

Review For EXAM 1 – Fall Semester 2012

1. Living organisms have been on Earth for _____ of Earth's history.
 - A) less than 1%
 - B) about 20%
 - C) about 50%
 - D) about 80%

2. Which of the following statements regarding the scientific method is true?
 - A) A hypothesis must be agreed upon by more than one scientist.
 - B) A theory is a hypothesis that has withstood many scientific tests.
 - C) A theory is proven to be true and therefore may not be discarded.
 - D) A hypothesis cannot predict the outcome of scientific experiments.

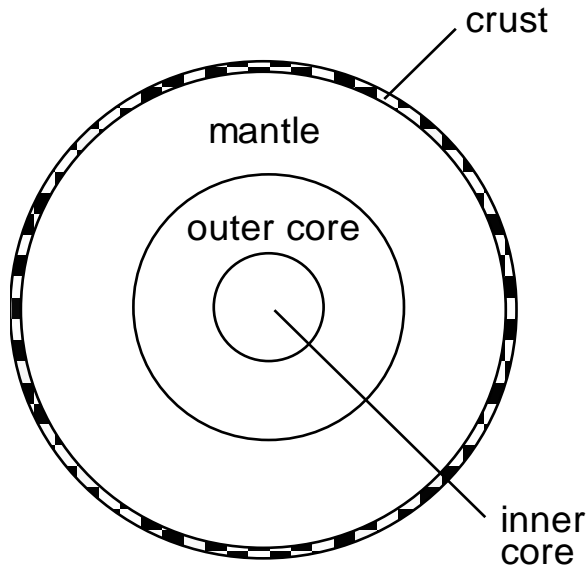
3. Which of the following statements about the scientific method is false?
 - A) A scientific theory is never considered finally proved.
 - B) Data used to generate a hypothesis may come from observations, experiments, and chance findings.
 - C) A theory that has accumulated a substantial body of experimental support is called a hypothesis.
 - D) A scientific model represents some aspect of nature based on a set of hypotheses and theories.

4. According to the principle of uniformitarianism, _____.
 - A) geologic processes we observe today have operated in the past
 - B) animals evolved at a uniform rate
 - C) all of the planets formed from a uniform solar nebula
 - D) early Earth was covered by a uniform magma ocean

5. How old is the Earth?
 - A) approximately 4.5 thousand years old
 - B) approximately 4.5 billion years old
 - C) approximately 4.5 million years old
 - D) approximately 4.5 trillion years old

6. The Earth's core is made up primarily of _____.
 - A) iron
 - B) lead
 - C) oxygen
 - D) silicon

7. Which part of the Earth depicted in the figure below is molten?



- A) crust
- B) mantle
- C) outer core
- D) inner core

8. Which of the following elements is more abundant in the Earth's crust as compared to the Earth as a whole?

- A) iron
- B) magnesium
- C) nickel
- D) silicon

9. Which of the following makes up the bulk of the Earth?

- A) crust
- B) inner core
- C) mantle
- D) outer core

10. Ninety percent of the Earth is made up of which four elements?

- A) iron, oxygen, silicon, and magnesium
- B) oxygen, nitrogen, hydrogen, and silicon
- C) magnesium, aluminum, silicon, and oxygen
- D) silicon, calcium, aluminum, and iron

11. Approximately 50% of the Earth's crust is made up of which element?
- A) aluminum
 - B) iron
 - C) oxygen
 - D) silicon
12. The Earth exchanges _____ with the rest of the cosmos.
- A) energy and mass
 - B) mass, but not energy,
 - C) energy, but not mass,
 - D) neither energy nor mass
13. Solar energy energizes all of the following major components of the Earth system except the _____.
- A) atmosphere
 - B) biosphere
 - C) hydrosphere
 - D) lithosphere
14. On average, the Earth's lithosphere is approximately ____ km thick.
- A) 4
 - B) 20
 - C) 100
 - D) 500
15. The asthenosphere is _____.
- A) cool and strong
 - B) cool and weak
 - C) hot and strong
 - D) hot and weak
16. What are the plates of plate tectonics made up of?
- A) asthenosphere
 - B) crust
 - C) lithosphere
 - D) mantle

