rupert 1972: Sparwood 1990: Philpott Road in Kelowna | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 10 years |  |  | | Student Response B. | 15 years | 100% | Student Response | | C. | 27 years |  |  | | D. | 30 years 100% |  |  | | E. | 60 years |  |  | | | | Score: | 1/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | A landslide is more likely to occur when \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Gp > Gt |  |  | | Student Response B. | Gt > Gp 100% | 100% | Student Response | | C. | Gt = Gp |  |  | | D. | (Gp + Gt) < gravity |  |  | | E. | (Gp – Gt) < gravity |  |  | | | | Score: | 1/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | The factor of safety is the ratio of \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Gp to Gt |  |  | | B. | shear stress to shear strength |  |  | | Student Response C. | shear strength to shear stress 100% | 100% | Student Response | | D. | the sum of Gp and Gt to shear strength |  |  | | E. | shear strength divided by Gp |  |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Which of the following factors would be MOST likely to trigger a landslide on the coast of BC? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | earthquake |  |  | | B. | undercutting |  |  | | C. | overloading |  |  | | Student Response D. | heavy rainfall 100% | 100% | Student Response | | E. | removal of vegetation |  |  | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | Which statement about flows is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | Flows behave like fluids. | 0% |  | | B. | Debris flows have higher water content than debris avalanches. |  |  | | C. | An example of a very fast moving flow (> 75 km/hour) is rock creep. 100% |  | Student Response | | D. | Debris flows are common in British Columbia coastal mountains. |  |  | | E. | Flows can have variable water content. |  |  | | | | Score: | 0/1 | |  | | |
| **11.** |  |
|  | |  |  | | --- | --- | | Water in a layer of unconsolidated sediment can lead to landslides as a result of \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | increased cohesion |  |  | | B. | vegetation growth |  |  | | C. | decreased pore water pressure |  |  | | Student Response D. | increased pore water pressure | 100% | Student Response | | E. | a decrease in the slide mass |  |  | | | | Score: | 1/1 | |  | | |
| **12.** |  |
|  | |  |  | | --- | --- | | Shear strength directly depends on which of the following? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | slope composition | 100% | Student Response | | B. | slope gradient |  |  | | C. | shear stress |  |  | | D. | earthquake frequencies |  |  | | E. | gravity |  |  | | | | Score: | 1/1 | |  | | |
| **13.** |  |
|  | |  |  | | --- | --- | | Lion’s Bay debris retention structure is designed to \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | stop the water and debris in a debris flow | 0% |  | | B. | stop the water in a debris flow |  |  | | C. | slow the water in debris flow |  |  | | D. | stop the debris in a debris flow 100% |  | Student Response | | E. | lower property values downslope |  |  | | | | Score: | 0/1 | |  | | |
| **14.** |  |
|  | |  |  | | --- | --- | | Which factor of safety represents the most stable slope? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 0.5 |  |  | | B. | 1 |  |  | | Student Response C. | 1.5 | 0% |  | | D. | 2 |  |  | | E. | 2.5 100% |  | Student Response | | | | Score: | 0/1 | |  | | |
| **15.** |  |
|  | |  |  | | --- | --- | | If a slope has a calculated factor of safety = 1.05 it means that a landslide \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | has already occurred |  |  | | B. | will happen within 24 hours |  |  | | Student Response C. | is likely to occur in the future 100% | 100% | Student Response | | D. | is highly unlikely |  |  | | E. | will never occur |  |  | | | | Score: | 1/1 | |  | | |
| **16.** |  |
|  | |  |  | | --- | --- | | Water may INCREASE the likelihood of a landslide by \_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | increasing cohesion between particles in unconsolidated sediment |  |  | | B. | decreasing the weight of the resisting mass |  |  | | C. | reducing pore pressure at the base of a potential slide mass |  |  | | Student Response D. | causing expansion of clay minerals | 100% | Student Response | | E. | introducing cement into pore spaces between unconsolidated sediment |  |  | | | | Score: | 1/1 | |  | | |
| **17.** |  |
|  | |  |  | | --- | --- | | Landslides are most likely to occur if \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the factor of safety goes below 1.0 100% |  | Student Response | | Student Response B. | the shear stress is exceeded by the shear strength | 0% |  | | 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: | 0/1 | |  | | |
| **18.** |  |
|  | |  |  | | --- | --- | | Which is TRUE of a debris avalanche? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Increasing the water content increases viscosity, which decreases velocity and destruction. |  |  | | 100%B. | Increasing the water content decreases viscosity, which increases velocity and destruction. |  | Student Response | | Student Response C. | Increasing the water content decreases viscosity, which decreases velocity and destruction. | 0% |  | | D. | Decreasing the water content decreases viscosity, which decreases velocity and destruction. |  |  | | E. | Decreasing the water content increases viscosity, which increases velocity and destruction. |  |  | | | | Score: | 0/1 | |  | | |
| **19.** |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | 100%A. | The 2005 La Conchita landslide was totally unexpected as the cause for previous landslides in the area had been dealt with. |  | Student Response | | B. | A landslide trigger is the process that pushes the factor of safety to an unsafe number. |  |  | | C. | The most common landslide trigger in western British Columbia is heavy precipitation. |  |  | | D. | One of the underlying causes of the landslide at Frank, Alberta was coal mining. |  |  | | E. | One hypothesis to explain how sturzstroms can flow extremely far and fast is acoustic fluidization. |  |  | | | | Score: | 0/1 | |  | | |
| **20.** |  |
|  | |  |  | | --- | --- | | Which of the following is the BEST example of rapid erosion? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | debris flows occurring on steep slopes due to deforestation and removal of the protective vegetation cover |  |  | | B. | liquefaction of a sensitive clay layer in a slope leading to its rapid failure |  |  | | 100%C. | undercutting of a slope through water action leading to a series of retrogressing landslides |  | Student Response | | D. | a series of rockfalls that occur due to changes in weather in winter and spring |  |  | | Student Response E. | wave action on highly resistant rock | 0% |  | | | | Score: | 0/1 | |  | | |

