EOSC 114 MIDTERM 1 EXAMPLE BASED ON 2016 EXAMS

REMINDER OF EXAM POLICY:

1. Each student must be prepared to produce, upon request, a UBC card for identification.
2. Students suspected of any of the following, or similar, dishonest practices shall be immediately dismissed from the examination and shall be liable to disciplinary action:
   - having at the place of writing any books, papers or memoranda, calculators, computers, sound or image players/recorders/transmitters (including telephones), or other memory aid devices, other than those authorized by the examiners;
   - speaking or communicating with other candidates;
   - purposely exposing written papers to the view of other candidates or imaging devices. The plea of accident or forgetfulness shall not be received.
3. Students must hand in all midterm materials.

For more details and UBC Policy on Student Conduct During Exams – use this link
http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,41,90,0

PLEASE NOTE – Answer keys are not provided, because that makes you less likely to learn from them. The reason is that students who memorize answers to past exams usually earn lower grades than those who study the subject material. We want you to learn the material.

1. Which of the following is most dense?

A) A 1 g wine bottle cork B) 2 kg of air C) 0.1 g of granite
D) $5x10^3$ kg of water E) A 50 g donut

2. Almost the entire mass of an atom is concentrated in the_____.

A) protons B) electrons C) nucleus
D) neutrons E) joules

3. The second most common element in the atmosphere is:

A) Nitrogen B) Oxygen C) Carbon Dioxide
D) Argon E) Radon

4. What does the metric prefix *kilo* mean?

A) Ten B) One Hundred C) One Thousand
D) One Million E) One Billion

5. The stratification in the Earth was caused by _____.

A) Differences in pressure
B) differences in density
C) differences in viscosity
D) differences in weight
E) differences in volume

6. A material that is very fluid and not very compressible is called a:

A) Solid B) Liquid C) Gas
D) Plasma E) Bose Einstein Condensate

7. If you push a car with 400 newtons of force for 10 metres in 20 seconds, how many joules of work have you done?

A) 200 J B) 220 J C) 2000 J
D) 4000 J E) 40000 J

8. If a chilled soda can is left outside on a hot day in the summer, drops of water will collect on the outside of the can. Which of the following is the most important reason this happens?

A) High humidity means the can stays cool longer.
B) As the can cools water vapour condenses on the can.
C) Water vapour in the air transfers heat energy to the can as it condenses.
D) Water vapour in the air takes heat energy from the can as it condenses.
E) Air molecules transfer heat energy to can.

9. Consider the following three phenomena: i) a flood caused by a thunderstorm; ii) a storm surge caused by a hurricane; iii) a tsunami caused by an underwater earthquake. They are all directly associated with:

A) storms
B) solar energy
C) geothermal energy
D) shorter return periods for more-intense phenomena
E) both the concentration and dilution of energy

10. Most disaster scales are logarithmic. The main reason for using this type of disaster scale is:
A) it is more confusing to the general public, thus strengthening the egos of scientists
B) the more intense disasters happen less frequently
C) the logarithmic values are smaller and more compact, thus easier to store in computer-file archives
D) the energy of most disasters varies by many orders of magnitude
E) the threat to life is related to both the disaster strength and its return period

11. How much larger is a disaster of magnitude 7 than a disaster of magnitude 4 if they are measured on an order of magnitude scale?
A) 3 B) 10 C) 100
D) 1000 E) 10000

12. Which of the following statements is correct?
A) Risk is a potential source of harm
B) Hazard is the chance a disaster could happen
C) Vulnerability is a weakness that could be affected by a disaster
D) Perception of risk in humans is directly related to the actual risk of a disaster
E) Any hazard could become a disaster

13. The table below lists Category 5 hurricanes that occurred in the Atlantic over a 10 year period. What is the return interval for Category 5 hurricanes in that time period?
A) 0.8 years B) 0.9 years C) 1 year
D) 1.1 years E) 10 years

Atlantic Category 5 Hurricanes 1998-2007

Mitch 1998	Isabel 2003	Ivan 2004	Emily 2005
Katrina 2005	Rita 2005	Wilma 2005	Dean 2007
Felix 2007			

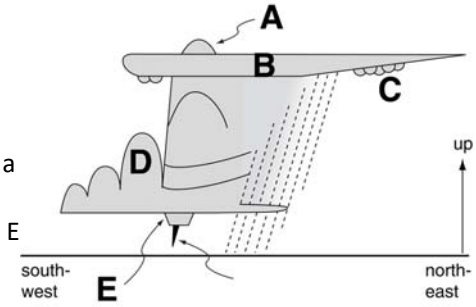
14. Large (>Mw 8) earthquakes in Vancouver occur on a roughly 500 year return interval. The last large earthquake occurred in 1700. Predict when the next large earthquake will occur:
A) 2016 B) 2200 C) 2266
D) 2516 E) Not enough information

