

1. This ozone layer is in what layer?
 - a. biosphere
 - b. stratosphere
 - c. troposphere
 - d. hydrosphere
 - e. mesosphere

2. The part of the earth characterized by ice is the:
 - a. lithosphere
 - b. biosphere
 - c. cryosphere
 - d. mesosphere
 - e. lithosphere

3. The part of the earth characterized by life is the:
 - a. mesosphere
 - b. lithosphere
 - c. biosphere
 - d. stratosphere
 - e. hydrosphere

4. The largest part of the solid earth is:
 - a. mantle
 - b. core
 - c. lithosphere
 - d. stratosphere
 - e. hydrosphere

5. Convection is:
 - a. a means of transporting heat by moving hot and cold material
 - b. a force that causes storms to travel curving paths
 - c. the force that drives ocean currents
 - d. related to earth's rotation
 - e. the process that creates the ozone layer

6. What drives convection?:
 - a. sunlight
 - b. earth's rotation
 - c. buoyancy
 - d. pressure deep in the earth
 - e. nuclear reactions

7. Earth's atmospheric circulation is driven mostly by:
 - a. waves in the ocean
 - b. evaporation of water from the oceans
 - c. unequal heating by the sun
 - d. the earth's magnetic field

8. The Coriolis Effect:
 - a. causes water in a sink to spin as it drains
 - b. causes hot air to rise and cool air to sink
 - c. causes tides
 - d. causes things moving on the earth to travel curving paths
 - e. causes air to move from high to low pressure areas.
9. Earth's surface ocean currents are driven mostly by:
 - a. sinking of cold, dense water
 - b. the winds
 - c. the attraction of the sun and moon
10. The principal reservoir for storing heat on the earth is the.
 - a. lithosphere
 - b. biosphere
 - c. stratosphere
 - d. hydrosphere
11. What is one of the roles of water in the earth's interior?
 - a. lowers the melting point of rocks
 - b. raises the melting point of rocks
 - c. makes rocks stronger
 - d. carries material outward from the core
12. What is one of the roles of water in the earth's interior?
 - a. raises the melting point of rocks
 - b. makes rocks stronger
 - c. carries material outward from the core
 - d. makes rocks weaker

1. The two most abundant elements in the Earth's crust are:
 - a. iron and magnesium
 - b. silicon and oxygen
 - c. carbon and potassium
 - d. sand and clay
 - e. sodium and nitrogen
2. The sharing of electrons by adjacent atoms is a type of bonding called:
 - a. hydrogen
 - b. tetrahedral
 - c. covalent
 - d. ionic
 - e. silicate
3. A chemical element is a substance made up of atoms, all of which have the same:
 - a. atomic mass number
 - b. size
 - c. number of neutrons
 - d. weight
 - e. number of protons
4. An example of a common silicate mineral is:
 - a. calcite
 - b. hematite
 - c. quartz
 - d. halite
 - e. pyrite
5. The ratio of a mineral's weight to the weight of an equal volume of water is its:
 - a. specific gravity or density
 - b. atomic mass number
 - c. luster
 - d. cleavage
 - e. hardness
6. The atomic number of an element is determined by the:
 - a. number of electrons in its outermost shell
 - b. number of protons in its nucleus
 - c. diameter of its most common isotope
 - d. number of neutrons plus electrons in its nucleus
 - e. total number of neutrons orbiting the nucleus
7. To which of the following groups do most minerals in the Earth's crust belong?
 - a. oxides
 - b. halides
 - c. carbonates
 - d. silicates
 - e. sulfates

8. When an atom loses or gains electrons, it becomes a(n):
- isotope
 - neutron
 - proton
 - native element
 - ion
9. These minerals have good cleavage
- silicates
 - sulfides
 - oxides
 - carbonates
10. Anions are _____ charged because they have _____ electrons:
- negatively ... lost
 - positively lost
 - positively ... gained
 - negatively gained
 - neutrally ... neither lost nor gained
11. After silicates, the most important rock-forming minerals:
- oxides
 - sulfates
 - halides
 - carbonates
12. Lacks good cleavage:
- mica
 - quartz
 - calcite
 - halite
13. Density of minerals refers to:
- weight per unit volume
 - weight relative to water
 - both a and b
 - neither a nor b
14. The single most abundant mineral on earth:
- hematite
 - calcite
 - gypsum
 - amphibole
 - quartz

