

EOSC 114 MIDTERM 2 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

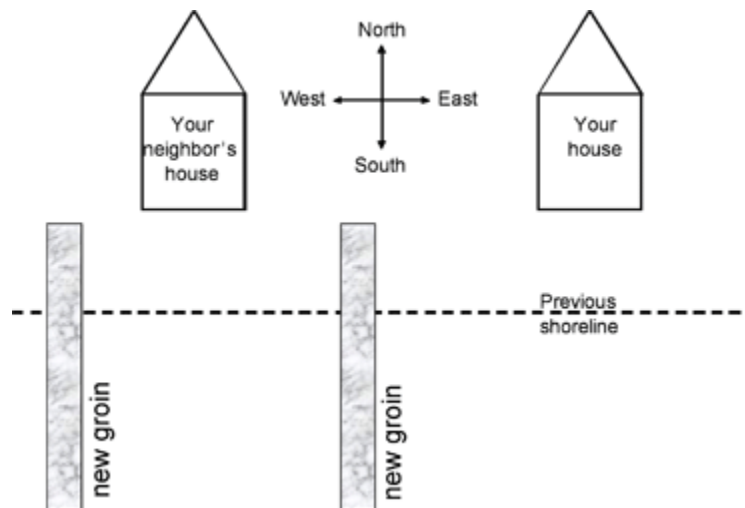
<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,41,90,0>

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. Waves in the middle of the ocean typically have a maximum of _____.
A) 700 km/hour wave speed B) 40 m wave height C) 3 day wave period
D) a Beaufort 9 condition E) 150 m wavelength
2. A wave with a wavelength of 200 meters is a deep water wave at a minimum water depth of _____ metres.
A) 5 B) 10 C) 50 D) 70 E) 100
3. To calculate wave speed while on a ship in the middle of the ocean, the most practical wave parameter to measure is _____.
A) wavelength B) period C) distance D) height E) amplitude
4. Rogue waves are notorious off the Cape of Good Hope in South Africa because _____.
A) the Southern Ocean has the longest fetch
B) this is where the largest wind waves in the world constructively interfere with very strong currents flowing into the Southern Ocean
C) wave heights are the highest in the world year-round
D) the large waves from the Southern Ocean approach the Cape very rapidly, thus growing to great heights
E) storm surges destructively interfere with the currents
5. Which of the following events would **NOT** trigger a tsunami?
A) The collision of strong currents and strong wind waves in the Antarctic Ocean.
B) A massive landslide into a semi-enclosed basin.
C) A meteorite impact into the deep ocean.
D) The eruption of an underwater volcano.
E) An earthquake causing vertical fault motion on the seafloor.
6. A force or event that generates tsunami is _____ and the restoring force is _____.
A) earthquake/surface tension
B) wind/gravity
C) change in atmospheric pressure/surface tension
D) landslide/gravity
E) landslide/wind
7. Which of the following is **FALSE** about tsunami?
A) The trough of a tsunami can arrive first, sucking the ocean water out away from land.
B) The crest of a tsunami can arrive first, giving little warning to people near the coastline.
C) The second tsunami wave to arrive is larger than the first one.
D) Tsunami can be detected using tsunameters anchored in the seafloor.
E) Tsunami can travel at about the speed of a jet plane.
8. Which does **NOT** contribute to the generation of a fully developed sea?
A) fetch B) constructive interference C) wind speed
D) wind duration E) All of the above contribute

