Identify the best answer. Answers are on the last page.

1. The classical planets in order from the Sun are:
   a. Mercury, Venus, Mars, Earth, Jupiter, Saturn, Neptune, Uranus
   b. Jupiter, Venus, Mars, Earth, Mercury, Saturn, Neptune, Uranus
   c. Mars, Venus, Earth, Jupiter, Saturn, Mercury Neptune, Uranus
   d. Venus, Mars, Mercury, Earth, Jupiter, Saturn, Neptune, Uranus
   e. None of the above

2. Nuclear fusion
   a. Is the source of Sun’s energy
   b. Occurs when the nucleus of an atom fissions and releases energy
   c. Radiates throughout the universe
   d. Is the reason that Jupiter has no solid surface
   e. All the above

3. Mercury, Venus, and Mars are different than Earth because:
   a. They are closer to the Sun.
   b. Earth has volcanoes and they don’t.
   c. Earth currently has liquid water and they don’t.
   d. Earth is the only planet with ice this close to the Sun.
   e. None of the above.

4. The largest storm in the Solar System is found on which planet?
   a. Uranus
   b. Earth
   c. Mars
   d. Jupiter
   e. Pluto

5. The basic structure of the Solar System is described as
   a. the ecliptic.
   b. the Oort Cloud.
   c. inner terrestrial and outer gaseous planets.
   d. the asteroid filter.
   e. rotating nuclear fission.

6. Why do the outer planets and their moons consist mostly of ice and gas while the inner planets are made up mostly of rock and metal?
   a. The solar wind stripped the inner planets of volatile compounds.
   b. The outer gas giants had greater volcanism, which produced large quantities of gases.
   c. Gravity sucked the gases from the inner planets into the Sun.
   d. Solar heat is so limited in the outer portion of the Solar System that solids turn into gas.
   e. All of the above.

7. The dwarf planets are:
   a. Mercury, Earth, and Mars
   b. Ceres, Pluto, Haumea, and Mercury
   c. Eris, Ceres, Pluto, Haumea, and Makemake
   d. There are no “dwarf” planets, only moons
   e. None of the above

8. What is planetesimal accretion?
   a. The collapse of the Kuiper Belt into the core region.
   b. Collisions of bits of ice, gas, and dust grew into planetesimals, and planetary embryos, and eventually planets.
   c. Jupiter, with its huge mass, broke into pieces that eventually became the major planets.
d. The solar wind tore the young planets into smaller pieces called planetesimals, and these later grew together to form the present planets.
e. All of the above.

9. Which of the following is the name of a hypothesis explaining the origin of the Solar System?
   a. planetesimal collision
   b. nebular expansion
   c. solar nebula
   d. nuclear fusion
   e. solar objects

10. The major gases in the outer Solar System include
    a. Ice, argon, methane, and carbon.
    b. Water, carbon dioxide, ammonia, helium, hydrogen, methane
    c. Lithium, carbon dioxide, carbon, hydrogen, carbon monoxide
    d. Ammonia, oxygen, helium, hydrogen, carbon monoxide, and water
    e. Water, hydrogen sulfide, ammonia, helium, lithium, carbon monoxide

11. Comets are made of:
    a. Molten rock
    b. Ice and mineral grains
    c. Gas and ice
    d. Rock and a thin atmosphere of water
    e. None of the above

12. Extraterrestrial impacts
    a. Probably occurred in two waves
    b. May have delivered water to Earth and an early atmosphere
    c. May have originated at the Oort cloud and Kuiper belt regions
    d. Produced the scars on the Moons surface
    e. All the above

13. The primary source of Earths heat is a combination of
    a. Extraterrestrial impacts, gravitational energy, radioactivity
    b. Nuclear fusion, volcanism, compression
    c. Compression, volcanism, solar wind
    d. Solar wind, radioactivity, gravitational energy
    e. None of the above

14. During the Hadean Era, which of the following is thought to have occurred?
    a. Growth of the modern seas
    b. Formation of modern continents
    c. The “iron catastrophe”
    d. Origin of life on Earth
    e. All the above

