

# GEOLOGY 1C

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### TEST #2 - Sample Questions

#### Continental Drift - Plate Tectonics – Earthquakes & Structure

##### True - False

1. Pangaea initially separated into two parts, Laurasia and Gondwanaland, both supercontinents.
2. Plate tectonics combines the concepts of sea-floor spreading with continental drift.
3. A descending plate will not generate magma until it reaches a depth of 100 kilometers.
4. A plate (the geological concept) is always made up of a combination of continental and oceanic crust.
5. Ocean-continent convergence forms either island arcs or belts of igneous activity on the edges of continents.
6. The Red Sea and Gulf of Aden are active converging plate boundaries.
7. Backarc crust appears to be the type of crust found in ophiolites.
8. Rapid spreading rates are thought to be related to falling sea level.
9. The steeper the angle of subduction, the closer the island arc is to the trench.
10. The San Andreas fault is also called a transform fault or a strike-slip fault.
11. Subducting crust in an ocean-ocean convergence produces basaltic magma while an ocean-continent convergence produces granitic magma.
12. The assumptions concerning the composition of the Earth's core are based on studies of deep drilling projects.
13. The asthenosphere can't be liquid because S waves pass through it.
14. Seismic waves travel faster through oceanic crust than through continental crust.

15. Generally, seismic waves travel faster with an increase in depth.
16. Isostasy refers to the balance or equilibrium of the crust as it “floats” above a plastic mantle.
17. The rise of the surface of the crust after the removal of glacial ice is known as isostatic rebound.
18. A joint is a fracture or crack in bedrock along which displacement has taken place.
19. Any fracture or crack in bedrock is a fault.
20. A strike-slip fault is a fault in which movement is predominantly horizontal.
21. Horsts and grabens reflect responses to compressional stresses.
22. The opposite of a horst is a graben.
23. A thrust fault is really a low angle reverse fault.
24. New seafloor crust is created at a divergent plate boundary.
25. A transform plate boundary is always associated with oceanic ridges.
26. Earthquakes occur more or less uniformly throughout the Earth and there isn't any place that hasn't experienced at least one 'quake during geologic time.
27. According to the elastic rebound theory, earthquakes are the sudden release of stored energy, usually along faults.
28. The incidence of earthquakes increases with depth inside the Earth.
29. Surface seismic waves originate at the epicenter of an earthquake.
30. Small earthquakes following the main event are called foreshocks.
31. The difference in arrival times between P and S waves determines the distance of the seismograph from the focus.
32. P and S waves are called body waves because they travel through the Earth's interior.
33. The first waves to be recorded at any seismograph are the shear waves.
34. Surface waves are the fastest earthquake waves.
35. The modified Mercalli Scale measures earthquake intensity, based on damage, while the Richter Scale measures earthquake magnitude, based on energy released.
36. Body waves pass through any material while surface waves only pass through rocks.
37. An earthquake measuring 5 on the Richter Scale will release more than 900 times more energy than an earthquake measuring a 4 on the same scale.
38. Houses built on solid rock suffer more damage in strong earthquakes than those built on softer sediments.
39. Earthquakes occur most commonly in the middle of plates.
40. The earthquake with the highest recorded magnitude ever to occur in North America struck near Anchorage, Alaska in 1964.
41. Ocean trenches with concentrations of deep focus earthquakes extending at an angle into the Earth are called Benioff zones.
42. Deep focus earthquakes are most common along the crests of mid-ocean ridges.

43. Transform plate boundaries are marked by shallow focus earthquakes along faults with strike-slip motion.
44. The point on the Earth's surface immediately above the focus is called the seismic center.
45. Paleoseismology studies the past record of earthquakes.
46. Seismographs can only detect earthquakes within 1000 miles of the instrument.
47. Periodically, the Earth's magnetic field reverses with the north and south magnetic poles switching polarity.
48. The rate of seafloor spreading averages about 1 meter per year.
49. San Francisco, having had two destructive earthquakes, will most likely be visited with many other such intensive quakes.
50. The liquid outer core is probably responsible for the Earth's magnetic (polarity) anomalies.

