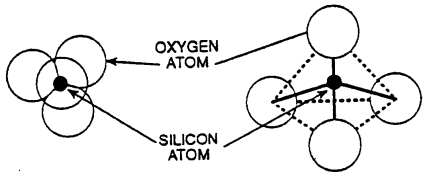
Name: _____ Period: _____

1. Although diamonds and graphite both consist of the element carbon, their physical properties are very different. The most likely explanation for these differences is that
   (1) the internal arrangement of carbon atoms is different in each mineral
   (2) graphite contains impurities not found in diamonds
   (3) graphite contains radioactive carbon-14 but diamonds do not
   (4) diamonds contain silicate tetrahedra but graphite does not

2. The diagram below represents top and side views of a model of the silicate tetrahedron.



   This tetrahedron is found in large amounts in the Earth's
   (1) hydrosphere
   (2) troposphere
   (3) lithosphere
   (4) stratosphere

3. Two mineral samples have different physical properties, but each contains silicate tetrahedra as its basic structural unit. Which statement about the two mineral samples must be true?
   (1) They have the same density.
   (2) They contain silicon and oxygen.
   (3) They are similar in appearance.
   (4) They are the same mineral.

4. One requirement for a substance to be a mineral is that the substance must be
   (1) a compound
   (2) formed naturally
   (3) an element
   (4) a rock

5. The major portion of the volume of the silicate mineral is
   (1) oxygen
   (2) carbon
   (3) silicon
   (4) calcium

6. Which is the hardest mineral on Earth?
   (1) talc
   (2) diamond
   (3) quartz
   (4) garnet

7. The mineral mica breaks evenly along flat surfaces mainly because of its
   (1) chemical composition
   (2) density
   (3) hardness
   (4) atomic arrangement

8. A student rubs a small sample of a mineral on a tile to see the color of its powder. The student is trying to determine the mineral's
   (1) density
   (2) chemical composition
   (3) streak
   (4) luster

9. A mineral sample is embedded in a piece of clear plastic. Which of the following physical properties could not be used in its identification?
   (1) crystal shape
   (2) hardness
   (3) color
   (4) luster

10. The mineral that reacts to hydrochloric acid is
    (1) halite
    (2) quartz
    (3) sulfur
    (4) calcite

11. Which mineral is made up of only one element?
    (1) biotite mica
    (2) quartz
    (3) olivine
    (4) sulfur

12. The mineral that has a greasy feel and is used as pencil “lead” is
    (1) halite
    (2) pyrite
    (3) graphite
    (4) quartz

13. The silicate mineral that is found in sheets and has cleavage in one direction is known as
    (1) olivine
    (2) mica
    (3) asbestos
    (4) quartz

14. Which mineral has a different color than its streak, has a metallic luster, and is the ore of both iron and sulfur?
    (1) gypsum
    (2) galena
    (3) pyrite
    (4) magnetite

15. Which mineral is a compound made up of nine different elements?
    (1) talc
    (2) muscovite mica
    (3) amphiboles
    (4) olivine

16. Which of the following resists scratching the most?
    (1) garnet
    (2) potassium feldspar
    (3) hematite
    (4) calcite

17. Which of the following is a silicate mineral?
    (1) magnetite
    (2) halite
    (3) fluorite
    (4) plagioclase feldspar

18. Which mineral cleaves in two directions at 90^{o}?
    (1) fluorite
    (2) potassium feldspar
    (3) olivine
    (4) quartz

19. Which mineral would be attracted to a magnet?
    (1) galena
    (2) magnetite
    (3) graphite
    (4) calcite

20. Which mineral contains iron, has a metallic luster, is hard, and has the same color and streak?
    (1) galena
    (2) magnetite
    (3) graphite
    (4) pyrite

21. Which mineral would most likely break down the most after being placed in a container and shaken for 5 minutes?
    (1) quartz
    (2) garnet
    (3) halite
    (4) pyroxene

22. Which of the following is a silicate mineral that breaks into tetrahedral sheets?
(1) olivine
(2) asbestos
(3) pyroxene
(4) biotite

23. Sand collected at a beach contains a mixture of pyroxene, olivine, hornblende, and plagioclase feldspar. According to the *Earth Science Reference Tables,* the rock from which this mixture of sand came is best described as
(1) dark-colored with a mafic composition
(2) light-colored with a mafic composition
(3) dark-colored with a felsic composition
(4) light-colored with a felsic composition