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| **1.** |  |
|  | |  |  | | --- | --- | | Which of the following is NOT an anthropogenic trigger of landslides? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | deforestation |  | | Student Response B. | irrigation |  | | C. | glacial erosion 100% | Student Response | | D. | mining |  | | E. | climate change |  | | | | Score: | 0/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | With regard to landslide hazards, which location would be the LEAST safe to build your house? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | A |  | | B. | B |  | | Student Response C. | C |  | | D. | D 100% | Student Response | | E. | E |  | | | | Score: | 0/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | In the factor of safety calculation, increasing pore pressures act to destabilize the slope by \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | adding weight to the slope |  | | B. | decreasing frictional strength 100% | Student Response | | C. | decreasing the cohesive strength |  | | Student Response D. | increasing the driving force |  | | E. | decreasing the driving shear forces |  | | | | Score: | 0/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | A landslide trigger \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | can be anthropogenic in origin 100% | Student Response | | B. | is the same thing as a landslide cause |  | | C. | in British Columbia is commonly a very large earthquake (> M 9.0) |  | | D. | rarely involves water |  | | E. | is defined as the frequency a landslide occurs |  | | | | Score: | 1/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | The enormous 1980 Mount St. Helens rockslide \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | was triggered following the massive eruption of the volcano |  | | B. | triggered an earthquake which in turn triggered the volcanic eruption |  | | C. | triggered the massive eruption of the volcano 100% | Student Response | | D. | was triggered by lahars that were flowing down the slope following the eruption |  | | E. | was triggered independently of the volcanic activity |  | | | | Score: | 0/1 | |  | | |

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| **1.** |  |
|  | |  |  | | --- | --- | | Which landslide type is most likely to exhibit SLOW movement? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | rotational slide 100% | Student Response | | Student Response B. | debris flow |  | | C. | quick clay flow |  | | D. | rock fall |  | | E. | massive rock avalanche |  | | | | Score: | 0/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | Water may INCREASE the likelihood of a landslide by \_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Student Response A. | increasing cohesion between particles in unconsolidated sediment |  | | B. | decreasing the weight of the resisting mass |  | | C. | reducing pore pressure at the base of a potential slide mass |  | | D. | causing expansion of clay minerals 100% | Student Response | | E. | introducing cement into pore spaces between unconsolidated sediment |  | | | | Score: | 0/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | With regard to landslide hazards, which location would be the LEAST safe to build your house? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | A |  | | B. | B |  | | C. | C |  | | D. | D 100% | Student Response | | E. | E |  | | | | Score: | 0/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | The uniform movement of coherent blocks of material along well-defined, inclined planar surfaces describes a \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | debris slide |  | | B. | complex slide |  | | Student Response C. | slump |  | | D. | rock block slide 100% | Student Response | | E. | rotational slide |  | | | | Score: | 0/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | All landslide flows are characterized by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | channelization |  | | B. | debris fans |  | | C. | fully saturated debris |  | | D. | velocities in excess of 30 km/hour |  | | Student Response E. | turbulent flow 100% | Student Response | | | | Score: | 1/1 | |  | | |

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| **1.** |  |
|  | |  |  | | --- | --- | | Rockfalls refer to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | large blocks of bedrock sliding on an inclined surface |  |  | | B. | fragmented rock that flows at very high velocities for long distances |  |  | | C. | a cement like mixture of rock, soil and water that travels rapidly down a stream channel |  |  | | D. | a flow of weathered rock |  |  | | Student Response E. | individual rocks that free fall from the face of a cliff 100% | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **2.** |  |
|  | |  |  | | --- | --- | | If the driving forces acting on a landslide are two times greater than the resisting forces opposing such movement, its factor of safety is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 1.5 |  |  | | B. | 0.2 |  |  | | C. | 20 |  |  | | Student Response D. | 0.5 | 100% | Student Response | | E. | 2 |  |  | | | | Score: | 1/1 | |  | | |
| **3.** |  |
|  | |  |  | | --- | --- | | Which of the following factors does NOT play a role in landslide activity? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | geology |  |  | | Student Response B. | Wind 100% | 100% | Student Response | | C. | water |  |  | | D. | tree roots |  |  | | E. | weathering |  |  | | | | Score: | 1/1 | |  | | |
| **4.** |  |
|  | |  |  | | --- | --- | | British Columbia has the highest landslide frequency in Canada because of all the following characteristics EXCEPT \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | poorly engineered forestry roads | 0% |  | | B. | high precipitation, including winter rain and snow |  |  | | C. | Leda clay accumulation in river deltas 100% |  | Student Response | | D. | mountains with steep slopes |  |  | | E. | frequent temperature fluctuation above and below water's freezing point |  |  | | | | Score: | 0/1 | |  | | |
| **5.** |  |