17. Which of the following relationships is correct?
- A) asthenosphere = crust
 - B) lithosphere = crust
 - C) asthenosphere = crust + upper mantle
 - D) lithosphere = crust + upper mantle
18. The motion of a flowing material where hot matter rises from the bottom and cool matter sinks from the surface is called _____.
- A) accretion
 - B) convection
 - C) differentiation
 - D) fusion
19. Which of the following statements about convection is true?
- A) Heat is transferred from hot material to cool material without inducing a flow.
 - B) Hot material flows upward and displaces cool material.
 - C) Cool material flows upward and displaces hot material.
 - D) Random circulation occurs.
20. How old are the oldest rocks now found on the Earth's surface?
- A) 0.5 billion years old
 - B) 4.0 billion years old
 - C) 2.5 billion years old
 - D) 4.5 billion years old
21. Who proposed the theory of continental drift?
- A) Charles Darwin
 - B) Harry Hess
 - C) Alfred Wegener
 - D) J. Tuzo Wilson
22. Which of the following concepts was developed earliest?
- A) continental drift
 - B) plate tectonics
 - C) seafloor spreading
 - D) All three concepts were developed at about the same time.

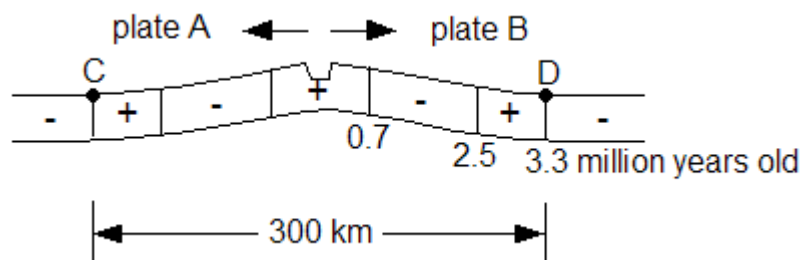
23. When was the theory of plate tectonics developed?
- A) 1860s
 - B) 1920s
 - C) 1940s
 - D) 1960s
24. In which ocean are most of the world's convergent plate margins located?
- A) Arctic Ocean
 - B) Atlantic Ocean
 - C) Indian Ocean
 - D) Pacific Ocean
25. The east coast of North America is _____.
- A) a convergent plate boundary
 - B) a transform plate boundary
 - C) a divergent plate boundary
 - D) not a plate boundary
26. Which of the following is associated with a divergent plate boundary?
- A) earthquakes
 - B) volcanism
 - C) rifting
 - D) all of the above
27. Which of the following is a divergent plate boundary?
- A) the Andes Mountains
 - B) the Mid-Atlantic Ridge
 - C) the Himalayan Mountains
 - D) the San Andreas fault
28. At what type of plate boundary do the deepest earthquakes occur?
- A) convergent
 - B) divergent
 - C) transform
 - D) All of these plate boundaries have deep earthquakes.

29. Approximately how deep (below sea level) are the deepest deep-sea trenches?
- A) 3 km
 - B) 10 km
 - C) 30 km
 - D) 100 km
30. Which of the following is not associated with convergent plate boundaries?
- A) earthquakes
 - B) deep-sea trenches
 - C) spreading centers
 - D) volcanoes
31. Which of the following is a type of convergent plate boundary?
- A) continental rift
 - B) spreading center
 - C) mid-ocean ridge
 - D) subduction zone
32. Which of the following mountain ranges formed as a result of ocean-continent convergence?
- A) the Andes
 - B) the Appalachians
 - C) the Himalayas
 - D) the Urals
33. When a deep-sea trench is located next to a continent, where would you expect to find active volcanoes?
- A) on the ocean side of the trench
 - B) in the deep-sea trench
 - C) on the continent side of the trench
 - D) on both the ocean side and continent side of the trench
34. What plate is subducting beneath southwestern Canada and the northwestern United States?
- A) the Cocos Plate
 - B) the Nazca Plate
 - C) the Juan de Fuca Plate
 - D) the Pacific Plate

