Quiz 1: Fragile Systems

1. When water vapour condenses, the latent heat
   1. Is released as sensible heat
   2. Is absorbed from sensible heat
   3. Is known as the latent heat of fusion
   4. Is known as the latent heat of sublimination
2. Strain is
   1. Elastic, if the object breaks when bent
   2. Plastic, if it is made of long chains of polymerized molecules
   3. Equal to stress
   4. The cause of fractures in ductile materials
   5. Deformation
3. The count of all protons and neutrons in the atom nucleus is called the
   1. Atomic mass number
   2. Atomic number
4. Which is not a form of energy
   1. Potential
   2. Kinetic
   3. Heat
   4. Work
   5. Power
5. Which is NOT a primary source that makes the Earth an active body?
   1. Electric power generated by the Earth’s rotating magnetic field
   2. Impact of extraterrestrial bodies
   3. Gravity
   4. The Earth’s internal heat associated with natural radioactive decay
   5. The Sun
6. The most common element in the
   1. Earth’s core is silicon
   2. Earth’s crust is silicon
   3. Earth’s crust is iron
   4. Atmosphere is oxygen
   5. Earth’s crust is oxygen
7. What process can transfer both matter and energy
   1. Turbulence
   2. Compression waves
   3. Displacement waves
   4. Group velocity
   5. Phase velocity
8. Most disaster scales are
   1. Logarithmic
9. The probable severity that a destructive event will occur multiplied by the event’s likely impact on people and property is called
   1. A natural disaster
   2. A catastrophe
   3. Risk
   4. Return period
   5. A hazard
10. The parameter that describes how the temperature of an object changes with heat input her unit is called
    1. Stress
    2. Strain
    3. Latent heat constant
    4. Specific heat
11. Which statement is true?
    1. Liquids are very compressible
    2. High viscosity fluids flow very easily
    3. Stress is for per unit volume parallel to a surface
    4. Material that fractures easily is said to be ductile
    5. Strain is deformation of a solid object
12. Which element is somewhat like iron?
    1. Iridium
    2. Manganese
    3. Titanium
    4. Silicon
    5. Magnesium

Quiz 2: Earthquakes

1. Which scenario describes a soft storey building collapse?
   1. A 100-year old 3-story wooden structure collapses completely
   2. A building is shaken off its first-floor posts, obliterating everything in the first floor space
   3. Brickwork on the face of a building is shaken off into the street
2. You have just heard that a large earthquake occurred 320 km below the Earth’s surface at a spreading zone. Why is this bullshit?
   1. No earthquakes occur at spreading zones
   2. Earthquakes occur at less than 15 km depth
   3. Only small earthquakes occur below 200 km depth
   4. Spreading zones are more likely to have slow, weak earthquakes
3. When was the last magnitude 9 Cascadia earthquake?
   1. January 26, 1700
4. What inexpensive revision to a building can prevent a soft story collapse?
   1. Remove all installed dampers
   2. Convert first floor into a parking garage
   3. Increase building foundation depth
   4. Add shear walls
5. Which seismic waves travel fastest?
   1. P waves
   2. S waves
   3. Surface waves
   4. Rayleigh waves
   5. Love waves
6. Evidence that rocks can deform plastically can be found
   1. Only by scientific presumption because process takes too long
   2. In the curves and bends of the layers seen in some mountain ranges
   3. As cracks a fissures in the ground or in cliff bases and road-cuts
7. The fault near Vancouver which produces the largest earthquakes is the \_\_\_\_\_\_\_\_ which can produce a magnitude \_\_\_\_\_\_\_\_\_\_\_\_ earthquakes
   1. Queen Charlotte Fault, 8
   2. Straight Creek, 7
   3. Cascadia Subduction Fault, 9
   4. Nootka Fault, 9
   5. Devil’s Mountain Fault, 8
8. The Himalayan mountains are an example of uplift due to
   1. The collision between two continental plates
   2. The subduction of a continental plate beneath a continental plate
9. Mitigating the damage to buildings may involve all of the following except
   1. Enhancing the static strength of a building
   2. Adding components which absorb energy due to motion
   3. Numerically simulating the action of ground accelerations on the building
   4. Building soft stories
10. Where do deepest earthquakes occur?
    1. Along mid-ocean ridges
    2. Where the lithosphere is 600km thick
    3. In subducted slabs
11. The strongest earthquakes recorded with modern instruments was
    1. Magnitude of 9.5
12. Earthquake moment magnitude calculation is based on three of the following four quantities. Which is NOT a part of the calculation?
    1. The shear wave amplitude
    2. The shear strength of the rocks
    3. The rupture area of the fault
    4. The average displacement (slip) on the fault
13. The runways at BC airport is built on
    1. Saturated, unconsolidated sediments
    2. Dry, unconsolidated sediments
    3. Dry, fractured rock
14. The order in which seismic waves arrive at a recording station is
    1. P waves, S waves, surface waves
15. When a fault ruptures DEEP in the lithosphere, the energy is released mainly by
    1. P-waves that dissipate perpendicularly from the fault plane
    2. S-waves that dissipate perpendicularly from the fault plane
    3. Both P- and S-waves that dissipate in all directions away from the fault plane
16. What does a seismogram record?
    1. Stress as a function of time
    2. Ground motion as a function of time
17. \_\_\_\_\_\_\_\_\_ waves are transverse waves that propagate by shearing or shaking particles in their path at right angles to the direction of their advance
    1. Love
    2. Rayleigh
    3. P-
    4. S-
    5. Both Love and S-
18. After a fault ruptures (moves)
    1. Stress is concentrated along the length of the rupture and released at the tips
    2. Plastic deformation releases most of its stress
    3. Stress increases along the fault
    4. Elastic deformation concentrates stress at the ends of the fault that moved