|  | |  |  | | --- | --- | | Which of the following factors is expected to lead to INCREASED landslide activity and fatalities with time? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | deforestation in landslide-prone areas |  |  | | B. | changing global climate patterns |  |  | | C. | increasing population density in mountainous areas |  |  | | D. | expanding development onto undeveloped slopes |  |  | | Student Response E. | all of the above | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| **6.** |  |
|  | |  |  | | --- | --- | | An unstable slope may be stabilized by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | removing material from the toe of the slope |  |  | | B. | steepening the slope |  |  | | C. | applying a load to the top of the slope |  |  | | D. | draining the slope 100% |  | Student Response | | Student Response E. | all of the above | 0% |  | | | | Score: | 0/1 | |  | | |
| **7.** |  |
|  | |  |  | | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:   [-----] slowest or lowest velocity  [-----]  [-----]  [-----] fastest or highest velocity | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:   [Slump] slowest or lowest velocity  [Debris flow]  [Earth creep]  [Rock fall] fastest or highest velocity | 0.0% | Put these landslides types in order of INCREASING velocity of their movement:   [Earth creep] slowest or lowest velocity  [Slump]  [Debris flow]  [Rock fall] fastest or highest velocity (100.0%) | | | | Score: | 0/1 | |  | | |
| **8.** |  |
|  | |  |  | | --- | --- | | Quick clay problems are common in what part of Canada? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Nova Scotia |  |  | | B. | Alberta |  |  | | C. | British Columbia |  |  | | Student Response D. | Quebec | 100% | Student Response | | E. | Manitoba |  |  | | | | Score: | 1/1 | |  | | |
| **9.** |  |
|  | |  |  | | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Removal of water from a landslide through drainage helps to stabilize slopes." | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | True | 100% | True | | | | Score: | 1/1 | |  | | |
| **10.** |  |
|  | |  |  | | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Ancient landslides that have since become stable may reactivate due to urban development and human activity." | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | False | 0% | True | | | | Score: | 0/1 | |  | | |

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| 1. |  |
|  | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | "Landslide" is a general term that includes mass wasting events moving at a range of velocities. |  |  | | B. | Landslides are more likely to occur in mountainous areas with abundant precipitation and exposed soil. |  |  | | Student Response C. | Landslides occur when the resisting mass exceeds the driving mass. | 100% | Student Response | | D. | Faster moving landslides generate more fatalities. |  |  | | E. | Globally, landslide fatalities are typically underestimated as many fatalities are associated with the landslide trigger (earthquakes, floods, etc.) and not the landslide. |  |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | Which of the following does NOT increase the likelihood of a landslide in British Columbia? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | frequent earthquakes |  |  | | B. | wave action |  |  | | C. | highway construction through mountainous areas |  |  | | D. | heavy winter rains |  |  | | Student Response E. | abundant vegetation | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Which of the following statements is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Sometimes it is more economical to repair the effects of a landslide than to remove the cause altogether. |  |  | | B. | A proper site investigation is fundamental for a meaningful slope stability analysis. |  |  | | Student Response C. | Landslide frequency in western Canada is equal or less than frequencies in other mountainous and landslide-prone areas around the world. | 100% | Student Response | | D. | Landslides may have several causes, but only one trigger. |  |  | | E. | The short history of human development in a region makes the evaluation of landslide hazards more difficult. |  |  | | | | Score: | 1/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | Trigger frequency is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | the speed of a sturzstrom |  |  | | B. | how often landslides occur |  |  | | C. | the period of time between earthquakes |  |  | | Student Response D. | how often an event occurs that sets off a landslide | 100% | Student Response | | E. | the prevalence of heavy rain in a landslide-prone region |  |  | | | | Score: | 1/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | A "house-of-cards" structure is associated with \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | rotational slides |  |  | | B. | slumps |  |  | | C. | rock falls |  |  | | D. | debris flows |  |  | | Student Response E. | quick clays | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 6. |  |
|  | |  |  | | --- | --- | | Which of the following was NOT a factor that contributed to the debris slide at Vaiont Dam, Italy in 1963? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | anthropogenic (human) activity |  |  | | B. | changes in water pressure due to filling/draining of dam |  |  | | C. | the presence of limestone and clay |  |  | | D. | fractured bedrock |  |  | | Student Response E. | an earthquake | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 7. |  |
|  | |  |  | | --- | --- | | The fastest landslide type is a \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | slump |  |  | | B. | rockfall |  | Student Response | | Student Response C. | debris flow | 0% |  | | D. | debris torrent |  |  | | E. | mud flow |  |  | | | | Score: | 0/1 | |  | | |
| 8. |  |
|  | |  |  | | --- | --- | | In areas where loose soils are saturated with water, seismic shaking (i.e. from an earthquake) can \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | trigger numerous rockfalls, endangering cars traveling on highways |  |  | | B. | help to compact the soils, strengthening the slope |  |  | | C. | transform the behaviour of a slope into one that begins to slowly creep |  |  | | D. | cause water pressures to dramatically increase resulting in liquefaction |  | Student Response | | E. | help drain the soils thereby strengthening the slope |  |  | | | | Score: | 0/1 | |  | | |
| 9. |  |