35. The west coast of South America is _____.
 A) a convergent plate boundary
 B) a transform fault boundary
 C) a divergent plate boundary
 D) not a plate boundary
36. Which of the following is an example of a transform plate boundary?
 A) the East African Rift
 B) the Mid-Atlantic Ridge
 C) the Marianas Trench
 D) the San Andreas Fault
37. Which of the following mountain ranges is the product of continent-continent convergence?
 A) the Andes
 B) the Cascade Range
 C) the Himalayas
 D) the Japanese islands
38. The North American Plate is bounded by _____ plate boundaries.
 A) convergent
 B) transform
 C) divergent
 D) convergent, divergent, and transform

Use the following to answer questions 39-40:

The questions refer to this cross section, which depicts magnetized oceanic crust at a spreading center. The “+” symbol indicates positive (normal) magnetic anomalies; the “-” symbol indicates negative (reverse) magnetic anomalies.

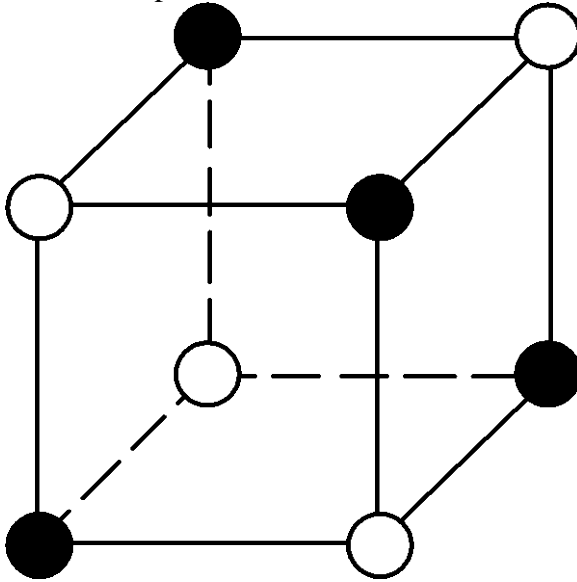


39. How fast are points C and D spreading apart from each other?
- A) about 20 millimeters/year
 - B) about 100 millimeters/year
 - C) about 50 millimeters/year
 - D) about 200 millimeters/year
40. "Normal" magnetized crust at the spreading center formed during the _____ epoch.
- A) Brunhes
 - B) Gauss
 - C) Gilbert
 - D) Matuyama
41. What is limestone made of?
- A) calcite
 - B) feldspar
 - C) olivine
 - D) quartz
42. Solid materials that do not possess an orderly arrangement of atoms are called _____.
- A) glasses
 - B) minerals
 - C) crystals
 - D) polymorphs
43. Which of the following substances is not considered a mineral?
- A) coal
 - B) diamond
 - C) gypsum
 - D) rock salt
44. Isotopes of a given element have _____.
- A) the same number of protons and the same atomic mass
 - B) the same number of protons but different atomic masses
 - C) different numbers of protons but the same atomic mass
 - D) different numbers of protons and different atomic masses

45. Which of the following subatomic particles has a positive charge?
- A) electron
 - B) neutron
 - C) proton
 - D) all of the above
46. Sodium has an atomic number of 11. How many electrons will the sodium ion Na^+ have?
- A) 1
 - B) 10
 - C) 11
 - D) 12
47. Isotopes of an element have different numbers of _____.
- A) electrons
 - B) neutrons
 - C) protons
 - D) all of the above
48. The atomic mass of an element is equal to the number of _____.
- A) protons
 - B) protons plus neutrons
 - C) neutrons
 - D) protons plus neutrons plus electrons
49. What will be the charge of an atom containing 8 protons, 9 neutrons, and 10 electrons?
- A) -2
 - B) -1
 - C) +1
 - D) +2
50. How are the elements organized in the periodic table?
- A) in order of increasing density
 - B) in order of increasing number of electrons
 - C) in order of increasing number of neutrons
 - D) in order of increasing number of protons