15. The number of natural disasters are increasing. Why?
A) The number of earthquakes per year is increasing
B) The number of hurricanes per year is increasing
C) The number of landslides per year is increasing
D) The number of people are living in the path of disasters
E) The statement is incorrect, the number of natural disasters is not increasing

16. Which type of lightning strike is most survivable?
    A) A direct strike to your body
    B) A side flash from a tree branch less than 2 m from you
    C) A ground strike near where you are standing
    D) A car strike to the metal car you are driving
    E) A water strike to a pool where you are swimming

17. Which is **NOT** a type of lightning?
    A) cloud to ground
    B) intracloud or cloud to cloud
    C) cloud to air
    D) air to air
    E) ground to cloud

18. In the thunderstorm drawing to the right, which feature is a wall cloud?
    A) A B) B C) C D) D E) E



19. Why is water so important for thunderstorm energy?
    A) Moist air is heavier than dry air, so for any given wind speed the moist air has more kinetic energy.
    B) The turbulent eddies (wind swirls) behind each falling rain drop can merge together into a powerful swirl that we see as a tornado.
    C) Because thunderstorms are so warm compared to their surrounding environment, they can hold more water in the form of vapour.
    D) Rising air that cools inside thunderstorms causes water vapour to condense and release its latent heat.
    E) When the heavy moist air rises in a thunderstorm, it has greater potential energy than dry air.

20. In a satellite image, thunderstorms can be identified by their_____.
    A) circular eye B) oval anvil C) rapid rotation
    D) cylindrical downburst E) tapered wall cloud

21. Radar echo intensity is displayed using what scale?
    A) inches of mercury B) km/hour C) acoustic energy scale (AES)
    D) kPa E) dBZ

22. Which phenomenon is generally **NOT** associated with a downburst?
    A) straight line winds B) gust front C) haboob
    D) arc cloud E) mammatus cloud

23. Which pair of phrases are **NOT** generally associated with each other?
    A) condensation / latent heating
    B) saturation / clouds
    C) continuity / lightning
    D) updrafts / adiabatic cooling
    E) evaporation / latent cooling

24. Which statement is **FALSE**?
    A) Some tornadoes are invisible.
    B) Some tornadoes create debris clouds.
    C) Some tornadoes create funnel clouds.
    D) Some tornadoes translate rapidly across the ground.
    E) Some tornadoes have high pressure in their core.

25. If the roof and outside walls of a wood-frame home are destroyed, but the interior walls are still standing after a tornado hits, then the tornado intensity would be classified as:
    A) EF1 B) EF2 C) EF3 D) EF4 E) EF5

26. Of the following options, which is least safe for your survival during a tornadic storm?
    A) get under the bed in your mobile home
    B) drive away from the storm
    C) go to the basement
    D) go to a community storm cellar
    E) go to an interior above-ground room

27. In North America, the greatest frequency of tornadoes is at what location on average?
    A) Southeast USA (e.g., Florida)
    B) Central USA (e.g., Oklahoma)
    C) Canadian Great Lakes (e.g., Ontario)
    D) Prairie provinces, Canada (e.g., Alberta)
    E) Central British Columbia (near Prince George)

28. Which statement is **FALSE**?
    A) Strong tornadoes are always associated with thunderstorms.
    B) Six or more tornadoes in a day in one region is called a tornado outbreak.
    C) Most tornadoes in North America move toward the southeast.
    D) Doppler radar can help detect tornadic rotation inside a thunderstorm.
    E) The decaying stage of a tornado often looks like a rope.

29. Mammatus clouds indicate _____ .
    A) that the storm is a supercell
    B) that the storm is tornadic
    C) that the storm has large hail
    D) that the storm is likely to have heavy rain that can cause flooding
    E) nothing special about the storm

30. Which statement about air motion is **FALSE**?
    A) Vertical motion (up- and down-drafts) can be driven by buoyancy.
    B) Vertical motion can be associated with mass continuity.
    C) Horizontal motion can be associated with mass continuity.
    D) Stronger horizontal motion can be driven by higher pressure.
    E) Horizontal motion can be the result of increasing pressure gradients aloft caused by horizontal gradients of temperature.

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