|  | |  |  | | --- | --- | | Suppose you are a geological engineer hired to deal with rockfall problems along new sections of the Sea-to-Sky Highway (Highway 99). You are asked to deal with large rockslides that may initiate along newly cut rock slopes blasted to widen the Sea-to-Sky Highway (Highway 99). To prevent massive blocks (>1000 m3) from sliding onto the road, which approach to mitigation would you take? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Prevention through rock bolts, anchors and drainage. |  | Student Response | | B. | Avoidance by selecting an alternative route for the highway. |  |  | | C. | Protection by installing netting. |  |  | | D. | Prevention by planting trees. |  |  | | Student Response E. | Protection by building a containment channel. | 0% |  | | | | Score: | 0/1 | |  | | |
| 10. |  |
|  | |  |  | | --- | --- | | A landslide trigger \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | can be anthropogenic in origin |  | Student Response | | Student Response B. | is the same thing as a landslide cause | 0% |  | | C. | in British Columbia is commonly a very large earthquake (> M 9.0) |  |  | | D. | rarely involves water |  |  | | E. | is defined as the frequency a landslide occurs |  |  | | | | Score: | 0/1 | |  | | |
| 11. |  |
|  | |  |  | | --- | --- | | A landslide is more likely to occur when \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Gp > Gt |  |  | | Student Response B. | Gt > Gp | 100% | Student Response | | C. | Gt = Gp |  |  | | D. | (Gp + Gt) < gravity |  |  | | E. | (Gp – Gt) < gravity |  |  | | | | Score: | 1/1 | |  | | |
| 12. |  |
|  | |  |  | | --- | --- | | The MAIN difference between a translational slide and a rotational slide is \_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | that a translational slide is also called a slump while a rotational slide is not |  |  | | B. | the shape of the failure surface |  | Student Response | | Student Response C. | the condition of the material moving downslope (coherent blocks verses a turbulent mixture of material) | 0% |  | | D. | the type of material involved in the landslide |  |  | | E. | cause of the landslide |  |  | | | | Score: | 0/1 | |  | | |
| 13. |  |
|  | |  |  | | --- | --- | | Tensioning a rock anchor helps to stabilize a slope by \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | reducing gravity |  |  | | B. | preventing rain water from infiltrating into the slope and reducing the pore pressure |  |  | | C. | breaking the rock, allowing it to be easily removed |  |  | | Student Response D. | increasing the frictional strength | 100% | Student Response | | E. | increasing the tensile strength of the slope |  |  | | | | Score: | 1/1 | |  | | |
| 14. |  |
|  | |  |  | | --- | --- | | The type of slope failure in the diagram (below) shows \_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | a rotational wedge failure | 0% |  | | B. | a translational planar failure |  |  | | C. | a translational wedge failure |  | Student Response | | D. | a channelized debris flow |  |  | | E. | a channelized avalanche |  |  | | | | Score: | 0/1 | |  | | |
| 15. |  |
|  | |  |  | | --- | --- | | Suppose you are a geological engineer retained to increase the slope stability in steep portions of a mountainside along a busy highway. Which technique would you use to reduce hazards from falling small blocky material? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | remove all unstable blocks |  |  | | B. | install drains |  |  | | C. | use cables and bolts to anchor the mass |  |  | | D. | plant trees |  |  | | Student Response E. | install netting | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 16. |  |
|  | |  |  | | --- | --- | | Which of the following did NOT contribute to the Frank slide in the Eastern Rocky Mountains? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | dissolution cavities in bedrock |  |  | | B. | weak, fractured, and faulted bedrock |  |  | | C. | bedding planes of sedimentary bedrock parallel to the slope |  |  | | Student Response D. | wet weather in years preceding the slide | 0% |  | | E. | removal of vegetation above the slide |  | Student Response | | | | Score: | 0/1 | |  | | |
| 17. |  |
|  | |  |  | | --- | --- | | Landslides are most likely to occur if \_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | the factor of safety goes below 1.0 | 100% | 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 | |  | | |
| 18. |  |
|  | |  |  | | --- | --- | | Which would NOT cause a landslide? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Adding material to the driving mass relative to the resisting mass. |  |  | | B. | Removing material from the resisting mass relative to the driving mass. |  |  | | C. | Saturating only the driving mass. |  |  | | Student Response D. | Removing material from the resisting mass and adding the same amount of material to the driving mass. | 0% |  | | E. | Adding the same amount of material to the driving mass and the resisting mass. |  | Student Response | | | | Score: | 0/1 | |  | | |
| 19. |  |
|  | |  |  | | --- | --- | | Which landslide type may cause a significant amount of damage, while posing a low threat to life? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Student Response A. | creep | 100% | Student Response | | B. | debris flow |  |  | | C. | quick clay flow |  |  | | D. | rock fall |  |  | | E. | massive rock avalanche |  |  | | | | Score: | 1/1 | |  | | |
| 20. |  |
|  | |  |  | | --- | --- | | Sturzstroms are a combination of which two landslide types? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | topples and slumps |  |  | | B. | falls and slumps |  |  | | C. | falls and translational slides |  | Student Response | | D. | topples and falls |  |  | | Student Response E. | translational slides and topples | 0% |  | | | | Score: | 0/1 | |  | | |
| . |  |
|  | |  |  | | --- | --- | | Which of the following is NOT a factor that increases cliff erosion at UBC? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | tides |  | | B. | wave action |  | | C. | precipitation |  | | Student Response D. | revegetation | Student Response | | E. | stormwater runoff |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | In areas where loose soils are saturated with water, seismic shaking (i.e. from an earthquake) can \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | trigger numerous rockfalls, endangering cars traveling on highways |  | | B. | help to compact the soils, strengthening the slope |  | | Student Response C. | transform the behaviour of a slope into one that begins to slowly creep |  | | D. | cause water pressures to dramatically increase resulting in liquefaction | Student Response | | E. | help drain the soils thereby strengthening the slope |  | | | | Score: | 0/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Which of the following causes of landslides is LEAST important in British Columbia? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | climate |  | | B. | slope angle |  | | Student Response C. | quick clays | Student Response | | D. | removal of vegetation |  | | E. | overloading |  | | | | Score: | 1/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | Which list correctly orders mass movements from slowest to fastest? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | creep, slump, translational slide, rock fall | Student Response | | B. | slump, debris avalanche, rock fall, translational slide |  | | C. | translational slide, slump, rock fall, rock avalanche |  | | D. | slump, creep, loess flow, rock fall |  | | Student Response E. | slump, debris flow, translational slide, debris avalanche |  | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | The Barrier was ORIGINALLY formed by \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a large landslide from Mt. Garibaldi |  | | B. | the Cheakamus glacier carving out a vertical face |  | | C. | lava cooling as it came in contact with a valley glacier | Student Response | | D. | millions of years of erosion |  | | Student Response E. | large vertical displacements along a fault |  | | | | Score: | 0/1 | |  | | |
| 1. |  |
|  | |  |  | | --- | --- | | Landslides are most likely to occur if \_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | the factor of safety goes below 1.0 | Student Response | | 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: | 0/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | In quick clays, a "House-of-cards" structure is composed primarily of \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | unconsolidated clay particles | Student Response | | B. | clay particles flowing like liquid |  | | Student Response C. | unconsolidated sand particles |  | | D. | sand and water mixture |  | | E. | saturated sand |  | | | | Score: | 0/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | In the following diagram of forces on a hill slope, which letter refers to the SHEAR STRESS? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | A |  | | Student Response B. | B |  | | C. | C |  | | D. | D |  | | E. | E | Student Response | | | | Score: | 0/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | Suppose you are a geological engineer retained to increase the slope stability in steep portions of a mountainside along a busy highway. Which technique would you use to reduce hazards from falling small blocky material? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | remove all unstable blocks |  | | B. | install drains |  | | Student Response C. | use cables and bolts to anchor the mass |  | | D. | plant trees |  | | E. | install netting | Student Response | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | The Barrier was ORIGINALLY formed by \_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | a large landslide from Mt. Garibaldi |  | | B. | the Cheakamus glacier carving out a vertical face |  | | Student Response C. | lava cooling as it came in contact with a valley glacier | Student Response | | D. | millions of years of erosion |  | | E. | large vertical displacements along a fault |  | | | | Score: | 1/1 | |  | | |

|  |  |
| --- | --- |
| 1. |  |
|  | |  |  | | --- | --- | | Rockfalls refer to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | a flow of weathered rock |  |  | | Student Response B. | individual rocks that free fall from the face of a cliff | 100% | Student Response | | C. | large blocks of bedrock sliding on an inclined surface |  |  | | D. | fragmented rock that flows at very high velocities for long distances |  |  | | E. | a cement like mixture of rock, soil and water that travels rapidly down a stream channel |  |  | | | | Score: | 1/1 | |  | | |
| 2. |  |
|  | |  |  | | --- | --- | | If the driving forces acting on a landslide are two times greater than the resisting forces opposing such movement, its factor of safety is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | 1.5 |  |  | | B. | 2 |  |  | | C. | 20 |  |  | | Student Response D. | 0.5 | 100% | Student Response | | E. | 0.2 |  |  | | | | Score: | 1/1 | |  | | |
| 3. |  |
|  | |  |  | | --- | --- | | Which of the following factors does NOT play a role in landslide activity? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | water |  |  | | B. | weathering |  |  | | C. | geology |  |  | | D. | tree roots |  |  | | Student Response E. | wind | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 4. |  |
|  | |  |  | | --- | --- | | British Columbia has the highest landslide frequency in Canada because of all the following characteristics EXCEPT \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Leda clay accumulation in river deltas |  | Student Response | | B. | frequent temperature fluctuation above and below water's freezing point |  |  | | Student Response C. | poorly engineered forestry roads | 0% |  | | D. | high precipitation, including winter rain and snow |  |  | | E. | mountains with steep slopes |  |  | | | | Score: | 0/1 | |  | | |
| 5. |  |
|  | |  |  | | --- | --- | | Which of the following factors is expected to lead to INCREASED landslide activity and fatalities with time? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | deforestation in landslide-prone areas |  |  | | B. | changing global climate patterns |  |  | | C. | increasing population density in mountainous areas |  |  | | D. | expanding development onto undeveloped slopes |  |  | | Student Response E. | all of the above | 100% | Student Response | | | | Score: | 1/1 | |  | | |
| 6. |  |
|  | |  |  | | --- | --- | | An unstable slope may be stabilized by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | removing material from the toe of the slope |  |  | | B. | steepening the slope |  |  | | C. | applying a load to the top of the slope |  |  | | Student Response D. | draining the slope | 100% | Student Response | | E. | all of the above |  |  | | | | Score: | 1/1 | |  | | |
| 7. |  |
|  | |  |  | | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:   [-----] slowest or lowest velocity  [-----]  [-----]  [-----] fastest or highest velocity | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:   [Earth creep] slowest or lowest velocity  [-----]  [Debris flow]  [Rock fall] fastest or highest velocity | 0.0% | Put these landslides types in order of INCREASING velocity of their movement:   [Earth creep] slowest or lowest velocity  [Slump]  [Debris flow]  [Rock fall] fastest or highest velocity (100.0%) | | | | Score: | 0/1 | |  | | |
| 8. |  |