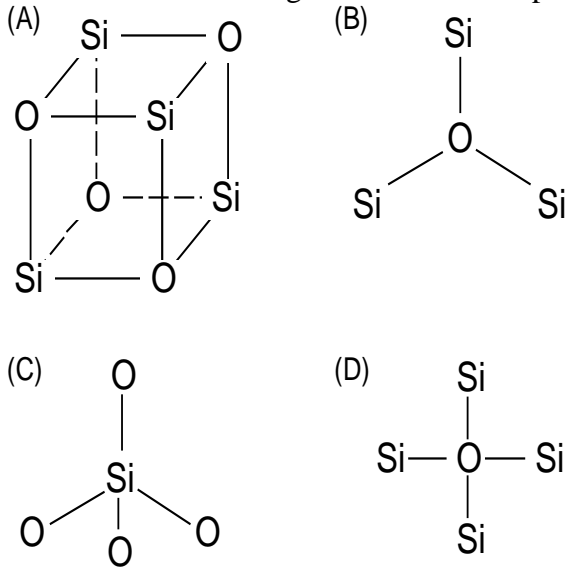
51. In order to make a sodium (Na) chlorine (Cl) bond in NaCl, _____.
A) one electron is transferred from the chlorine atom to the sodium atom
B) one electron is transferred from the sodium atom to the chlorine atom
C) two electrons are transferred from the chlorine atom to the sodium atom
D) two electrons are transferred from the sodium atom to the chlorine atom
52. What is the dominant type of bonding in minerals?
A) covalent bonding
B) ionic bonding
C) metallic bonding
D) nuclear bonding
53. Diamond is an example of what type of bonding?
A) covalent
B) ionic
C) metallic
D) nuclear
54. The growth of a solid from a gas or liquid whose atoms can come together in the proper chemical proportions and crystalline arrangement is called _____.
A) bonding
B) crystallization
C) density
D) melting

55. What elements could be represented by the open and solid spheres in the mineral structure depicted below?



- A) carbon and oxygen
B) silicon and oxygen
C) iron and magnesium
D) sodium and chlorine
56. The chemical formula $(\text{Mg,Fe})_2\text{SiO}_4$ describes which of the following minerals?
- A) feldspar
B) mica
C) olivine
D) pyroxene
57. Chemical substances that have exactly the same chemical formula but different crystal structures are called ____.
- A) electrons
B) ions
C) isotopes
D) polymorphs

58. Which of the following structures best depicts a silicate ion?



- A) Diagram A
B) Diagram B
C) Diagram C
D) Diagram D

59. The most common rock-forming minerals in the crust are _____.

- A) carbonates
B) oxides
C) silicates
D) sulfides

60. Which of the following statements about feldspar is false?

- A) Feldspar is harder than calcite.
B) Feldspar is softer than corundum.
C) Feldspar is the most abundant mineral in the Earth's crust.
D) Feldspar is a sheet silicate.

61. Where would you expect to find the largest crystals in a lava flow?

- A) near the top surface of the flow
B) in the center of the flow
C) near the bottom surface of the flow
D) The crystals would be the same size throughout.

62. Which of the following properties does not depend on the chemical composition of an igneous rock/magma?
- A) grain size
 - B) melting temperature
 - C) mineralogy
 - D) viscosity
63. What geologist is credited with figuring out the origin of granite?
- A) N.L. Bowen
 - B) Charles Darwin
 - C) James Hutton
 - D) Alfred Wegener
64. Which of the following igneous rocks crystallizes at the Earth's surface?
- A) basalt
 - B) gabbro
 - C) granite
 - D) peridotite
65. Felsic igneous rocks contain abundant _____ silicate minerals.
- A) double-chain
 - B) framework
 - C) isolated tetrahedra
 - D) single-chain
66. Which of the following igneous rocks does not consist of volcanic glass?
- A) ash
 - B) gabbro
 - C) obsidian
 - D) pumice
67. Which of the following minerals is common in both felsic and mafic igneous rocks?
- A) olivine
 - B) plagioclase feldspar
 - C) pyroxene
 - D) quartz

68. Which of the following igneous rocks has the lowest silica content?

- A) felsic
- B) intermediate
- C) mafic
- D) ultramafic

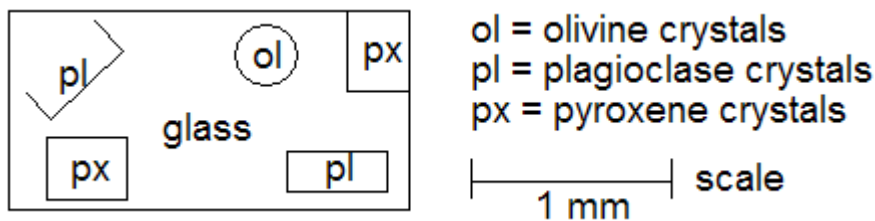
69. Which of the following best describes a rhyolite?