Quiz 3: Landslides

1. Which is true of a debris avalanche?
   1. Increasing the water content decreases viscosity, which increases velocity and destruction
2. Which of the following is FALSE?
   1. Shear strength is related to friction and cohesion
   2. Creep causes the most long-term economic damage because it is not often detected until damage is done
   3. Landslides are classified according to mass, slope and velocity
   4. Hydrothermal alteration can result in lowering the factor of safety in a slope
3. QUICK CLAY is most common in what part of Canada?
   1. BC
   2. Saskatchewan
   3. Manitoba
   4. Quebec
   5. NB
4. Which of the following will ALWAYS INCREASE the likelihood of a landslide
   1. Human activities
   2. Erosion
   3. Vegetation
   4. Low trigger frequency
5. Which location is the LEAST landslide-prone?
   1. Surrey
   2. North Vancouver
   3. Lion’s Bay
   4. Squamish
6. Which statement is true?
   1. Landslides may develop into another landslide type through time
7. Which statement is false?
   1. A rotational slide often leaves a crescent-shaped scarp
   2. Altering the way water drains naturally from steep slope can have a significant effect on landslide frequency
   3. If the driving mass equals the resisting mass in a slope then a landslide will occur
   4. Hydrothermal alteration increases the frequency of landslides in volcanically active areas
8. Which of the following did NOT contribute to the Frank slide in Eastern Rocky Mountains?
   1. Dissolution cavities in bedrock
   2. Weak, fractured, and faulted bedrock
   3. Wet weather
   4. Removal of vegetation above the slide
9. Which of the following is NOT an approach to landslide mitigation?
   1. Prevention
   2. Protection
   3. Litigation
   4. Avoidance
   5. Relocation
10. Most landslides on record in the province are located in southern BC because
    1. The population density is much higher in southern BC so landslides are considered as natural disasters
11. A landslide trigger
    1. Can be anthropogenic origin
12. Which of the following is NOT a factor that increases cliff erosion at UBC?
    1. Tides
    2. Wave action
    3. Precipitation
    4. Revegetation
    5. Stormwater runoff
13. Which statement about causes and triggers of landslides is TRUE?
    1. Causes can trigger landslides in some situations
14. In slope stability analysis, the effective stress is
    1. The integranular stress
    2. The grain to grain contact forces resulting in fictional stress
    3. The total tress minus any pore water pressures
    4. All of the above
15. By definition, a landslide trigger is an external stimulus that
    1. Causes a near-immediate response by rapidly decreasing strength
16. Based on how avalanche starts and moves, which category of mass movement would this type of landslide BEST fit into?
    1. Debris flows
    2. Complex movements
    3. Falls
    4. Flows
    5. Rotational slides
17. You are asked to recommend appropriate landslide mitigation techniques for use in an arid area composed of highly fractured granite. Which of the following technique is NOT suitable?
    1. Building retaining walls
    2. Reinforce slide mass with rock bolts
    3. Spray slide mass with shotcrete
    4. Drain water from interior of the slide mass
    5. Grade the slope
18. Which landslide type would cause a significant damage with a low threat to life
    1. Creep
19. Debris flows and channels decrease damage from debris flows by all of the following EXCEPT
    1. Boulder-lined channels decrease flow velocity
    2. Concrete lined channels prevent more debris from being incorporated into the flow
    3. Grates remove large debris from flow masses
    4. Boulder and concrete-lined channels decrease erosion
    5. Basins collect water which prevents flows from moving quickly