|  | |  |  | | --- | --- | | Quick clay problems are common in what part of Canada? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Nova Scotia |  |  | | B. | Manitoba |  |  | | Student Response C. | Quebec | 100% | Student Response | | D. | British Columbia |  |  | | E. | Alberta |  |  | | | | Score: | 1/1 | |  | | |
| 9. |  |
|  | |  |  | | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Only fast moving landslides pose a hazard to infrastructure and communities." | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | False | 100% | False | | | | Score: | 1/1 | |  | | |
| 10. |  |
|  | |  |  |  |  | | --- | --- | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Removal of water from a landslide through drainage helps to stabilize slopes." | | | | |  | | | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | True | 100% | True | | | | | | Score: | | 1/1 | | |  | | | | |  | | |  |  | | --- | --- | | ALL landslides are BROADLY classified according to \_\_\_\_\_\_ and \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | type of movement… amount of water present |  |  | | B. | type of movement… steepness of the slope |  |  | | C. | geologic material… amount of water present |  |  | | D. | geologic material… steepness of the slope |  |  | | Description: Student ResponseE. | geologic material… type of movement | 100% | Description: Student Response | | | | Score: | 1/1 | |  | | | | | **2.** | |  | | |  | | |  |  | | --- | --- | | In areas where loose soils are saturated with water, seismic shaking (i.e. from an earthquake) can \_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | trigger numerous rockfalls, endangering cars traveling on highways |  |  | | B. | help to compact the soils, strengthening the slope |  |  | | C. | transform the behaviour of a slope into one that begins to slowly creep |  |  | | Description: Student ResponseD. | cause water pressures to dramatically increase resulting in liquefaction | 100% | Description: Student Response | | E. | help drain the soils thereby strengthening the slope |  |  | | | | Score: | 1/1 | |  | | | | | **3.** | |  | | |  | | |  |  | | --- | --- | | Which of the following causes of landslides is LEAST important in British Columbia? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | climate |  |  | | B. | slope angle |  |  | | C. | quick clays |  | Description: Student Response | | D. | removal of vegetation |  |  | | Description: Student ResponseE. | overloading | 0% |  | | | | Score: | 0/1 | |  | | | | | **4.** | |  | | |  | | |  |  | | --- | --- | | What is the MOST important function of water in a debris flow? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | freeze/thaw within rock fractures initiates a debris flow |  |  | | B. | water is quite dense and adds weight to the flow |  |  | | Description: Student ResponseC. | a fully saturated debris flow is able to flow like a fluid | 100% | Description: 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 | |  | | | | | **5.** | |  | | |  | | |  |  | | --- | --- | | In the factor of safety calculation, increasing pore pressures act to destabilize the slope by \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | decreasing the cohesive strength |  |  | | Description: Student ResponseB. | decreasing frictional strength | 100% | Description: Student Response | | C. | increasing the driving force |  |  | | D. | decreasing the driving shear forces |  |  | | E. | adding weight to the slope |  |  | | | | Score: | 1/1 | |  | | | | | **6.** | |  | | |  | | |  |  | | --- | --- | | In slope stability analyses, the effective stress is \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | the intergranular stress | 0% |  | | B. | the grain to grain contact forces resulting in frictional strength |  |  | | C. | the total stress minus any pore water pressures |  |  | | D. | All of the above |  | Description: Student Response | | E. | None of the above |  |  | | | | Score: | 0/1 | |  | | | | | **7.** | |  | | |  | | |  |  | | --- | --- | | Slopes with daylighted bedding (as shown in the figure below) are most susceptible to \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | rock topples |  |  | | B. | translational slides |  | Description: Student Response | | Description: Student ResponseC. | creep | 0% |  | | D. | debris flows |  |  | | E. | rotational slides |  |  | | | | Score: | 0/1 | |  | | | | | **8.** | |  | | |  | | |  |  | | --- | --- | | Which of the following will ALWAYS INCREASE the likelihood of a landslide? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | human activities |  |  | | Description: Student ResponseB. | erosion | 100% | Description: Student Response | | C. | low trigger frequency |  |  | | D. | vegetation |  |  | | E. | type of material |  |  | | | | Score: | 1/1 | |  | | | | | **9.** | |  | | |  | | |  |  | | --- | --- | | Which statement about flows is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Debris flows are common in British Columbia coastal mountains. |  |  | | Description: Student ResponseB. | An example of a very fast moving flow (> 75 km/hour) is rock creep. | 100% | Description: Student Response | | C. | Flows behave like fluids. |  |  | | D. | Debris flows have higher water content than debris avalanches. |  |  | | E. | Flows can have variable water content. |  |  | | | | Score: | 1/1 | |  | | | | | **10.** | |  | | |  | | |  |  | | --- | --- | | Gravity influences \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | precipitation |  |  | | B. | slope composition |  |  | | C. | trigger frequency |  |  | | Description: Student ResponseD. | shear stress | 100% | Description: Student Response | | E. | shear strength |  |  | | | | Score: | 1/1 | |  | | | | | **11.** | |  | | |  | | |  |  | | --- | --- | | Which is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Infiltration of water and increasing pore pressures acts to reduce the shear strength of a rock slope. |  |  | | B. | Shear stress is the component of gravity acting parallel to the sliding surface of a landslide. |  |  | | C. | Faults and cracks weaken the shear strength of a rock slope. |  |  | | Description: Student ResponseD. | The main force acting on a slope is pore pressure and not gravity. | 100% | Description: Student Response | | E. | Increasing the normal stress across the sliding surface helps to increase the frictional strength. |  |  | | | | Score: | 1/1 | |  | | | | | **12.** | |  | | |  | | |  |  | | --- | --- | | Which of the following may DECREASE the shear strength of unconsolidated sediment? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | increased cementation |  |  | | Description: Student ResponseB. | increased pore pressure | 100% | Description: Student Response | | C. | decreased surface tension of water |  |  | | D. | decreased electrostatic forces |  |  | | E. | increased compaction and dewatering |  |  | | | | Score: | 1/1 | |  | | | | | **13.** | |  | | |  | | |  |  | | --- | --- | | High pore water pressure can cause landslides by \_\_\_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | reducing friction between adjacent grains | 100% | Description: Student Response | | B. | affecting the rate of infiltration |  |  | | C. | dissolving cement between adjacent grains |  |  | | D. | increasing water surface tension |  |  | | E. | decreasing the likelihood of liquefaction |  |  | | | | Score: | 1/1 | |  | | | | | **14.** | |  | | |  | | |  |  | | --- | --- | | Which of the following is FALSE about creep? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | Creep occurs slowly. |  |  | | Description: Student ResponseB. | Creep can happen on flat surfaces. | 100% | Description: Student Response | | C. | Freezing and thawing of surface soil can cause creep. |  |  | | D. | Wetting and drying of surface soil can cause creep. |  |  | | E. | Creep can result in tilted telephone poles and curved tree trunks. |  |  | | | | Score: | 1/1 | |  | | | | | **15.** | |  | | |  | | |  |  | | --- | --- | | Which of the following statements is FALSE? | | |  | | | |  | **Student Response** | **Value** | **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. |  |  | | Description: Student ResponseC. | The factor of safety is the ratio of shear stress to shear strength. | 100% | Description: 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 | |  | | | | | **16.** | |  | | |  | | |  |  | | --- | --- | | When the Factor of Safety is < 1 it means that \_\_\_\_\_\_ | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | shear strength > shear stress |  |  | | B. | shear strength = shear stress |  |  | | Description: Student ResponseC. | shear strength < shear stress | 100% | Description: Student Response | | D. | Gp > Gt |  |  | | E. | Gp < Gt |  |  | | | | Score: | 1/1 | |  | | | | | **17.** | |  | | |  | | |  |  | | --- | --- | | Which landslide type is most likely to exhibit SLOW movement? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | rotational slide | 100% | Description: Student Response | | B. | debris flow |  |  | | C. | quick clay flow |  |  | | D. | rock fall |  |  | | E. | massive rock avalanche |  |  | | | | Score: | 1/1 | |  | | | | | **18.** | |  | | |  | | |  |  | | --- | --- | | Increased vulnerability to landslide hazards may result from all of the following EXCEPT \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | logging on unstable slopes |  |  | | B. | deep infiltration of water |  |  | | C. | clearcutting |  |  | | Description: Student ResponseD. | legislation | 100% | Description: Student Response | | E. | urbanization |  |  | | | | Score: | 1/1 | |  | | | | | **19.** | |  | | |  | | |  |  | | --- | --- | | Which statement is FALSE? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | The 2005 La Conchita landslide was totally unexpected as the cause for previous landslides in the area had been dealt with. | 100% | Description: Student Response | | B. | A landslide trigger is the process that pushes the factor of safety to an unsafe number. |  |  | | C. | The most common landslide trigger in western British Columbia is heavy precipitation. |  |  | | D. | One of the underlying causes of the landslide at Frank, Alberta was coal mining. |  |  | | E. | One hypothesis to explain how sturzstroms can flow extremely far and fast is acoustic fluidization. |  |  | | | | Score: | 1/1 | |  | | | | | **20.** | |  | | |  | | |  |  | | --- | --- | | Which is NOT a type of flow? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | soil creep |  |  | | Description: Student ResponseB. | debris avalanche | 0% |  | | C. | sturzstrom |  |  | | D. | debris flow |  |  | | E. | slump |  | Description: Student Response | | | | Score: | 0/1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | Which statement is TRUE? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Description: Student ResponseA. | Scientists are confident in their ability to predict volcanic eruptions hours in advance. |  | | B. | The Alaskan Volcano Observatory uses a numeric (levels 1-4) eruption warning system. |  | | C. | Predicting eruptions can be very costly because many times equipment is completely destroyed. | Description: Student Response | | D. | The Volcanic Explosivity Index ranks eruptions based ONLY on the height of the eruption column and the volume of material erupted. |  | | E. | The number of eruption-related fatalities has decreased in the past 50 years due to better eruption prediction techniques. |  | | | | Score: | 0/1 | |  | | | | **2.** |  | |  | |  |  | | --- | --- | | Igneous rock textures are dictated by a magma/lava’s \_\_\_\_\_\_\_\_ | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | silica composition |  | | B. | CO2 gas content |  | | C. | temperature |  | | D. | cooling rate | Description: Student Response | | Description: Student ResponseE. | mineralogy |  | | | | Score: | 0/1 | |  | | | | **3.** |  | |  | |  |  | | --- | --- | | By volume, the largest type of volcanic landform is a \_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | cinder cone |  | | B. | stratovolcano |  | | Description: Student ResponseC. | shield volcano | Description: Student Response | | D. | composite cone |  | | E. | lava dome |  | | | | Score: | 1/1 | |  | | | | **4.** |  | |  | |  |  | | --- | --- | | What event started the sequence of events recorded during the May 18, 1980 eruption of Mount St. Helens? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | eruption of a crypto-dome |  | | B. | a large landslide |  | | C. | melting of snow and ice in the summit crater |  | | D. | a blast eruption |  | | Description: Student ResponseE. | a magnitude 5.1 earthquake | Description: Student Response | | | | Score: | 1/1 | |  | | | | **5.** |  | |  | |  | | --- | | Which of the following is a volcanic HAZARD to passenger aircraft flying overhead? | |  | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | Description: Student ResponseA. | ash in VEI 6 Plinian eruption columns | Description: Student Response | | B. | radiation from lahars |  | | C. | ash in VEI 1 Hawaiian eruption plumes |  | | D. | volcanic bombs hitting the aircraft |  | | E. | heat rising from volcanoes |  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | Rockfalls refer to \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | a cement like mixture of rock, soil and water that travels rapidly down a stream channel |  |  | | Description: Student ResponseB. | individual rocks that free fall from the face of a cliff | 100% | Description: Student Response | | C. | a flow of weathered rock |  |  | | D. | large blocks of bedrock sliding on an inclined surface |  |  | | E. | fragmented rock that flows at very high velocities for long distances |  |  | | | | Score: | 1/1 | |  | | | | **2.