- A) fine-grained igneous rock rich in silica
- B) fine-grained igneous rock poor in silica
- C) coarse-grained igneous rock rich in silica
- D) coarse-grained igneous rock poor in silica

70. Which of the following minerals is rarely found in felsic igneous rocks?

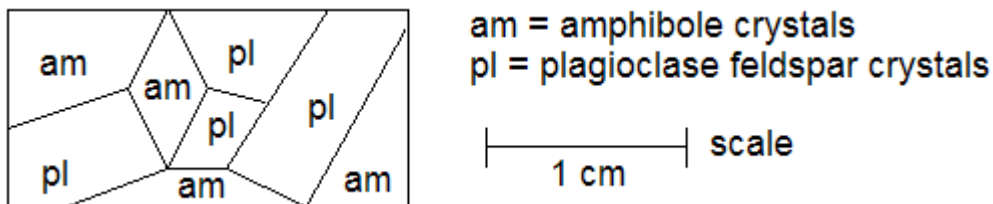
- A) olivine
- B) orthoclase feldspar
- C) plagioclase feldspar
- D) quartz

71. Which of the following best describes the igneous rock depicted in the diagram below?





- A) andesite
- B) basalt
- C) granite
- D) peridotite

72. Which of the following best describes the igneous rock depicted in the diagram below?



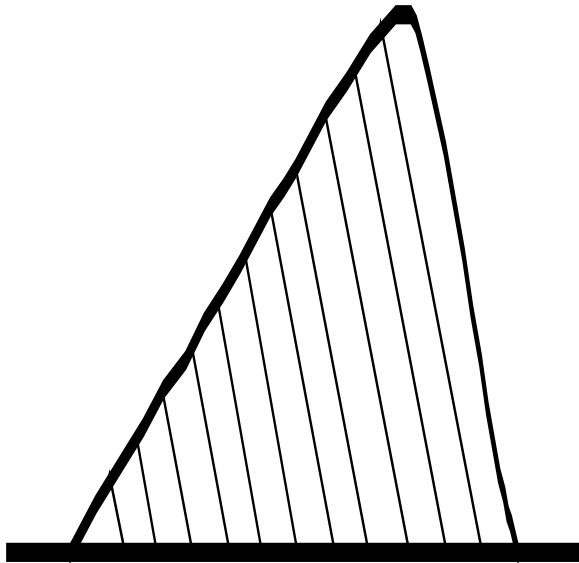
- A) basalt
- B) diorite
- C) granite
- D) rhyolite

73. Andesite is an example of a(n) _____ igneous rock.
- A) felsic
 - B) intermediate
 - C) mafic
 - D) ultramafic
74. Which of the following types of igneous rocks are rarely found as lavas?
- A) felsic
 - B) intermediate
 - C) mafic
 - D) ultramafic
75. Which of the following igneous rocks has the same chemical composition as basalt?
- A) andesite
 - B) diorite
 - C) gabbro
 - D) rhyolite
76. Which of the following pairs of intrusive and extrusive rocks have the same chemical composition?
- A) diorite and rhyolite
 - B) gabbro and rhyolite
 - C) gabbro and basalt
 - D) granite and andesite
77. Which igneous rock is the most abundant igneous rock of the crust and underlies virtually all of the floors of the ocean?
- A) andesite
 - B) basalt
 - C) granite
 - D) peridotite
78. Which of the following properties increases in the direction of the arrows in the diagram below?
- Felsic**  **Intermediate**  **Mafic**
- A) melting temperature
 - B) potassium content
 - C) silica content
 - D) viscosity