## **MULTIPLE CHOICE ----- TEST # 2**

1. Seismic shear waves
  1. pass through all kinds of materials
  2. pass through solids only
  3. are one of two kinds of waves used to locate earthquake epicenters
  4. cause most of the earthquake damage on the surface of the earth
  5. responses 2 & 3 only.
2. Earthquakes consist of a pattered sequence of waves that arrive in the following sequence:
  1. primary, love, rayleigh, shear
  2. rayleigh, shear, love, primary
  3. primary, shear, love, rayleigh
  4. focus, epicenter, primary, shear
  5. none of these.
3. A fracture in bedrock along which movement has occurred is called

1. plane      2. joint      3. strike      4. strain      5. fault.

4. The point within the Earth where seismic waves first originate and from where all waves

propagate is called

1. scarp      2. epicenter      3. focus      4. trace      5. origin.

5. Deep focus earthquakes are most common in

1. continental interiors      2. along mid-oceanic ridges      3. where volcanoes also occur

4. subduction zones      5. at the poles.

6. Most of the destruction caused by the 1906 San Francisco earthquake was from

1. fires      2. building collapse      3. landslides      4. soil displacement      5. tsunamis.

7. The greatest loss of life in the 1964 Alaskan earthquake and the 2004 Indonesian earthquake

was from

1. landslides      2. tsunamis      3. fires      4. building collapse      5. soil displacement.

8. According to the elastic rebound theory, earthquakes are the sudden release of stored

1. seismic waves      2. strain      3. tectonism      4. stress      5. ductile behavior.

9. Which seismic wave is fastest?

1. Love waves      2. Rayleigh waves      3. Shear waves      4. Primary waves  
5. Surface waves.

10. Body waves are seismic waves that

1. cause the most damage from earthquakes  
2. are the last to arrive at the seismograph  
3. resemble water waves formed by throwing a pebble into a pond  
4. cause vibrations perpendicular to wave propagation  
5. spread out from the focus in all directions.

11. Surface waves cause most property damage because

1. they travel slowly and produce the greatest ground movement  
2. they are the first to arrive at any point      3. they are emitted from the epicenter  
4. they vibrate perpendicular to the direction of wave propagation  
5. they vibrate parallel to the direction of wave propagation.

12. S waves are the second to arrive at a recording station because



20. Deep earthquakes below 100 km. may be due to
1. the collapse of minerals into a denser form
  2. collision of convection currents
  3. collapse of pore space in sedimentary rocks
  4. friction between core and mantle
  5. the rise of core material into the mantle.
21. Which of the following would not be associated with Benioff zones?
1. andesite volcanoes
  2. diverging plate boundaries
  3. oceanic trenches
  4. edges of continents
  5. island arcs.
22. The maximum depth of focus of earthquakes is
1. 100 km.
  2. 550 km.
  3. 670 km.
  4. the earth's center
  5. the core –mantle boundary.
23. The circum-Pacific Belt is best known as an area for
1. a Benioff zone
  2. the San Andreas fault
  3. the boundaries for all the major plates
  4. diverging plate boundaries
  5. deep focus earthquakes, andesite volcanoes and trenches.
24. Shallow focus earthquakes are most common where
1. the rock masses and their faults are lighter and tend to float on the heavier rocks below
  2. divergent boundaries redirect earthquakes to the surface producing shallow focus 'quakes
  3. the plate boundaries are divergent
  4. seismic pathways which allow for deep earthquakes to escape the earth's interior don't occur at divergent boundaries
  5. this is where all faults originate.
25. A famous example of a transform fault is the
1. New Madrid Seismic Zone
  2. New York-Alabama Line
  3. San Andreas Fault
  4. Mid-Atlantic Ridge
  5. Grand Teton Mountains.
26. The phenomenon that allows shaken, saturated soil to lose its strength during an earthquake is called
1. creep
  2. liquefaction
  3. solifluction
  4. rupture
  5. gelation.