Quiz 4: Volcanoes

1. Which of the following is NOT used to predict volcano eruptions
   1. Lava dome growth
   2. Gas emissions
   3. Air density
   4. Seismic activity
   5. Heat flow
2. When Mt. Vesuvius erupted, people in Pompeii were buried by
   1. Pyroclastic flows
3. All of the following is used to detect ground deformation except
   1. Titmeters
   2. GPS
   3. COSPEC
   4. InSAR
   5. A measuring tape
4. The majority of world’s explosive volcanoes are found at
   1. Convergent plate margins
5. Where do most subaerial volcanoes occur
   1. Convergent plate tectonic boundaries
6. Lahars, pyroclastic flow, and volcanic landslides are all hazards at
   1. Volcanoes above subduction zones
7. A nearby volcano is erupting pyroclastic flows, where would you be the safest?
   1. On a ridge top
8. Which statement is FALSE?
   1. Lahars pose a threat to communities that are proximal to both volcanoes and rivers
   2. Lahars require tephra and water to form
   3. Lahars are associated with stratovolcanoes
   4. Acoustic flow monitors are used to which detect high frequency waves produced by lahars
   5. Lahars are mudflows that occur only during an eruption
9. Which of the following location is the LEAST likely location for a volcano?
   1. Divergent plate boundaries
   2. Hot spots
   3. Transform plate boundaries
   4. Convergent plate boundaries
   5. Above mantle plumes
10. A shield volcano such as Kilauea will most likely erupt
    1. Lava flows and scoria
11. Hot spot volcanoes form when
    1. Material from the core-mantle boundary rises to form magma and melts the overlying crust
12. Highly viscous lavas ( m=7) with high gas content will generally yield
    1. Explosive volcanism
13. Which of the following volcanic hazard is NOT caused by pyroclastic material?
    1. Burial in lahars
    2. Failure of airplane engines
    3. Respiratory ailments
    4. Crop failure
    5. Being hit by falling fragments
14. During the 1986 Lake Nyos eruption, the most dangerous area to be were valleys because the hazardous gas was denser than air
15. Which of the following about pyroclastic flows is FALSE?
    1. They follow the local topography
    2. They are a major volcanic hazard in Hawaii
    3. They are generated when volcanic material spill over the crater rim
    4. They are a laterally flowing mixture of hot gases and volcanic materials
    5. They are associated with intermediate to high viscosity magmas/lavas
16. Magma viscosity is increased by
    1. High silica content
17. Which of the following represnts the most violent eruption style?
    1. VEI 9 Icelandic
    2. VEI 6 Plinian
    3. VEI 2 Strombolian
18. Which of the following is a volcanic HAZARD to an airplane flying overhead
    1. Ashi n VEI 6 Plinian eruption columns