15. How does the chemical differentiation of Earth today reflect the influence of the “iron catastrophe”?
    a. There is more iron in the core than in the crust.
    b. The lower lithosphere stores most of Earth’s iron.
    c. Much of Earth’s iron has escaped as a result of extraterrestrial impacts.
    d. Iron is largely rare on Earth
    e. None of the above

16. What are the principal differences between the average chemistry of the crust and the average chemistry of Earth as a whole?
    a. The crust is relatively enriched in less dense compounds and relatively depleted in iron.
    b. The crust is relatively enriched in magnesium and relatively depleted in oxygen.
    c. Earth as a whole has a greater abundance of silicon than does the crust.
d. The crust contains a greater abundance of heavier elements than does Earth as a whole.
e. None of the above

17. How is Earth organized?
a. Earth has an inner and outer core, a mantle, and a crust.
b. Earth has an inner mantle and an outer lithosphere, with a liquid inner core.
c. Earth’s crust rests atop the liquid mantle and the solid outer core.
d. The inner core is solid, the mantle is solid, and the crust is solid under the continents and they are all liquid under the oceans.
e. None of the above

18. The rock cycle is a concept that
a. Has no relationship to plate tectonics.
b. Is not a well-accepted hypothesis.
c. Describes the recycling of rock.
d. Was first described only two decades ago.
e. All of the above

19. Which of the following is part of the definition of a mineral?
a. Liquid
b. Electrically charged
c. Inorganic
d. Synthetic
e. None of the above

20. Many minerals are useful in everyday life. Some examples include:
a. Feldspar and quartz
b. Clay and gypsum
c. Graphite and chalcopyrite
d. Copper and titanium
e. All of the above

21. To quickly identify a mineral sample, geologists use
a. Physical size
b. Color
c. Physical properties
d. Laboratory analysis
e. None of the above

22. “Fool’s gold” is
a. Hematite
b. Calcite
c. Pyrite
d. Native gold
e. None of the above

23. One of the isotopes of the element carbon (atomic number 6) has a mass number of 13. How many neutrons does this isotope have in its nucleus?
a. 5
b. 6
c. 7
d. 14
e. None of the above

24. What are formed when sodium ions and chlorine ions combine to produce NaCl?
a. Ionic bonds
b. Covalent bonds
c. Organic structures
d. Isotopes
25. What property causes the mineral biotite to break into flat sheets?
   a. Its density
   b. Its electrical charge
   c. Its crystalline structure
   d. Its hardness
   e. None of the above

26. Silicates are constructed by
   a. Carbon and hydrogen.
   b. Iron and oxygen.
   c. Silica and feldspar.
   d. Silicon and oxygen.
   e. None of the above

27. Single substitution occurs during crystallization because
   a. Neutral compounds attract ions.
   b. The number of leftover ions must be balanced.
   c. A charged compound is formed.
   d. Ions of similar size can substitute for one another.
   e. To form a dense compound.

28. The two most abundant elements in the crust form
   a. Oxides.
   b. Sulfates.
   c. Silicates.
   d. Carbonates.
   e. Halides

29. The important rock-forming minerals include
   a. Feldspars, biotite, and goingouttonight.
   b. Calcite, feldspars, biotite, and amphiboles.
   c. Amphiboles, feldspars, quartz, and rutile.
   d. Rutile, amphibole, calcite, and garnet.
   e. Quartz, feldspar, granite, basalt

30. The silica compound takes the shape of
   a. A rectangle.
   b. A tetrahedron.
   c. A polygon.
   d. A polymer.
   e. Magma

31. Plagioclase feldspar is a
   b. Type of carbon compound.
   c. Mineral
   d. All of the above
   e. Type of quartz

32. What is igneous rock?
   a. Rock produced by melting
   b. Rock composed of sediments
   c. Rock derived from pressure
   d. Rock that mixes the mantle and crust
   e. None of the above

