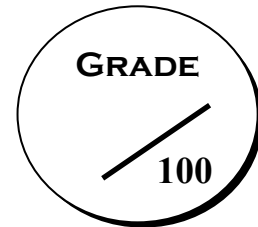


AMERICAN UNIVERSITY OF BEIRUT

Department of Geology

GEO. 104 EXAM 1



Name:

Date: 23/03/2007

ID No.:

Time: 1 hr.

Section:

Part I: Multiple-choice questions (80%).

Choose the best answer for the following 40 questions.

1. During the last half of the 20th Century, earthquakes and _____ account for the majority of deaths from natural disasters.
a. volcanic eruptions c. hurricanes
b. floods d. tornadoes
2. The return period of a disaster is the average number of years:
a. before survivors return to their homes
b. between same-sized events
c. between events of the same type, regardless of size
d. before the economy returns to pre-disaster levels
3. The rapid increase in human population during the past several centuries is an example of _____ growth.
a. linear c. integrated
b. parabolic d. exponential
4. Using the rule of 70, a population growth rate of 2% annually will result in doubling a population in _____ years.
a. 70 c. 7
b. 35 d. 2
5. The primary energy sources that make the Earth an active body include all but which of the following?
a. Earth's internal heat
b. gravity
c. impact of extraterrestrial bodies
d. None of the choices
6. As radioactive atoms decay, energy is:
a. absorbed
b. released
c. neither absorbed nor released

- d. may be absorbed or released, depending on which isotope is involved in the decay*
7. The law of gravity states that two bodies attract each other with a force directly proportional to the product of their masses and inversely proportional to the _____ of the distance between them.
- | | |
|-----------------------|-----------------------|
| <i>a. first power</i> | <i>c. cube</i> |
| <i>b. square</i> | <i>d. square root</i> |
8. The Earth's layering can be described as separations based on:
- | | |
|-------------------------------|--|
| <i>a. differing densities</i> | <i>c. different chemical composition</i> |
| <i>b. different strengths</i> | <i>d. all the choices</i> |
9. The type of mechanical behavior illustrated by the flow of ice in glaciers typifies that of the rock within the Earth's:
- | | |
|-------------------------|-----------------------|
| <i>a. asthenosphere</i> | <i>c. lithosphere</i> |
| <i>b. crust</i> | <i>d. a & b</i> |
10. Which of the following is not a basic principle of plate tectonics?
- melted asthenosphere flows upward as magma and cools to form new ocean floor lithosphere*
 - the new lithosphere slowly moves laterally away from the zones of oceanic crust formation on top of the underlying asthenosphere (seafloor spreading)*
 - when the leading edge of a moving slab of oceanic lithosphere collides with another slab, the older, colder, denser slab turns downward and is pulled by gravity back into the asthenosphere (subduction), while the less-dense, more buoyant slab overrides it*
 - the slab pulled into the asthenosphere begins the process of melting and moves into the liquid core*
11. When oceanic lithosphere collides with another plate, the _____ in the process of subduction.
- older, colder plate goes beneath the younger, warmer plate*
 - younger, warmer plate goes beneath the older, colder plate*
 - plates both disappear downward*
 - plates pile up, forming mid-ocean ridges*
12. The greatest earthquakes in the world occur:
- where plates separate from one another*
 - where plates slide past each other*
 - where plates collide with each other*
 - in the interiors of individual plates*
13. Shallow subduction zone earthquakes occur:
- in the upper portion of the down-going plate*
 - at the bend in the subducting plate*
 - in the overriding plate*
 - all of the above*

14. Three basic classes of collisions include all but which of the following?
- oceanic plate versus oceanic plate*
 - oceanic plate versus continent-bearing plate*
 - continental plate versus continental plate*
 - mantle plate versus lithospheric plate*
15. The map of _____ can be viewed as a connect-the-dots puzzle.
- hot spots*
 - lithospheric plates*
 - earthquake epicenters*
 - faults*
16. The divergent or pull-apart motion at spreading centers causes rocks to fail in _____, yielding mainly _____ earthquakes.
- tension ; larger and destructive*
 - tension ; smaller and unthreatening*
 - compression ; larger and destructive*
 - compression ; smaller and unthreatening*
17. The compressional movements at _____ generate the largest tectonic earthquakes and they affect the widest areas.
- subduction zones & seafloor spreading centers*
 - subduction zones & continent-continent collisions*
 - transform faults & seafloor spreading centers*
 - transform faults & ocean-ocean collisions*
18. Earthquakes are most commonly caused by:
- explosions of nuclear bombs*
 - undersea landslides*
 - meteorite impacts*
 - sudden earth movements along faults*
19. The point on the Earth's surface directly above the point where the fault first ruptures is called the:
- epicenter*
 - hypocenter*
 - depocenter*
 - ethnocenter*
20. The _____ wave travels fastest and moves in a push-pull fashion of alternating pulses of compression (push) and extension (pull).
- Love*
 - Rayleigh*
 - P-*
 - S-*
21. Which of the following wave types travels slowest through rocks?
- P-waves*
 - S-waves*
 - surface waves*
 - body waves*
22. The frequency of a wave is:
- the amount of displacement of the medium through which the wave is passing*
 - the number of waves passing a given point per unit time*
 - the time between successive waves*
 - the energy of the wave*