Quiz 5: Storms

1. Which conditions below would be ideal for the development of a supercell thunderstorm?
   1. Hot humid day with strong winds
2. In addition to the rotating tornadic winds, the other damaging winds from thunderstorms are straight-line winds near the
   1. Beaver’s tail
   2. Altocumulus castellanus
   3. Wall cloud
   4. Mammatus cloud
   5. Gust front
3. To calculate the mixing ratio
   1. Divide the mass of water vapour by the mass of all remaining gases
4. Which statement about tornadoes is TRUE?
   1. Tornadoes are short-lived, usually lasting a few minutes
5. In colder air, pressure \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in warmer air
   1. Decreases more rapidly with height than
6. Warm air rises because of
   1. Buoyancy
7. Which statement is FALSE?
   1. Lightening often ranks in top two of weather-related killers in NA
   2. Lightening can shoot out of the side of a storm and hit the ground ten miles away from the storm
   3. Most lightening-caused forest fires are triggered by positive cloud-to-ground lightening
   4. Some lightening occur with no thunder but where there is thunder, there must be lightening
8. Hurricanes can last a long time (a week or so) because
   1. Strong winds make high waves that evaporate warm water into the boundary layer
9. According to the pressure gradient force equation, increasing the density of an air parcel relative to its surroundings will
   1. Increase the pressure gradient force
10. Thunderstorm tops often reach an altitude of roughly
    1. 10 km
11. Which one thing do supercells have that most air-mass thunderstorms do NOT?
    1. Anvil
    2. Cloud base at the LCL
    3. Updraft
    4. Downdraft
    5. Environmental wind shear
12. Which hazard or feature is NOT associated with individual thunderstorms?
    1. Flooding
    2. Tornadoes
    3. Spiral band
    4. Derechos
    5. Gust fronts
13. Which statement is true?
    1. Surface winds in tropical cyclones, typhoons, and hurricanes spiral clockwise in the North Atlantic Ocean
    2. The eye of a hurricane has high pressure at the bottom of the stratosphere and low pressure at sea level
14. Which is not a measure of humidity?
    1. Mixing ratio
    2. Relative humidity
    3. Vapour pressure
    4. Hydrometer
    5. Dew-point temperature
15. Suppose you have an air parcel at height 1 km above the ground with temperature 0. If you lower this air parcel to the ground, its temperature will be
    1. 10
    2. -10
16. Lapse rate is the
    1. Decrease of temperature with height
17. Condensation of water vapour can happen in an adiabatically rising air parcel because
    1. The vapour pressure increases to saturation
18. Which statement is FALSE?
    1. Tornado outbreaks are when many tornadoes occur in one day to a week
    2. The centre of tornado alley is near Oklahoma
    3. Tornadoes are violently rotating horizontal columns of air
    4. Hook echoes in weather radar images don't always indicate tornadoes
    5. The Torro scale is used to classify tornado strength

Quiz 6: Waves and tsunami

1. INTERFERENCE in wind waves can cause
   1. An occasional wave greater than any noted before or after its occurrence
2. Larger wind-driven waves can develop in the Pacific Ocean than develop in Lake Ontario. Why?
   1. The fetch is larger in the Pacific Ocean than in Lake Ontario
3. When waves shoal, all of the following occur EXCEPT
   1. Wave height increases
   2. Wave period decreases
   3. Wavelength shortens
   4. The wave steepens
   5. Wave speed decreases
4. Tsunami can be generated by \_\_\_\_\_\_\_\_\_ and restored by
   1. Landslides, earthquakes / gravity
5. Imagine that hurricanes would rotate around their centre in the OPPOSITE DIRECTION in the North Atlantic. When these hurricanes reach the coast of North America
   1. The storm surge would be on the left side of the hurricanes relative to its direction of travel
6. What are typical tsunami speeds, wavelengths, and periods
   1. 700 km/hr, 200 km, 10 minutes
7. Which of the following mitigation strategies DISSIPATES OR SCATTERS WAVE ENERGY while allowing sediment transport?
   1. Tethered-float breakwaters
8. Sea state is Beaufort Force 5
   1. Conditions are fine and ships can proceed on course
9. In the middle of the Pacific Ocean, waves with greatest speed
   1. Have the greatest wave base
10. Which statement is TRUE?
    1. The bulge (height) of a storm surge increases as it approaches shallower water
11. Which of the following is TRUE about wave speed
    1. In deep water, longer wavelength waves travel faster than those with shorter wavelength
12. Which lists waves in order from shortest to longest wavelength
    1. Wind waves, tsunami, seiches, tides
13. The San Andreas Fault extends offshore under some water in some sections to the north of San Francisco. Imagine that a magnitude 8.5 earthquake occurs along an underwater section of the fault. Is it likely or unlikely to generate a large tsunami?
    1. It is unlikely because the movement along the fault is horizontal
14. The tsunami that caused the most deaths in Canada in the past century occurred in
    1. Newfoundland
15. Wavelength equals
    1. Velocity times period