33. Magma that is cooling undergoes
   a. Crystallization.
b. Recrystallization.
c. Partial melting.
d. Refractionation.
e. Erosion

34. Bowen’s reaction series describes
   a. the sequence in which minerals melt in rapidly heating magma.
   b. the sequence in which plutons are formed in migrating magma.
   c. the sequence in which rocks are formed in average continental crust.
   d. The sequence in which minerals crystallize in cooling magma.
   e. None of the above

35. The order of mineral crystallization is typically
   a. felsic, mafic, intermediate, ultramafic.
   b. felsic, intermediate, mafic, ultramafic.
   c. ultramafic, mafic, intermediate, felsic.
   d. mafic, ultramafic, felsic, intermediate.
   e. All of the above

36. Mafic means________; felsic means________.
   a. high in iron, magnesium, and calcium; high in silicon and oxygen
   b. high in calcium and magnesium; high in silicon, oxygen, and iron
   c. high in iron and oxygen; high in silicon, calcium, and magnesium
   d. high in silicon, oxygen, and calcium; high in iron and magnesium
   e. Volcanic; plutonic

37. The composition of dark igneous rock is likely to be
   a. Felsic
   b. Mafic
   c. Rhyolitic
   d. Plutonic
   e. None of the above

38. Which of the following best describes igneous evolution?
   a. All rocks evolved as a result of partial melting.
   b. All rocks evolved as a result of hotspot volcanism.
   c. All rocks evolved as a result of differentiation of recent metamorphic rocks.
   d. All rocks are a result of meteorite impacts.
   e. None of the above

39. Which of the following is correct?
   a. Granite is formed at spreading centers.
   b. Andesite is formed at subduction zones.
   c. Basalt is a mineral commonly in granite.
   d. Gabbro is formed by chemical weathering.
   e. None of the above

40. Volcanic arcs are primarily composed of
   a. granite and phyllite.
   b. gabbro and gneiss.
   c. basalt and pyroxenite.
   d. andesite and diorite.
   e. All of the above

41. The chemical interaction of oxygen with other substances is known as
   a. Dissolution
   b. Hydrolysis
   c. Saturation
   d. Oxidation
42. The most important form of chemical weathering of silicate minerals is
   a. Crystal growth
   b. Slaking
   c. Hydrolysis
   d. Dissolution
   e. Frost wedging

43. The variable that most affects the weathering process are rock composition and _________.
   a. Topography
   b. Surface area
   c. Living things
   d. Climate
   e. None of these

44. Which of the following statements about soil erosion is true?
   a. It is a form of pollution that affects biological communities.
   b. It is a major problem affecting millions of acres of cropland.
   c. It threatens to impact food production.
   d. It takes centuries to make soil and only minutes to erode it
   e. All the above

45. Karst topography is the result of
   a. Soil erosion
   b. Biological weathering of silicate rock
   c. Chemical weathering of carbonate rock
   d. Spheroidal weathering
   e. All the above

46. Weathering consists of
   a. Erosion, tectonics, and uplift.
   b. Chemical, biological, and physical degradation.
   c. crust age, chemistry and sedimentary minerals
   d. Sedimentary quartz, hematite, and sillimanite.
   e. None of the above

47. Sediments produced by the action of living organisms are called
   a. Chemical sediments.
   b. Physical sediments.
   c. Clastic sediments.
   d. Biogenic sediments.
   e. None of the above

48. Well-sorted and well-rounded f indicate that sediment
   a. Came from a nearby source area.
   b. Was deposited at the location where it was found.
   c. Traveled from a distant source area.
   d. Have not been influenced by weathering
   e. None of the above

49. Lithification refers to
   a. the set of natural processes that turn sediment into rock.
   b. the processes of erosion and tectonic uplift.
   c. the effects of chemical weathering.
   d. erosion
   e. None of the above

50. After being created by weathering, sediments may
   a. Experience more weathering
b. Combine with chemical sediments
c. Combine with biogenic sediments
d. Experience sorting and abrasion
e. All of the above