27. How many recording stations are necessary to determine the location of an earthquake?  
1. One      2. Two      3. Three      4. Four      5. Five.
28. Mountains are thought to be “rooted” because of the influence of  
1. isostatic adjustment      2. crustal rebound      3. mantle convection  
4. mohorovicic discontinuity      5. subducting oceanic lithosphere.
29. Plastic flow in the mantle probably takes place in the  
1. asthenosphere      2. lower crust      3. inner core      4. outer core      5. moho.
30. Continental heat flow is mostly produced by  
1. mantle plumes      2. cooling magmas      3. radioactive decay  
4. thinning of the crust      5. continents have no heat flow.
31. The fact that there are areas of the Earth that do not propagate seismic waves tells us what about the interior of the Earth?  
1. it is comprised of a variety of different rock types      2. a large part of the core is liquid  
3. there are voids within the Earth      4. the propagation of seismic waves is sporadic
32. Which of the following was not cited by Wegener as evidence for continental drift?  
1. polar wandering      2. distribution of ridges and trenches      3. distribution of fossil plants  
4. distribution of Paleozoic glaciations      5. distribution of Paleozoic reefs and deserts.
33. According to sea-floor spreading, the age of the sea floor  
1. should become older as the water becomes deeper  
2. should become older toward the trench  
3. should become younger as the deep waters become colder  
4. should become younger toward the trench  
5. the sea floor is the same age throughout.
34. The maximum rate of sea-floor spreading is  
1. 10 cm/yr.      2. 100 cm/yr.      3. 50 feet/yr.      4. 24 cm/yr.      5. 1 cm/yr.
35. The Rift Valleys of East Africa are a perfect example of a  
1. diverging plate boundary      2. converging plate boundary  
3. transform plate boundary      4. barkarc spreading center      5. continental rise.

36. Which of the following is not a type of converging plate boundary?
1. continent – continent
  2. mid-ocean ridges
  3. oceanic – oceanic
  4. oceanic – continent
  5. all are converging plate boundaries.
37. The Himalayan Mountains formed by
1. continent – ocean convergence
  2. ocean – ocean convergence
  3. continent – continent convergence
  4. spreading center
  5. transform faulting.
38. Rising mantle plumes form “hot spots” that produce uplift and
1. andesitic volcanoes
  2. transform faults
  3. flood basalt
  4. spreading centers
  5. subduction zones.
39. Iceland, Yellowstone National Park and Hawaii reflect the effects of
1. converging plate boundaries
  2. trenches
  3. aseismic ridges
  4. mantle plumes
  5. failed rifts.
40. According to the theory of plate tectonics, the youngest seafloor should be at the
1. trenches
  2. ridges
  3. transform faults
  4. aseismic ridges
  5. guyots.
41. Spreading center volcanism most generally produces rocks which are
1. granitic in composition
  2. basaltic in composition
  3. andesitic in composition
  4. ultramafic in composition
  5. none of these.
42. Convergent plate boundaries are zones where plates
1. slide past one another
  2. move together causing one to subduct
  3. move apart leaving a gap
  4. cause seafloor spreading
  5. none of these.
43. The Aleutian Islands are the result of plate interaction at which type of boundary?
1. divergent
  2. convergent (oceanic – oceanic)
  3. transform fault
  4. convergent (oceanic – continental)
  5. convergent (continent – continent).
44. Oceanic crust is neither created nor destroyed along this type of plate boundary.
1. divergent
  2. convergent
  3. transform fault
  4. trench areas
  5. none of these.
45. Earthquakes are generated in association with
1. divergent boundaries
  2. convergent boundaries
  3. transform fault boundaries
  4. all of these
  5. only some of these.