79. Which of the following statements about felsic igneous rocks is true?
- A) Felsic rocks contain less silica than mafic rocks.
 - B) Felsic rocks crystallize at lower temperatures than mafic rocks.
 - C) Felsic rocks tend to be darker colored than mafic rocks.
 - D) Felsic rocks tend to be finer grained than mafic rocks.
80. Which of the following lists is in the correct order of increasing silica content?
- A) diorite → granite → gabbro
 - B) gabbro → diorite → granite
 - C) gabbro → granite → diorite
 - D) granite → diorite → gabbro
81. What composition is the Palisades sill located near New York?
- A) felsic
 - B) intermediate
 - C) mafic
 - D) ultramafic
82. Which of the following sets of processes is written in order of increasing temperature?
- A) sedimentation, metamorphism, diagenesis
 - B) diagenesis, sedimentation, metamorphism
 - C) sedimentation, diagenesis, metamorphism
 - D) metamorphism, diagenesis, sedimentation
83. Which of the following terms describes the alteration of sediments to sedimentary rocks after deposition?
- A) diagenesis
 - B) crystallization
 - C) precipitation
 - D) metamorphism
84. What type of sediments are accumulations of solid fragments produced by weathering?
- A) biochemical sediments
 - B) clastic sediments
 - C) chemical sediments
 - D) all of the above

85. Which of the following minerals would be most concentrated at a site containing heavily weathered sediments?
- A) amphibole
 - B) feldspar
 - C) mica
 - D) quartz
86. Which of the following statements about transportation of sediment is false?
- A) Smaller particles settle faster than larger particles.
 - B) As a current slows, the largest particles start to settle.
 - C) Faster currents carry larger particles than slower currents.
 - D) Rivers and ocean currents move much more material than do air currents.
87. The tendency for variations in current velocity to segregate sediments on the basis of particle size is called _____.
- A) compaction
 - B) lithification
 - C) metamorphism
 - D) sorting
88. Which of the following environments is an example of a shoreline environment?
- A) alluvial
 - B) continental shelf
 - C) deltaic
 - D) organic reef
89. In which of the following sedimentary environments would gravel most likely be deposited?
- A) alluvial
 - B) continental shelf
 - C) deep-sea
 - D) deltaic
90. In which of the following environments are siliceous sediments deposited?
- A) deep-sea
 - B) reef
 - C) evaporite
 - D) swamp

Use the following to answer questions 91-92:



91. Assuming the sand dune was deposited by wind currents, which way was the wind blowing?

A) ←

B) →

C) ↔

D) Cannot determine from the information given.

92. The diagonal layers are called _____.

A) cross-beds

B) graded beds

C) point bars

D) ripples

93. Which of the following is not a sedimentary structure?

A) bioturbation

B) cross-bedding

C) vesicles

D) ripples

94. Burial of sediments results in _____.
A) decreasing pressure and decreasing temperature
B) decreasing pressure and increasing temperature
C) increasing pressure and decreasing temperature
D) increasing pressure and increasing temperature
95. Which of the following statements is true?
A) Cementation and compaction both decrease porosity.
B) Cementation increases porosity, whereas compaction decreases porosity.
C) Cementation decreases porosity, whereas compaction increases porosity.
D) Cementation and compaction both increase porosity.
96. Which of the following lists is written in order of decreasing particle size?
A) conglomerate, sandstone, siltstone
B) sandstone, siltstone, conglomerate
C) sandstone, conglomerate, siltstone
D) siltstone, sandstone, conglomerate
97. Which of the following is an example of a clastic sedimentary rock?
A) chert
B) dolostone
C) evaporite
D) shale
98. Which of the following rocks is composed of clay-sized clastic sediment?
A) conglomerate
B) dolostone
C) sandstone
D) shale
99. A clastic sedimentary rock composed of medium-grained (1 mm across) particles is called a _____.
A) conglomerate
B) sandstone
C) shale
D) siltstone
100. Which of the following sedimentary rock groups are most abundant?
A) cherts and evaporites
B) sandstones and conglomerates
C) limestones and dolostones
D) siltstones, mudstones, and shales