51. The sedimentary cycle refers to
   a. The continual erosion of sediments from mountainsides.
   b. The process of recycling sediments.
   c. The formation of rock through compaction of sediments.
   d. The formation of rock through chemical precipitation of sediments.
   e. None of the above

52. Which of the following statements is correct?
   a. Clastic sedimentary rocks include sandstone.
   b. Biochemical sedimentary rocks include Andesite
   c. Biochemical sedimentary rocks include shale and mudstone.
   d. Clastic sedimentary rock includes chert and coal.
   e. All of the above

53. Biochemical sedimentary rocks may form by
   a. Evaporation
   b. Erosion
   c. Metamorphism
   d. Floods
   e. None of the above

54. Rock fragments are known as
   a. Clasts
   b. Bioclastic sediments.
   c. Evaporites
   d. Natural cements.
   e. None of the above

55. Particle sizes are described using the following terms
   a. Sand, gravel, lithic fragments, and natural cements.
   b. Gravel, sand, silt, and clay.
   c. Conglomerate, sandstone, arkose, and shale.
   d. Abraded, sorted, rounded, and spherical.
   e. High grade and low grade

56. Organisms play a significant role in the origin of _____ sedimentary rock.
   a. Clastic
   b. Biogenic
   c. Chemical
   d. Lithologic
   e. None of the above

57. Sedimentary rocks are classified by
   a. Mineralogy and fossils.
   b. Cementation and compaction.
   c. Environment of precipitation and environment of deposition.
   d. Composition and texture.
   e. All the above

58. Metamorphic rocks are formed by increased
   a. Pressure and cementation.
   b. Heat and melting.
   c. Pressure and heat.
   d. Cooling and solidification.
59. Metamorphism occurs when
   a. Minerals partially melt and quickly recrystallize.
   b. Recrystallization occurs in the solid state.
   c. Loose sediments grow new crystals that cement grains together.
   d. Igneous minerals have solidified.
   e. None of the above

60. What type of metamorphism is local in extent and results from the rise in temperature in country rock surrounding an igneous intrusion?
   a. Regional
   b. Contact
   c. Burial
   d. Metasomatism
   e. Plutonism

61. The metamorphic index minerals are:
   a. Kaolinite, garnet, quartz, chlorite, biotite, and schist.
   b. Chlorite, garnet, sillimanite, hornfels, schist, and muscovite.
   c. Slate, phyllite, schist, chlorite, greenschist, and gneiss.
   d. Chlorite, muscovite, biotite, garnet, and sillimanite.
   e. Gneiss, slate, chlorite, quartz

62. Marble is related to limestone in the same way that
   a. Basalt is related to granite.
   b. Slate is related to shale.
   c. Gravel is related to siltstone.
   d. Gneiss is related to marble.
   e. Sandstone is related to basalt.

63. Which of the following statements about foliated rocks is correct?
   a. They reflect the influence of directed stress in the crust.
   b. They are usually formed within intruded country rock.
   c. They are the product of metasomatism.
   d. They rarely develop at convergent margins.
   e. None of the above

64. Regional metamorphosis of shale occurs in the following sequence:
   a. Zeolite, gneiss, slate
   b. Slate, phyllite, schist, gneiss
   c. Gneiss, marble, schist, hornfels
   d. Greenschist, slate, hornfels, basalt
   e. None of the above
Answers

1. E 40. D
2. A 41. D
3. C 42. C
4. D 43. D
5. C 44. E
6. A 45. C
7. C 46. B
8. B 47. D
9. C 48. C
10. B 49. A
11. B 50. E
12. E 51. B
13. A 52. A
14. C 53. A
15. A 54. A
16. A 55. B
17. A 56. B
18. C 57. D
19. C 58. C
20. E 59. B
21. C 60. B
22. C 61. D
23. C 62. B
24. A 63. A
25. C 64. B
26. D
27. D
28. C
29. B
30. B
31. C
32. A
33. A
34. D
35. C
36. A
37. B
38. A
39. B