46. Deep focus earthquakes are associated with  
 1. divergent plates      2. subduction zones      3. transform fault boundaries  
 4. all of these      5. choices 1 and 2 but not 3.
47. Island arc systems are associated with  
 1. divergent plates      2. convergent (ocean – continent) boundaries  
 3. subduction zone (ocean –ocean)      4. convergent (continent – continent) zone  
 5. transform fault boundaries.
48. Iceland is located along  
 1. a deep ocean trench      2. the edge of converging plates      3. a subduction zone  
 4. a very long transform fault      5. an oceanic ridge system.
49. An earthquake with a magnitude of 6.5 on the Richter Scale releases about.....times more energy than one with a 4.5.  
 1. 5      2. 10      3. 30      4. 50      5. 900.
50. Which of the statements is true concerning primary waves?  
 1. travel only in solids      2. travel faster than secondary waves      3. are slower than S waves  
 4. are responsible for an earthquakes destruction      5. can't be recorded on a seismograph.
51. S waves  
 1. are the same as surface waves      2. travels through solids, liquids and gases  
 3. propagate slower than P waves      4. are the only waves recorded on a seismograph  
 5. are slower than L waves.
52. The Mercalli scale rates earthquake intensity by determining the  
 1. amount of damage to human structures      2. number of faults in the area  
 3. maximum motion recorded on seismic instruments      4. maximum height of tsunamis  
 4. none of these.
53. The amount of destruction caused by earthquake vibrations is affected by  
 1. the design of structures      2. the intensity and duration of the vibrations  
 3. the nature of the surface material      4. all of these      5. only choices 2 and 3.
54. L waves are also known as

1. surface waves      2. primary waves      3. seismic sea waves      4. secondary waves  
5. none of these.
55. Tsunamis  
1. are often generated by movements of the ocean floor  
2. are waves produced by tidal forces  
3. often strike the mainland of Asia but for unknown reasons do not strike Japan  
4. all of these      5. none of these.
56. Major earthquakes are often followed by somewhat smaller events called  
1. tremors      2. foreshocks      3. tsunamis      4. aftershocks      5. hyposhocks.
57. Most very strong earthquakes occur in a zone known as the  
1. circum-Pacific belt      2. mid-ocean ridge      3. high intensity seismic belt  
4. Antarctic Ridge      5. asthenosphere.
58. The quantity of energy released by an earthquake is a measurement referred to as  
1. magnitude      2. intensity      3. displacement      4. stress      5. ergs.
59. The position on the Earth's surface directly above the focus is referred to as the  
1. seismic site      2. epicenter      3. wave front      4. inertial point      5. Reid zone.
60. This type of seismic wave propagates through intervening material by compressing and dilating the rocks in the direction that the wave is traveling.  
1. P wave      2. S wave      3. surface wave      4. tsunami      5. seiches.
61. The destruction caused by an earthquake is affected by  
1. the type of ground material on which any structure sits  
2. distance from the earthquake      3. the design and structure of buildings  
4. the magnitude and intensity of the event      5. all of these.
62. A succession of ocean waves set in motion by a submarine eruption is called a  
1. tidal bore      2. tidal surge      3. tsunami      4. seismic sea wave      5. choices 3 and 4.
63. The distance between a seismological recording station and the earthquake source is determined from

1. the calculation of the earthquake magnitude                      2. the intensity of the earthquake
  3. the length of the seismic record                      4. the arrival times of P and S waves
  5. the measure of the amplitude of the surface waves.
64. The slow but continual movement which occurs along some fault zones is termed
1. slip              2. creep              3. stick-slip              4. strike-slip              5. fault drag.
65. The difference in arrival time between P and S waves is equivalent to
1. depth of the focus                      2. intensity                      3. distance from the epicenter
  4. amplitude                      5. amount of damage
66. The interpretation that the Earth's outer core is liquid comes from
1. density calculations                      2. studies of meteorites              3. studies of L waves
  4. the outer core is not liquid              5. none of these.
67. Lava extruded into the cold water of the seafloor has a characteristic appearance termed
1. andesitic lava              2. pillow lava              3. sheeted dikes              4. gabbro              5. peridotite.
68. The diameter of the Earth's core is determined by calculations based on
1. P and S wave shadow zones              2. deep drill holes              3. gravitational anomalies
  4. magnetic anomalies              5. heat flow conditions.
69. Plastic flow in the mantle probably takes place in the
1. lower crust              2. core              3. outer core              4. asthenosphere              5. shadow zone.
70. The apparent movement of the magnetic poles through geologic time is called
1. mantle plume motion                      2. polar drift                      3. seafloor spreading
  4. continental drift                      5. polar wandering.
71. Most of the world's mountains were formed in response to
1. compressional stress              2. tensional stress              3. intrusions              4. metamorphism
  5. density differences.
72. The Himalayan and Ural mountains were formed as a result of
1. ocean – continent convergence              2. island arc – continent convergence
  3. ocean – ocean convergence              4. arc – ocean convergence
  5. continent – continent convergence.
73. At the close of the Paleozoic, eastern North America was attached to what is now