15. Which is a phyllosilicate?
- garnet
 - clay minerals
 - amphibole
 - pyroxene
16. Calcite will scratch glass. True or false?
- True
 - False
17. Most gem minerals (except diamond) belong to the following groups:
- silicates and oxides
 - sulfates and elements
 - elements and oxides
 - sulfates and carbonates
 - sulfides and oxides
18. Bonding in minerals is mostly:
- ionic
 - metallic
 - covalent
 - a mixture of these
19. The two most abundant elements in the Earth's crust are:
- nickel and zinc
 - nitrogen and carbon
 - oxygen and silicon
 - chlorine and iron
20. The charged atoms that make up most crystal structures:
- protons
 - tetrahedra
 - catalysts
 - ions
21. Pyrite is:
- a silicate
 - an important iron ore
 - water-soluble
 - none of the above
22. Minerals are classified on the basis of:
- their negatively charged atoms (anions)
 - their positively charged atoms (cations)
 - their oxygen content
 - their metal content

23. _____ are examples of sheet silicates:
- micas and clay minerals
 - pyroxenes and amphiboles
 - olivine and feldspar
 - staurolite and quartz
24. The tendency of some minerals to break along smooth planes
- crystallization
 - fracture
 - weathering
 - cleavage
25. The most common single mineral on Earth is:
- chromium
 - copper
 - halite
 - quartz
26. Cations are _____ charged because they have _____ electrons:
- negatively ... lost
 - positively lost
 - positively ... gained
 - negatively gained
 - neutrally ... neither lost nor gained
27. These minerals are among the leading contributors to acid rain:
- sulfates
 - sulfides
 - silicates
 - nitrates
28. The property that causes salt to come out of the salt shaker as tiny cubes:
- density or specific gravity
 - crystal form
 - fracture
 - hardness
 - cleavage
29. Which is not a phyllosilicate (sheet silicate)?
- mica
 - clay minerals
 - serpentine asbestos
 - pyroxene
30. You can identify diamonds by seeing if they scratch glass. True or false?
- True
 - False

31. Most ore minerals belong to the following groups:
 - a. silicates and carbonates
 - b. sulfates and elements
 - c. elements and oxides
 - d. sulfates and carbonates
 - e. sulfides and oxides

32. The silicon atom has a positive charge of 4, and oxygen has a negative charge of 2. Accordingly, the ion group (SiO_4) has a:
 - a. positive charge of 2
 - b. positive charge of 4
 - c. negative charge of 2
 - d. negative charge of 4
 - e. negative charge of 1

33. Calcite and dolomite are:
 - a. oxide minerals of great value
 - b. ferromagnesian silicates possessing a sheet structure
 - c. carbonate minerals
 - d. sulfates found in evaporite deposits

34. Many minerals break along closely spaced planes and are said to possess:
 - a. specific gravity
 - b. fracture
 - c. cleavage
 - d. double
 - e. covalent bonds

35. The chemical formula for olivine is $(\text{Mg,Fe})_2\text{SiO}_4$, which means that in addition to silica:
 - a. magnesium and iron can substitute for one another
 - b. magnesium is more common than iron
 - c. magnesium is heavier than iron
 - d. all olivine contains both magnesium and iron
 - e. more magnesium than iron occurs in the Earth's crust

36. The basic building block of all silicate minerals is the:
 - a. silicon sheet
 - b. silicate double chain
 - c. oxygen-silicon cube
 - d. silica framework
 - e. silica tetrahedron

37. This mineral suite includes many major ores:
 - a. halides
 - b. sulfides
 - c. sulfates
 - d. carbonates

38. A mineral suite that contains radicals
- oxides
 - sulfides
 - halides
 - sulfates
39. Which property is most directly related to the closeness of atoms in a mineral?
- hardness
 - density
 - cleavage
 - fracture
40. Which property is related to planes of weakness between atoms in a mineral?
- hardness
 - density
 - cleavage
 - fracture
41. Which property is related to the strength of bonding between atoms in a mineral?
- hardness
 - density
 - cleavage
 - fracture
42. Which property is least reliable in identifying minerals?
- hardness
 - density
 - cleavage
 - color
43. Which of these factors can affect the color of a mineral?
- weathering
 - surface coatings
 - grain size
 - chemical impurities
 - All of these can affect the color of minerals.
44. Hardness refers to:
- resistance to chemical alteration.
 - difficulty in breaking.
 - roughness.
 - resistance to scratching.
45. The property that causes salt to come out of a salt shaker as tiny cubes:
- hardness
 - density
 - cleavage
 - fracture