23. Seismic waves that travel only near the Earth's surface are of two main types:
 _____ waves.
- a. *S- and Love*
 - b. *P- and Rayleigh*
 - c. *P- and Love*
 - d. *Love and Rayleigh*
24. Tsunamis are created by big "splashes" made in the deep ocean by all but which of the following?
- a. *fault movements*
 - b. *landslides*
 - c. *volcanic eruptions*
 - d. *magnetic reversals*
25. The captain of a ship tells you that he once experienced a huge tsunami while sailing in the Pacific Ocean several hundred miles from any landmass. You decide that this sounds untrue because:
- a. *in deep water, tsunamis are not generally felt because they have low wave heights and long wavelengths*
 - b. *the ship could not have survived a tsunami*
 - c. *earthquakes do not occur in deep ocean waters*
 - d. *the captain did not describe any tremors or shaking associated with an earthquake*
26. Using the S-P timing method, epicenters can be located using seismograms from a minimum of _____ recording stations.
- a. *one*
 - b. *two*
 - c. *three*
 - d. *four*
27. The Richter Scale is set up so that for every _____ increase in the amplitude of the recorded seismic wave, the Richter magnitude increases one number, e.g., from 4 to 5.
- a. *two-fold*
 - b. *four-fold*
 - c. *ten-fold*
 - d. *hundred-fold*
28. Earthquake moment is calculated by multiplying all but which of the following quantities together?
- a. *the shear strength of the rocks*
 - b. *the rupture area of the fault*
 - c. *the average displacement (slip) on the fault*
 - d. *the Modified Mercalli Intensity at the epicenter*
29. Usually, the biggest concern in designing buildings to withstand large earthquakes is the _____ components of movement.
- a. *upward push from the vertical*
 - b. *downward pull from the vertical*
 - c. *sideways push from the horizontal*
 - d. *oblique push from the oblique*
30. Earthquake-induced ground motions cause buildings to sway at certain periods. In general, the taller the structure, the _____ the period.
- a. *longer*
 - b. *shorter*
 - c. *period does not depend on building height*
 - d. *none of the above*

31. The biggest shaking event is the _____, the smaller ones before it are known as foreshocks, and the smaller ones after it are called aftershocks.
- earthquake*
 - rupture*
 - shock*
 - focus*
32. The shaking produced by Rayleigh waves causes _____ movement.
- vertical*
 - horizontal*
 - no*
 - a & b*
33. Tsunami arrive as a series of several waves separated by periods typically in the _____ minute range.
- 0.5 to 1*
 - 1 to 5*
 - 10 to 60*
 - 200 to 300*
34. A natural hazard is _____ of a dangerous event. It _____ exist(s) where disasters are infrequent.
- the probability of occurrence ; doesn't*
 - the probability of occurrence ; even*
 - the occurrence ; even*
 - the occurrence ; doesn't*
35. Frequent occurrences are _____ in magnitude, rare occurrences are _____ in magnitude.
- low ; low*
 - low ; high*
 - high ; high*
 - high ; low*
36. The lithosphere is _____ whereas the asthenosphere is _____.
- viscous like ; plastic*
 - viscous like ; rigid*
 - plastic ; rigid*
 - rigid ; viscous like*
37. The fault causing the major earthquakes in the Arabian Plate is called the:
- San Andreas fault*
 - Anatolian fault*
 - Dead Sea Transform fault*
 - Arabian fault*
38. _____ rupture and duration generates _____ frequency seismic waves.
- short ; high*
 - long ; low*
 - short ; low*
 - a & b*
39. To eliminate resonance in earthquake-prone areas, we build _____ buildings on soft foundation and _____ buildings of hard rocks.
- short stiff ; tall flexible*
 - short stiff ; short stiff*
 - tall flexible ; tall flexible*
 - tall flexible ; short stiff*
40. The attached image shows a building that failed during an earthquake due to:
- building on hard rocks*
 - absence of shear walls in the ground floor*
 - hard shear walls in the ground floor*
 - all of the above*



Part II: (20%).

Answer the following questions.

1. Label the attached map “Q1” (10 items). For each location identify the **zone type** and the **earthquake** it generates (*light, strong to major or great*).

2. Fill in the blanks with the correct expressions (10 items).

Earthquake magnitude scales are used to assess the _____ during an earthquake. The most famous scale used for small to moderate earthquakes is called the _____ and _____. Earthquake intensity scales assess the effects on _____. The famous scale for intensity is called the _____. Its value at a given location depends on different variables: (1) _____, (2) _____, (3) _____, (4) _____ and (5) _____.

BEST WISHES