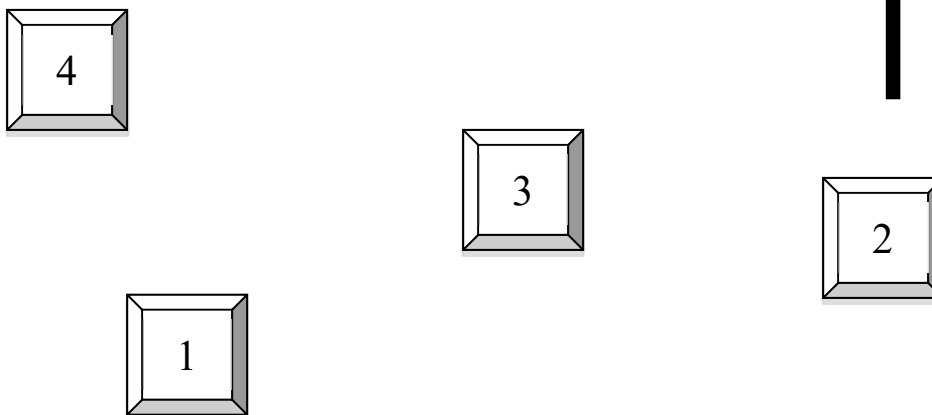
9. Which of the following phrases will make this a **TRUE** statement?
 "When a tsunami warning is issued after a megathrust earthquake occurs off the Alaskan coastline, _____."
 A) residents on the west coast of Vancouver Island should wait for the typical sea level drawdown before evacuating
 B) boats must be securely anchored in harbors to avoid destruction
 C) coastlines are safe after the fourth wave has arrived
 D) residents may retreat to higher floors of buildings, if evacuation from the coastline is impossible
 E) residents living near protected inlets and harbors on the west coast of Vancouver Island do not have to evacuate
10. Compared to Tofino, Port Alberni on Vancouver Island suffered more damage from the tsunami generated by an earthquake in 1964 because _____.
 A) the tsunami arrived much earlier than expected
 B) town residents did not have enough time to secure property and to evacuate to higher ground
 C) refracting tsunami waves constructively interfered resulting in larger waves than expected
 D) local effects of the semi-enclosed Alberni Inlet caused wave heights to increase as they approached Port Alberni
 E) a tsunami-generated seiche in Alberni Inlet combined with the tsunami to create waves with greater wave heights
11. A storm surge _____.
 A) is a tall mound of water that approaches shore like a wave, in a series of crests and troughs
 B) is mound of seawater, associated with tropical cyclones, that spills onto land
 C) is more dangerous when it hits shore during low tide
 D) causes only minor flooding on land and rarely any deaths
 E) occurs when waves from different storms collide, combining to form an unexpected giant wave
12. Which statement is **TRUE**? At Kitsilano Beach, _____.
 A) perfect pipeline (plunging) waves do not happen because the seafloor is very flat
 B) as a wave approaches shore, the motion of water particles is unaffected by friction with the ocean bottom
 C) deep water waves become shallow water waves at 5m depth
 D) waves form whitecaps when the bottom of the wave outraces the top of the wave
 E) water particles move in a back-and-forth motion as a wave passes
13. Which of the following mitigation strategies dissipates or scatters wave energy while allowing sediment transport?
 A) seawalls
 B) tethered-float breakwaters
 C) solid breakwaters
 D) jetties
 E) groins
14. Seiche can occur in all of the following places **EXCEPT** _____.
 A) Hilo Bay, Hawaii
 B) Lake Tahoe
 C) reservoirs
 D) the western Pacific Ocean
 E) your coffee cup

15. Refer to the figure below. Imagine that you live in a house at the beach where longshore drift is from east to west. Your neighbour to the west builds two new groins. The sand on the beach in front of your house will _____.
- A) not change
 - B) be carried to the east and deposited in front of a different neighbor's house
 - C) be carried around the groins and continue its journey to the west
 - D) build up gradually
 - E) erode completely unless another source of sand contributes to your beach



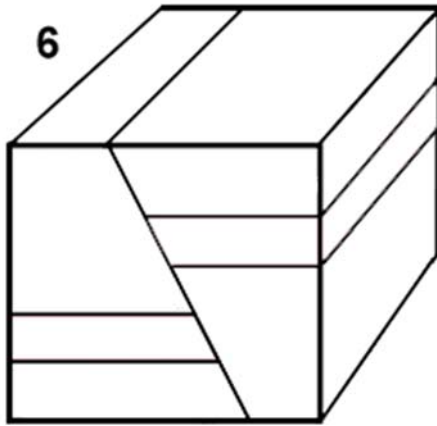
16. At a divergent margin, what conditions are most likely to result in an earthquake?
- A) Plastic deformation under the influence of tensional forces.
 - B) Brittle deformation under the influence of compressional forces.
 - C) Elastic deformation under the influence of shearing forces.
 - D) Elastic deformation under the influence of compressional forces.
 - E) Brittle deformation under the influence of tensional forces.
17. When we refer to lithospheric plates, we are talking about _____.
- A) ductile rocks above the rigid asthenosphere
 - B) everything above the outer core
 - C) rigid parts of the lower mantle
 - D) compositionally uniform portions of the crust
 - E) rigid parts of the upper mantle and crust
18. Convergent plate margins are dominantly associated with _____.
- A) normal faults
 - B) reverse faults
 - C) strike-slip faults
 - D) no faults, only earthquakes
 - E) no faults and no earthquakes