Quiz 7: Meteors/Extinction

1. What is the PRINCIPLE OF FAUNAL SUCCESSION?
   1. Using fossils in rock layers to date the layer and to correlate it with others with similar fossils
2. How is shocked quartz different from regular quartz?
   1. It is a regular quartz that as been affected by high-energy impacts
3. All of the following have been used as a supporting evidence for an impact event in the late Cretaceous EXCEPT
   1. The presence of elevated iridium levels
   2. The presence of a large circular structure off the coast of Mexico
   3. The presence of shocked quartz
   4. Evidence of glaciers in Gondwana
   5. The extinction of ammonites
4. The organism most responsible for biological extinctions today are
   1. Humans
5. Your chance of dying as a result of an extraterrestrial impact is
   1. About the same risk you take each time you fly somewhere on vacation
6. Which of the following statements about mass extinctions is FALSE?
   1. Mass extinctions are those that collectively occur within 1 million yrs
   2. Mass extinctions are caused by a variety of factors
   3. Mass extinctions have occurred more frequently in the last 65 million yrs
   4. A mass extinction is an event that wipes out more than 30% of existing species at any one time
   5. During a mass extinction species from all environments are affected
7. What was the Earth’s climate like during the Triassic?
   1. Hot and arid
8. In terms of biostratigraphy, what a fossil’s “range”?
   1. The length of time a fossil species occupies in the geological record
9. How can change in seafloor spreading rates contribute to a mass extinction event?
   1. It could cause changes in sea level and loss of habitat
10. In which of the following continental configurations would you expect a biodiversity
    1. Highly fragmented continental configuration
11. All of the following caused the Permo-Triassic extinction except
    1. Massive loss of marine life in anoxic oceans
    2. Greenhouse warming
    3. Loss of coastal and shallow water marine habitats
    4. Decrease in continental biodiversity
    5. Widespread deforestation
12. Regarding the Shoemaker-Levy 9 impact, which of the following is TRUE?
    1. If the impact occurred on Earth, it could have wiped out life down to the bacterial level
13. Which of the following has NOT been used to explain the extinction periodicity of Raup and Sepkoski?
    1. Movement of Earth through the galactic plane
    2. The presence of a small companion star to our Sun
    3. The presence of a planet outside the orbit of Pluto
    4. The presence of a planet inside the orbit of Mars
    5. The gravitational nudging of comets
14. Which of the following best describes the long-term (yrs to decades) effect of the Chicxulub impact on global climate
    1. Greenhouse conditions with elevated levels of water vapour and carbon dioxide in the atmosphere
15. Which of the following would be at a base of a food chain on land
    1. Grass
16. Which of the following likely contributed to the significant increase in greenhouse gases in the atmosphere in the Late Cretaceous?
    1. Emission of volcanic gasses
17. Which of the following best describes a comet’s composition?
    1. Ice and rocky material
18. Which of the following statement is TRUE about the Creteceous-Paleogene (K/P) extinction event?
    1. Nitrogen combining with oxygen in the atmosphere may have generated acid rain