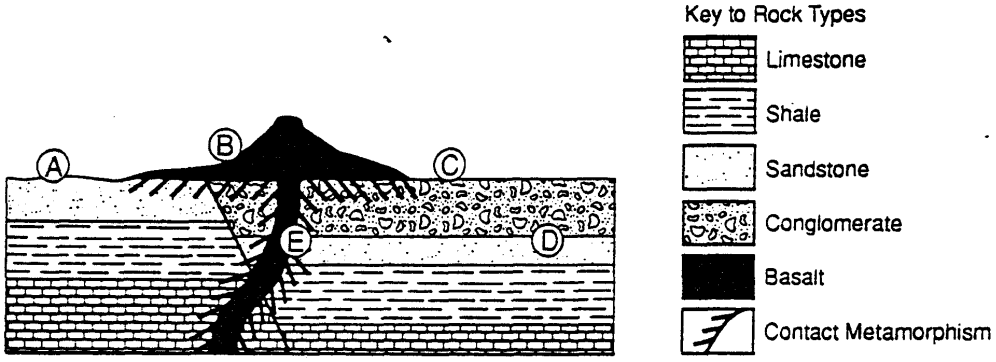
24. Which is the best description of the properties of basalt?
(1) fine-grained and mafic
(2) coarse-grained and mafic
(3) fine-grained and felsic
(4) coarse-grained and felsic

25. The grouping of rocks as igneous, sedimentary, and metamorphic is based primarily upon differences in
(1) age
(2) origin
(3) size
(4) hardness

26. According to the Scheme for Igneous Rock Identification, compared to basalt, granite is
(1) lighter in color
(2) more mafic in composition
(3) greater in density
(4) more fine grained in texture

27. As the rate of cooling of molten rock decreases, the size of the crystals that form in the rock will usually
(1) decrease
(2) increase
(3) remain the same

Base your answers to **questions 28-30** on the diagram below which represents a geologic cross section.

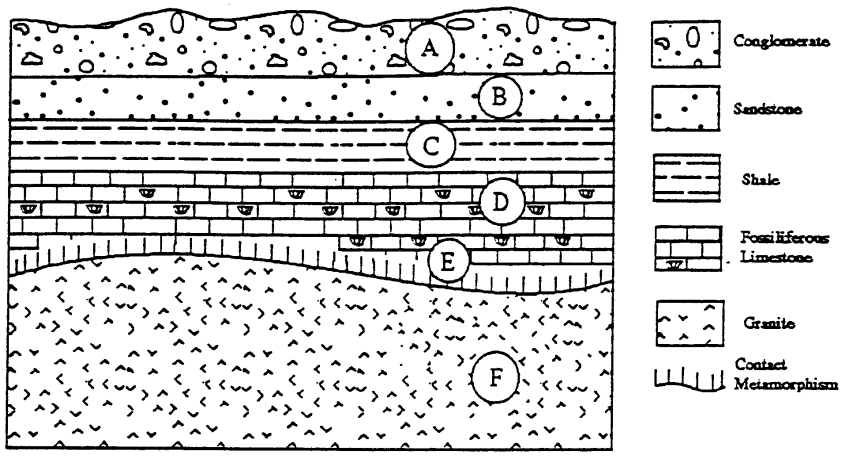


28. In which location is a geologist most likely to find rock composed of intergrown crystals?
(1) A
(2) B
(3) C
(4) D

29. At which location would quartzite most likely be found?
(1) A
(2) B
(3) E
(4) D

30. The rock at B most likely contains
(1) quartz, only
(2) quartz and potassium feldspar, only
(3) potassium feldspar, pyroxene, and olivine
(4) plagioclase feldspar, pyroxene, and olivine

Base your answers to **questions 31-33** on the diagram below and your knowledge of earth science. The diagram represents a geologic cross-section of Earth's crust.



31. At which location would marble most likely be found?
    (1) F (3) C
    (2) B (4) E

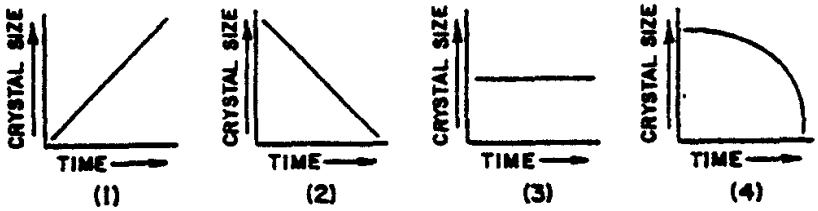
32. At which location would a felsic igneous rock most likely be found?
    (1) F (3) C
    (2) B (4) E

33. A rock which would fizz upon contact with dilute hydrochloric acid is found at location
    (1) A (3) C
    (2) F (4) D

34. Olivine and pyroxene are commonly found in igneous rocks that are
    (1) felsic, with low density (3) felsic, with high density
    (2) mafic, with low density (4) mafic, with high density

35. Which statement about the minerals quartz and olivine must always be true?
    (1) They have the same form at the same temperature.
    (2) They have the same density.
    (3) They contain the elements silicon and oxygen.
    (4) They contain the elements iron and magnesium.