1. Europe
2. Europe and Africa
3. China and South America
4. Africa and China
5. India and Antarctica.

74. The mountain belt that forms the western part of North America is called the  
1. Ural 2. Andes 3. Himalayan 4. North American Cordillera 5.  
Appalachians

75. "Floating mountains" adjust their elevation in response to the concept of  
1. delamination 2. gravitational collapse 3. block faulting 4.  
isostasy  
5. geosynclines.

76. It is believed that the slowing down of seismic waves in the asthenosphere is brought  
about

by

1. a change in composition
2. the existence of partially molten rock
3. the close proximity of the liquid core
4. the increased rigidity of the rock
5. the distance from the Earth's surface.

77. The density of the material at the center of the Earth is thought to be

1. less than that of water
2. 3.5 times the density of water
3. 5 times water's density
4. 13.5 times the density of water
5. 21 times the density of water.

78. After stresses in a deformed body of rock have exceeded the elastic limit

1. the rock may undergo brittle fracture
2. the rock may deform plastically
3. an earthquake may occur
4. all of these
5. only choices 1 and 2.

79. Deep earthquakes do not occur in the asthenosphere except in association with  
descending

plates because

1. the movement of the material of the asthenosphere occurs only along subduction zones
2. the asthenosphere consists of peridotite or something closely allied to it
3. the asthenosphere is too rigid to rupture
4. the asthenosphere is weak and deforms plastically
5. none of these choices.

80. The M Discontinuity or Moho forms the outer boundary of which one of the  
following

layers of the Earth?

1. crust
2. mantle
3. outer core
4. inner core
5. low velocity zone (asthenosphere).

81. The direct arrival of P waves from an earthquake reach all parts of the Earth except  
for

1. a region directly opposite the epicenter
  2. the region immediately surrounding the epicenter
  3. the equatorial belt
  4. the magnetic poles
  5. a shadow zone that forms around the opposite hemisphere about 105° and 140° from the epicenter.
82. The study of earthquake waves has made it possible to identify and locate
1. the crust-mantle boundary
  2. the mantle core boundary
  3. the low-velocity zone
  4. the Mohorovicic discontinuity
  5. all of these.
83. When a rock above a fault plane moves down relative to the rock below, what type of fault is indicated?
1. reverse
  2. strike – slip
  3. thrust
  4. normal
  5. none of these.
84. New oceanic crust forms at
1. divergent plate boundaries
  2. convergent plate boundaries
  3. transform fault boundaries
  4. island arc boundaries
  5. all of these.
85. Mount St. Helens is associated with a
1. divergent boundary
  2. convergent (oceanic-oceanic) boundary
  3. convergent (oceanic – continental) boundary
  4. convergent (continental-continental) boundary
  5. transform fault boundary.
86. Earthquakes are generated in association with what type of boundary?
1. divergent plate
  2. convergent plate
  3. transform fault
  4. all of these
  5. only some of these.
87. The Earth is capable of recycling its crust
1. at subduction zones
  2. in trench areas
  3. in Benioff zones
  4. at convergent plates
  5. all of these places.
88. The name of a low-angle reverse fault is called a (n)
1. oblique
  2. normal
  3. thrust
  4. compressional
  5. transform.
89. Tensional forces usually cause what type of fault?
1. normal
  2. reverse
  3. thrust
  4. oblique
  5. compressional.