46. The property that makes gold panning possible:
- a. hardness
 - b. density
 - c. cleavage
 - d. fracture
47. The single most important group of minerals in abundance:
- a. silicates
 - b. carbonates
 - c. oxides
 - d. sulfates
48. Limestone and dolomite are made from these minerals:
- a. silicates
 - b. carbonates
 - c. oxides
 - d. sulfates
49. Tend to be dense, metallic in luster, and often have cubic crystals:
- a. sulfides
 - b. carbonates
 - c. oxides
 - d. sulfates
50. Have good cleavage and fizz in acid:
- a. silicates
 - b. carbonates
 - c. oxides
 - d. sulfates
51. Light in color and weight, good cleavage, often water-soluble:
- a. silicates
 - b. carbonates
 - c. oxides
 - d. halides
52. A hard mineral is most likely to be one of these:
- a. silicates
 - b. carbonates
 - c. halides
 - d. sulfates
53. Gold, diamonds and graphite are examples::
- a. native elements
 - b. carbonates
 - c. oxides
 - d. sulfates

54. Quartz is one of these:

- a. sheet silicate
- b. chain silicate
- c. silicate with single tetrahedra
- d. framework silicate

55. Mica is an example:

- a. sheet silicate
- b. chain silicate
- c. silicate with single tetrahedra
- d. framework silicate

56. Amphibole and Pyroxene are examples:

- a. sheet silicate
- b. chain silicate
- c. silicate with single tetrahedra
- d. framework silicate

57. Most likely to split into thin sheets:

- a. mica
- b. halite
- c. calcite
- d. quartz

58. Most likely to split into splintery fragments:

- a. sheet silicate
- b. chain silicate
- c. silicate with single tetrahedra
- d. framework silicate

59. Chain silicates include:

- a. clays and micas
- b. amphiboles and pyroxenes
- c. feldspars
- d. olivine and garnet

60. Which has the lowest hardness?:

- a. feldspar
- b. calcite
- c. topaz
- d. gypsum

61. Quartz:

- a. can scratch glass.
- b. has good cleavage
- c. has density of 5 grams per cubic centimeter
- d. dissolves in acid

62. Calcite:
- a. can scratch glass.
 - b. has good cleavage
 - c. has density of 5 grams per cubic centimeter
 - d. dissolves in acid
63. Which is likely to have the highest density?
- a. halide
 - b. sulfate
 - c. sulfide
 - d. carbonate
64. Has silica tetrahedra arranged in three-dimensional networks:
- a. mica
 - b. olivine
 - c. halite
 - d. feldspar
65. Which property is not desirable in a gemstone?
- a. hardness
 - b. beauty
 - c. rarity
 - d. good cleavage
 - e. ability to refract light
66. Atoms of this element occupy more space in the crust than all other atoms combined:
- a. oxygen
 - b. chlorine
 - c. sulfur
 - d. silicon
67. This kind of atomic bonding holds wood, plastic, and people together:
- a. covalent
 - b. metallic
 - c. ionic
 - d. organic
68. This kind of atomic bonding holds steel girders and jet airplanes together:
- a. covalent
 - b. metallic
 - c. ionic
 - d. organic
69. This kind of atomic bonding holds most minerals together:
- a. covalent
 - b. metallic
 - c. ionic
 - d. organic

70. Which is not a type of atomic bonding?
- covalent
 - metallic
 - ionic
 - organic
71. The most abundant negatively-charged ion in the earth's crust:
- oxygen
 - silicon
 - sulfur
 - iron
72. The most abundant positively-charged ion in the earth's crust:
- oxygen
 - silicon
 - sulfur
 - iron
73. The atomic number of an element is determined by its:
- number of protons.
 - number of neutrons.
 - total of protons plus neutrons.
 - number of electrons.
74. The atomic weight of an element is determined by its:
- number of protons.
 - number of neutrons.
 - total of protons plus neutrons.
 - number of electrons.
75. This changes easily in response to chemical reactions:
- number of protons
 - number of neutrons
 - total of protons plus neutrons
 - number of electrons
76. After oxygen, the most abundant negatively-charged ion in the earth's crust:
- chlorine
 - silicon
 - sulfur
 - iron
77. Which is true of crystal form and cleavage?
- Every cleavage face is a possible crystal face.
 - Every crystal face is a cleavage face.
 - Every crystal possesses cleavage.
 - Only minerals that occur as good crystals have cleavage.
78. Saying that minerals have "crystalline structure" means:

Earth Science

Minerals

- a. they all occur as crystals
- b. they all have an orderly internal arrangement of atoms
- c. they all have good cleavage
- d. they all have ions

1. This mineral tends to form first in Bowen's Series:
 - a. quartz
 - b. plagioclase
 - c. olivine
 - d. muscovite
 - e. biotite
2. This rock is so porous it often floats on water:
 - a. gabbro
 - b. obsidian
 - c. pumice
 - d. granite
 - e. rhyolite
3. Which of these igneous rocks is classified on the basis of its texture:
 - a. dunite
 - b. andesite
 - c. scoria
 - d. rhyolite
 - e. basalt
4. This mineral tends to form last in Bowen's Series:
 - a. quartz
 - b. plagioclase
 - c. olivine
 - d. muscovite
 - e. biotite
5. All these rocks have about the same chemical composition except:
 - a. gabbro
 - b. obsidian
 - c. pumice
 - d. granite
 - e. rhyolite
6. Which is not a common volcanic rock?:
 - a. andesite
 - b. basalt
 - c. gabbro
 - d. rhyolite
 - e. none of these
7. Gabbro is coarser grained than basalt because:
 - a. it contains more silica
 - b. the original magma cooled under low pressure, so that larger crystals could form
 - c. the original magma cooled more slowly

- d. the crystals have grown larger during later metamorphism
 - e. none of these
8. Granites and rhyolites are related by:
- a. their grain size
 - b. their mode of emplacement
 - c. their association in the ocean basins
 - d. their mineralogical composition
 - e. none of these
9. The first question a geologist asks in classifying an igneous rock
- a. What feldspars are present?
 - b. Is quartz present?
 - c. What dark minerals are present?
10. An igneous rock with large crystals in a fine-grained matrix.
- a. basalt
 - b. pumice
 - c. scoria
 - d. porphyry
11. According to Bowen's Series:
- a. quartz forms last
 - b. quartz and olivine form together
 - c. quartz forms before biotite
 - d. quartz forms first
12. Obsidian
- a. is volcanic glass
 - b. is usually rhyolitic in composition
 - c. has conchoidal fracture
 - d. all of the above
13. What are the two major kinds of igneous rocks:
- a. volcanic and eruptive
 - b. volcanic and plutonic
 - c. granitic and plutonic
 - d. sills and lava
 - e. dikes and batholiths
14. Why is silica the major component of magma?:
- a. it melts at low temperatures
 - b. it retains heat well
 - c. it dissolves other rocks
 - d. it is so abundant
15. Which of the following pairs of igneous rocks have the same mineral composition?

- a. granite-tuff
- b. basalt-gabbro
- c. andesite-rhyolite
- d. peridotite-andesite
- e. pumice-diorite

16. Volcanic rocks can usually be distinguished from plutonic rocks by:

- a. color
- b. the size of their mineral grains
- c. composition
- d. specific gravity
- e. iron-magnesium content

17. When mantle material melts, it usually forms magma of what composition:

- a. basalt
- b. rhyolite
- c. andesite
- d. dunite

18. The most common intermediate volcanic rock is:

- a. andesite.
- b. basalt
- c. rhyolite
- d. diorite

19. The most abundant sedimentary rocks are:

- a. limestones
- b. mudrocks
- c. sandstones
- d. arkoses
- e. evaporites

20. Most limestones have a large component of calcite that was originally extracted from seawater by:

- a. inorganic chemical reactions
- b. chemical weathering
- c. organisms
- d. lithification
- e. evaporation

21. Dolostone is formed by the addition of _____ to limestone:

- a. calcium
- b. iron
- c. carbonate
- d. sodium
- e. magnesium

22. The process where dissolved minerals precipitate in the pore spaces of sediment and bind it together is:

- a. compaction
- b. weathering
- c. rounding
- d. cementation
- e. bedding

23. Coal is

- a. a clastic sedimentary rock
- b. an evaporite
- c. always found with limestone
- d. none of the above

24. Bedding or stratification in a sedimentary rock

- a. is due to directed pressure from earth forces
- b. results from heat
- c. is always exactly horizontal
- d. represents variations which took place during deposition