** |  | |  | |  |  | | --- | --- | | If the driving forces acting on a landslide are two times greater than the resisting forces opposing such movement, its factor of safety is \_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | 0.5 | 100% | Description: Student Response | | B. | 2 |  |  | | C. | 1.5 |  |  | | D. | 0.2 |  |  | | E. | 20 |  |  | | | | Score: | 1/1 | |  | | | | **3.** |  | |  | |  |  | | --- | --- | | Which of the following factors does NOT play a role in landslide activity? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | tree roots |  |  | | Description: Student ResponseB. | wind | 100% | Description: Student Response | | C. | geology |  |  | | D. | weathering |  |  | | E. | water |  |  | | | | Score: | 1/1 | |  | | | | **4.** |  | |  | |  |  | | --- | --- | | British Columbia has the highest landslide frequency in Canada because of all the following characteristics EXCEPT \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | poorly engineered forestry roads | 0% |  | | B. | high precipitation, including winter rain and snow |  |  | | C. | mountains with steep slopes |  |  | | D. | frequent temperature fluctuation above and below water's freezing point |  |  | | E. | Leda clay accumulation in river deltas |  | Description: Student Response | | | | Score: | 0/1 | |  | | | | **5.** |  | |  | |  |  | | --- | --- | | Which of the following factors is expected to lead to INCREASED landslide activity and fatalities with time? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | deforestation in landslide-prone areas |  |  | | B. | changing global climate patterns |  |  | | C. | increasing population density in mountainous areas |  |  | | D. | expanding development onto undeveloped slopes |  |  | | Description: Student ResponseE. | all of the above | 100% | Description: Student Response | | | | Score: | 1/1 | |  | | | | **6.** |  | |  | |  |  | | --- | --- | | An unstable slope may be stabilized by \_\_\_\_\_\_\_\_\_\_. | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | A. | removing material from the toe of the slope |  |  | | B. | steepening the slope |  |  | | C. | applying a load to the top of the slope |  |  | | Description: Student ResponseD. | draining the slope | 100% | Description: Student Response | | E. | all of the above |  |  | | | | Score: | 1/1 | |  | | | | **7.** |  | |  | |  |  | | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:  [-----] slowest or lowest velocity  [-----]  [-----]  [-----] fastest or highest velocity | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | Put these landslides types in order of INCREASING velocity of their movement:  [Earth creep] slowest or lowest velocity  [Slump]  [Debris flow]  [Rock fall] fastest or highest velocity | 100.0% | Put these landslides types in order of INCREASING velocity of their movement:  [Earth creep] slowest or lowest velocity  [Slump]  [Debris flow]  [Rock fall] fastest or highest velocity (100.0%) | | | | Score: | 1/1 | |  | | | | **8.** |  | |  | |  |  | | --- | --- | | Quick clay problems are common in what part of Canada? | | |  | | | |  | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | --- | | Description: Student ResponseA. | British Columbia | 0% |  | | B. | Quebec |  | Description: Student Response | | C. | Alberta |  |  | | D. | Manitoba |  |  | | E. | Nova Scotia |  |  | | | | Score: | 0/1 | |  | | | | **9.** |  | |  | |  |  | | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Removal of water from a landslide through drainage helps to stabilize slopes." | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | True | 100% | True | | | | Score: | 1/1 | |  | | | | **10.** |  | |  | |  |  | | --- | --- | | Based on the case history of the Portuguese Bend landslide near Los Angeles, California, indicate whether the following statement is TRUE or FALSE:   "Ancient landslides that have since become stable may reactivate due to urban development and human activity." | | |  | | | | **Student Response** | **Value** | **Correct Answer** | | --- | --- | --- | | True | 100% | True | | | | Score: | 1/1 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | Which of the following is NOT an approach to landslide mitigation? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | prevention |  | | B. | litigation | Description: Student Response | | C. | protection |  | | Description: Student ResponseD. | avoidance |  | | E. | relocation |  | | | | Score: | 0/1 | |  | | | | **2.** |  | |  | |  |  | | --- | --- | | Which of the following is NOT an anthropogenic trigger of landslides? | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | irrigation |  | | Description: Student ResponseB. | mining |  | | C. | climate change |  | | D. | glacial erosion | Description: Student Response | | E. | deforestation |  | | | | Score: | 0/1 | |  | | | | **3.** |  | |  | |  |  | | --- | --- | | In the Vaiont Dam disaster, \_\_\_\_\_\_\_\_ was both a cause and a trigger for the slide. | | |  | | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | removal of vegetation |  | | Description: Student ResponseB. | water | Description: Student Response | | C. | overloading |  | | D. | inherently weak materials in the slope |  | | E. | adverse bedding orientation |  | | | | Score: | 1/1 | |  | | | | **4.** |  | |  | |  |  | | --- | --- | | 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** | | --- | --- | --- | | Description: Student ResponseA. | topples (W) and translational slides (E) | Description: 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 | |  | | | | **5.** |  | |  | |  | | --- | | The enormous 1980 Mount St. Helens rockslide \_\_\_\_\_. | |  | | |  | **Student Response** | **Correct Answer** | | --- | --- | --- | | A. | was triggered following the massive eruption of the volcano |  | | B. | was triggered by lahars that were flowing down the slope following the eruption |  | | Description: Student ResponseC. | triggered an earthquake which in turn triggered the volcanic eruption |  | | D. | triggered the massive eruption of the volcano | Description: Student Response | | E. | was triggered independently of the volcanic activity |  | | | |