19. Which of the following hazards would **NOT** be associated with earthquakes in the Himalayas?
- A) Tsunami
 - B) Landslides
 - C) Building Collapse
 - D) Liquefaction
 - E) Fires
20. If two M_w 7 earthquakes were felt in Vancouver, with the epicenter of the first being 100 km away and the second being 10 km away, the difference of intensity of the earthquakes is likely to be:
- A) first is more intense than the second
 - B) second is more intense than the first
 - C) they both have the same intensity
 - D) it would depend how much energy is released
 - E) it would depend on what time of day they struck
21. Faulting and earthquakes are examples of _____.
- A) brittle behaviour
 - B) elastic behaviour
 - C) ductile behaviour
 - D) A and B
 - E) A and C
22. Look at the diagram below. If four seismic stations (1-4) in and around SW British Columbia recorded data from the same earthquake and the time between the arrival of P and S waves gets progressively longer as you go from station 1 to 3 to 4, what is the most likely relative location of the earthquake? Arrow points to north.
- A) To the west of Station 4
 - B) To the east of Station 2
 - C) To the south of Station 1
 - D) To the north of Station 3
 - E) To the north of Station 2



23. An earthquake will trigger a 1-story house to vibrate or resonate _____.
- A) at a much lower frequency (slower vibrations) than a tall skinny building
 - B) at about the same frequency as a tall skinny building (dimensions don't matter)
 - C) at a much higher frequency (faster vibrations) than a tall skinny building
 - D) for a shorter time if built in Richmond instead of North Vancouver
 - E) C and D are correct

24. The type of fault in the figure to the left is a _____.



- A) normal fault
- B) reverse fault
- C) strike-slip fault
- D) Brett's fault
- E) none of the above

25. You are in the Lower Mainland when a M_w 9.2 megathrust earthquake hits off the coast of Vancouver Island. Which of the following places would be the most dangerous to be, and why?
- A) An open field in Surrey, because the ground could crack open and swallow you up.
 - B) Over in North Vancouver, because the liquefaction risk is extremely high.
 - C) In Delta, because of high risk of landslides caused by the earthquake.
 - D) Downtown Vancouver, because of material falling off of sky scrapers.
 - E) In a wooden single-family home, because wood performs poorly in earthquakes and the house will turn into a pile of rubble.
26. An earthquake hits directly underneath Vancouver at a depth of 10 km, with a M_w of 7.1. Which of the following is a **TRUE** statement about the earthquake and its effects?
- A) The Modified Mercalli index number will be higher in North Vancouver than in Richmond.
 - B) The duration of shaking will be longer in North Vancouver than in Richmond.
 - C) You will be immune to liquefaction hazards in False Creek because you live in a high-rise, newly built, condo tower.
 - D) The earthquake will generate a tsunami in the Pacific Ocean affecting the west Coast of Vancouver Island.
 - E) Older masonry buildings will be more heavily damaged than either newer taller buildings or wooden houses.
27. If an earthquake occurs, you should be ready to do which of the following, both during and after the earthquake?
- A) Get under a sturdy table or desk to avoid objects falling on your head.
 - B) Be without help for at least 3 days.
 - C) Stop making yourself a sandwich and get out of the kitchen.
 - D) Get away from old masonry buildings if outside.

E) All of the above.

28. P-waves travel through the Earth at ~6km/s, at what speed do S-waves travel?

- A) ~1.5 km/s
- B) ~3.5 km/s
- C) ~5.5 km/s
- D) ~7.5 km/s
- E) ~9.5 km/s

29. Which of the following statements about earthquakes is **TRUE**?

- A) Magnitude is a measure of the damage caused by an earthquake.
- B) Intensity is a measure of the amount of ground displacement during an earthquake.
- C) Magnitude and intensity are always the same as each other
- D) Magnitude is a measure of the amount of energy released during an earthquake
- E) Intensity is a measure of the speed of the earthquake waves

30. Which of the following observed precursors is useful for predicting earthquakes?

- A) Strange animal behaviour.
- B) Radon emissions.
- C) Water table changes.
- D) All of the above, precursors are very useful for earthquake prediction.
- E) None of the above, precursors are not useful for earthquake prediction.

--THE END--