25. What holds a sedimentary rock together?

- a. cement
- b. fossils
- c. water in its pore spaces
- d. silt

26. Clastic means:

- a. formed by the evaporation of water
- b. formed by living organisms
- c. formed from fragments cemented together
- d. formed from the molten state

27. The clastic sedimentary rocks are classified primarily on the basis of:

- a. color
- b. grain size
- c. composition
- d. hardness

28. Deposits of clay become consolidated to form:

- a. limestone
- b. sandstone
- c. shale
- d. evaporite

29. The single most characteristic feature of sedimentary rocks is:

- a. widely varying grain sizes

- b. made by organisms
- c. the presence of nodules
- d. stratification (bedding)
- e. water-soluble minerals

30. The rock type that best describes the various types of coal is:

- a. clastic
- b. biochemical
- c. evaporitic
- d. detrital

31. You would most likely find the remains of plants in a deposit of:

- a. limestone
- b. sandstone
- c. coal
- d. conglomerate
- e. gypsum

32. Which is most likely to represent a deposit formed on dry land?

- a. Black shale
- b. Red sandstone
- c. Mudrocks
- d. Dolomite

33. Which would be least likely to indicate a desert environment?:

- a. Sandstone
- b. Coal
- c. Evaporites
- d. Gypsum

34. Which is most likely to be an evaporite?

- a. Black shale
- b. Rock Salt
- c. Mudrocks
- d. Dolomite

35. Which indicates the highest metamorphic grade?

- a. epidote
- b. kyanite
- c. chlorite
- d. amphibole
- e. feldspar

36. A metamorphosed equivalent of a limestone would be a:

- a. dolomite
- b. marble

- c. schist
- d. amphibolite
- e. none of these

37. Three minerals which are not normally found in sedimentary and igneous rocks are:

- a. quartz, biotite and plagioclase
- b. sillimanite, kyanite and garnet
- c. biotite, muscovite and clay
- d. garnet, kyanite and feldspar

38. Gneiss:

- a. shows dark and light bands of minerals
- b. has recrystallized at low temperatures
- c. has good rock cleavage parallel to banding
- d. is very fine-grained

39. To which metamorphic facies do metamorphic rocks formed under the lowest temperature and pressure conditions belong?

- a. granulite
- b. blueschist
- c. greenschist
- d. eclogite
- e. amphibolite

40. Which is not a stage in the diagenesis and metamorphism of coal?

- a. anthracite
- b. lignite
- c. diamond
- d. graphite
- e. bituminous

41. The metamorphic rock formed from limestone is:

- a. quartzite
- b. slate
- c. hornfels
- d. greenstone
- e. marble

42. From which of the following rock groups can metamorphic rocks form?

- a. plutonic
- b. volcanic
- c. sedimentary
- d. metamorphic
- e. all of these

43. What is the correct metamorphic sequence of increasingly coarser grain size?

- a. phyllite --> slate --> gneiss --> schist
- b. slate --> phyllite --> schist --> gneiss
- c. gneiss --> phyllite --> slate --> schist
- d. schist --> gneiss --> phyllite --> slate
- e. slate --> schist --> gneiss --> phyllite

44. An excellent rock for billiard table tops, floor and roofing tiles, and blackboards is:

- a. marble
- b. hornfels
- c. gneiss
- d. slate
- e. phyllite

45. Diamond and graphite are both made of carbon but have different atomic structures and very different properties. This phenomenon is called:

- a. Isometry
- b. Polymorphism
- c. Multiphasing
- d. Homology

1. Recently, a number of large earthquakes have been reported as exceeding magnitude 9. The reason is:
 - a. earthquakes are getting stronger
 - b. our records of earlier earthquakes were incomplete
 - c. the magnitude scale for the strongest earthquakes has been redefined
2. A seismograph is basically a:
 - a. lens
 - b. wheel
 - c. lever
 - d. pendulum
3. The approximate deepest level of earthquakes:
 - a. 10 Km
 - b. 100 Km
 - c. 300 Km
 - d. 700 Km
4. If you are facing a right-lateral fault, during an earthquake
 - a. the opposite side of the fault moves to the right
 - b. your side of the fault moves down
 - c. your side of the fault moves to the right
 - d. the opposite side of the fault moves down
5. Can a seismic wave be reflected off the surface of the earth's core.
 - a. yes
 - b. no
6. All earthquakes are located along plate boundaries.
 - a. true
 - b. false
7. If an earthquake has a certain intensity 10 km from the fault rupture, the intensity 100 km away will probably be:
 - a. greater
 - b. less
 - c. the same
 - d. impossible to predict
8. The least likely to cause casualties in earthquakes:
 - a. building collapse
 - b. shaking and vibration
 - c. fire
 - d. landslides
9. Seismologists believe the Earth's core is liquid because:
 - a. certain types of seismic waves do not pass through liquids
 - b. the Earth wobbles on its axis
 - c. it's the most logical conclusion
 - d. molten rock sometimes erupts on the surface

10. Most tsunamis occur
 - a. in the Pacific
 - b. during hurricanes
 - c. in the Indian Ocean
 - d. in Hawaii
11. Why no earthquake greater than magnitude 10 has ever been observed:
 - a. It is mathematically impossible
 - b. The Richter Scale only goes to 8.
 - c. We haven't been observing long enough.
 - d. The crust can't store that much strain energy.
12. It takes at least ____ seismographs at different locations to locate earthquakes accurately.
 - a. six
 - b. three
 - c. two
 - d. four
13. An earthquake with negative magnitude
 - a. is very tiny
 - b. is very large
 - c. is impossible
14. It takes ____ earthquakes of magnitude 4 to release as much energy as one of magnitude 5.
 - a. 5×4 or 20
 - b. $5/4$ or 1.25
 - c. $5+4$ or 9
 - d. 30
15. In the continental U.S., earthquakes occur
 - a. only in California
 - b. only west of the rockies
 - c. mostly in the West but occasionally in the East
 - d. in a band extending from Los Angeles to Charleston
16. Who's most likely to feel an earthquake?
 - a. someone driving a car
 - b. someone crossing a bridge
 - c. someone on the top floor of a skyscraper
 - d. someone sitting on the ground
17. Why earthquakes cause such large death tolls in Third World countries
 - a. weak but heavy construction materials
 - b. more tsunamis
 - c. poor hospitals
 - d. stronger earthquakes
18. Seismograph pendulums are designed
 - a. to swing at any period at all

- b. to swing with a period longer than seismic waves
 - c. to swing with a period shorter than seismic waves
 - d. to swing as long as possible once starte
19. Why it is inaccurate to say the Richter Scale "runs from one to ten"?
- a. It actually starts at zero.
 - b. It actually ends at nine
 - c. It starts at zero but has no upper limit.
 - d. It ends at ten but has no lower limit
 - e. It has to upper or lower limit.
20. If a magnitude 3 earthquake releases one unit of energy, a magnitude zero quake:
- a. is impossible
 - b. will release 27,000 units
 - c. will release zero energy
 - d. will release 1/27,000
 - e. will release -3 units units
21. Seismic waves arrive in the following order:
- a. P,S, surface
 - b. P, surface, S
 - c. S, surface, P
 - d. S,P, surface
 - e. surface, S,P
22. Ships at sea off California in 1906 felt the earthquake shock. They probably felt:
- a. the S wave
 - b. the P wave
 - c. the surface waves
 - d. a tsunami
23. A region where our theories of plate tectonics do not provide a good explanation for earthquakes yet.
- a. the San Andreas Fault
 - b. the New Madrid, Missouri region
 - c. the Andes
 - d. Iceland
24. The most dangerous type of construction for earthquake-prone regions:
- a. adobe
 - b. reinforced masonry
 - c. concrete block
 - d. steel frame
 - e. wood frame
25. The instrument used to record earthquakes waves is called:
- a. quakeometer
 - b. strainometer
 - c. seismogram

- d. none of these
 - e. seismograph
26. From a seismogram, the distance to an earthquake can be determined by measuring:
- a. the speed of the surface waves
 - b. the ratio of the amplitude of the largest P and S waves
 - c. the arrival times of the surface waves
 - d. the difference in the arrival times of the P and S waves
 - e. none of these
27. The arrival time of the P and S waves recorded at one seismic station can determine:
- a. the location of the earthquake
 - b. the damage at the focus
 - c. the distance to the earthquake
 - d. none of these
 - e. the intensity of the earthquake
28. The outer core of the earth is probably liquid because:
- a. it does not transmit S waves
 - b. it must float on top of the inner core
 - c. it does not transmit P and S waves
 - d. it has high rigidity
 - e. none of these
29. Another name for a seismic sea wave is:
- a. tidal wave
 - b. tsunami
 - c. elastic sea wave
 - d. bonsai
 - e. none of these
30. The core of the earth is composed primarily of:
- a. iron and sulfur
 - b. iron and nickel
 - c. nickel and cobalt
 - d. none of these
 - e. silicon and oxygen
31. Earthquakes have been found to originate:
- a. only in the earth's crust
 - b. at all depths up to 700 km
 - c. only above the Moho
 - d. none of these
32. The scale for measuring earthquake intensity is:
- a. Mercalli
 - b. Richter
 - c. Moh's
 - d. Wentworth's

33. The vast majority of all earthquake foci occur at a depth of _____ kilometers.

- a. 20-40
- b. 40-60
- c. 60-80
- d. 80-100
- e. 100 and more

34. With few exceptions, the most destructive earthquakes are:

- a. shallow focus
- b. intermediate focus
- c. deep focus

35. The majority of all earthquakes occur in the:

- a. Mediterranean-Asiatic belt
- b. circum-Pacific belt
- c. interior of plates
- d. along spreading ridges
- e. circum-Atlantic belt

36. Fractures along with no movement has occurred are:

- a. joints
- b. axial planes
- c. monoclines
- d. fold limbs
- e. transform faults

37. The Earth's core is inferred to be:

- a. hollow
- b. composed of rock with a high silica content
- c. completely molten
- d. composed mostly of iron and nickel
- e. completely solid

38. The asthenosphere:

- a. lies beneath the lithosphere
- b. is composed primarily of peridotite
- c. behaves plastically and flows slowly
- d. is the zone over which plates move
- e. all of these

39. The layer between the core and the crust is the:

- a. mantle
- b. sial
- c. lithosphere
- d. innersphere
- e. sima

40. The magnetic field is probably generated by:

- a. the tilt of the Earth's rotational axis

- b. the solar wind
 - c. fluid movements in the outer core
 - d. deformation of the asthenosphere
 - e. a large deposit of magnetite at the North Pole
41. Which of the following usually causes the greatest amount of damage and loss of life?
- a. fire
 - b. building collapse
 - c. tsunami
 - d. landslides
 - e. ground shaking
42. A tsunami is a:
- a. measure of the energy released by an earthquake
 - b. seismic sea wave
 - c. precursor to an earthquake
 - d. locked portion of a fault
 - e. seismic gap
43. The fastest type of seismic waves are:
- a. P waves
 - b. Surface waves
 - c. S waves
 - d. tsunami
44. An epicenter is:
- a. the location where rupture begins
 - b. the point on the Earth's surface vertically above the focus
 - c. the same as the hypocenter
 - d. the location where energy is released
 - e. none of these
45. When seismic waves travel through materials having different properties, their direction of travel changes. This phenomenon is wave:
- a. elasticity
 - b. deflection
 - c. energy dissipation
 - d. reflection
 - e. refraction
46. A major seismic discontinuity at a depth of 2,900 km is the:
- a. core-mantle boundary
 - b. oceanic crust-continental crust boundary
 - c. Moho
 - d. inner core-outer core boundary
 - e. lithosphere-asthenosphere boundary
47. A qualitative assessment of the kinds of damage done by an earthquake is expressed by:
- a. seismicity

- b. intensity
 - c. dilatancy
 - d. none of these
 - e. magnitude
48. How much more energy is released by a magnitude 5 earthquake than by one of the magnitude 2?
- a. 2.5 times
 - b. 1,000 times
 - c. 3 times
 - d. 27,000 times
 - e. 30 times
49. A graben is a:
- a. fold with a horizontal axial plane
 - b. type of reverse fault with a very low dip
 - c. fracture along which no movement has occurred
 - d. down-dropped block bounded by normal faults
 - e. type of structure resulting from compression
50. Strike-slip faults:
- a. are low-angle reverse faults
 - b. have mainly vertical displacement
 - c. have mainly horizontal movement
 - d. are faults on which no movement has yet occurred
 - e. are characterized by uplift of the footwall block
51. The range-bounding faults in the Basin and Range Province of the western United States are _____ faults.
- a. normal
 - b. strike-slip
 - c. reverse
 - d. oblique-slip
 - e. thrust
52. The seismic discontinuity at the base of the crust is the:
- a. magnetic anomaly
 - b. high-velocity
 - c. Moho
 - d. transition zone
 - e. geothermal gradient
53. Seismic waves arrive in what order?
- a. P, S, Surface
 - b. Surface, S, P
 - c. S, P, Surface
 - d. S, Surface, P
 - e. Surface, P, S