36. Which graph best shows the relationship between the size of the crystals in an igneous rock and the length of time it has taken the rock to solidify?



37. Which rock type most likely would contain fossils?
    (1) sedimentary rock (3) metamorphic rock
    (2) intrusive igneous rock (4) extrusive igneous rock

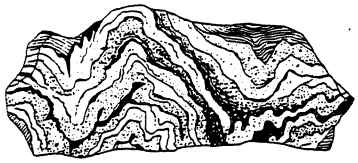
38. Which rocks form relatively thin layers, compared to the thickness of the continent, over large areas of the continents?
(1) granite and gabbro
(2) metamorphic rocks
(3) sandstone and shale
(4) intrusive igneous rocks

39. According to the Earth Science Reference Tables, which rock most likely formed as a result of biologic processes?
(1) granite
(2) basalt
(3) sandstone
(4) limestone

40. Which sedimentary rocks are formed by chemical precipitation from seawater?
(1) gypsum and limestone
(2) sandstone and siltstone
(3) fossil limestone and shale
(4) conglomerate and dolostone

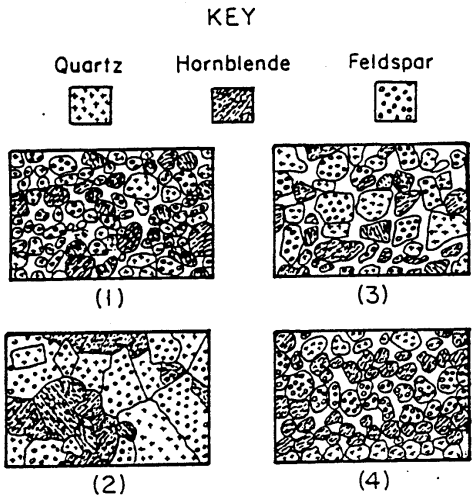
41. According to the Earth Science Reference Tables, which sedimentary rock is land-derived?
1 limestone
2 siltstone
3 gypsum
4 salt

The diagram below represents a rock with a distorted laver structure.



42. The distorted structure of this rock is most likely the result of
(1) a long period of weathering
(2) wind erosion
(3) glacial activity
(4) extreme pressure

43. The diagrams below represent magnifications of rocks. Which is most likely a diagram of a non-sedimentary rock?



44. Which rock is most likely a non-sedimentary rock?
(1) a rock showing mud cracks
(2) a rock containing dinosaur bones
(3) a rock consisting of layers of rounded sand grains
(4) a rock composed of distorted light-colored and dark-colored mineral bands

45. Which sequence of events occurs in the formation of a sedimentary rock?

(1) Source material eroded → Sediments deposited → Sediments compacted and cemented

(2) Sediments compacted and cemented → Sediments deposited → Source material eroded

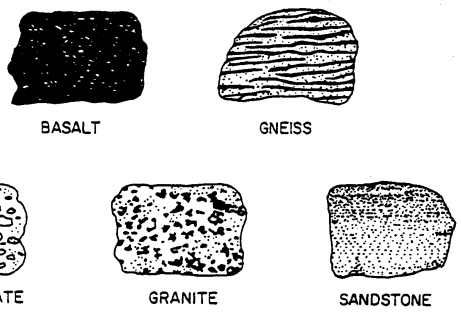
(3) Sediments deposited → Sediments compacted and cemented → Source material eroded

(4) Source material eroded → Sediments compacted and cemented → Sediments deposited

46. According to the Rock Cycle Diagram in the *Earth Science Reference Tables*, metamorphic rock could be the direct result of the
    (1) melting and solidification of sedimentary rock
    (2) weathering and erosion of igneous rock
    (3) heat and pressure added to an igneous rock
    (4) erosion and deposition of sediments

47. Which statement is supported by information in the Rock Cycle diagram in the *Earth Science Reference Tables?*
    (1) Metamorphic rock results directly from melting and crystallization.
    (2) Sedimentary rock can only be formed from igneous rock.
    (3) Igneous rock always results from melting and solidification.
    (4) All sediments turn directly into sedimentary rock.

Base your answers to **questions 48-49** on your knowledge of Earth science, and the diagrams of five rock samples shown below.



48. Which rock is composed of sediments that have a range of sizes and that originate from different rock types?
    (1) basalt (3) conglomerate
    (2) gneiss (4) granite

49. Which rock shows banding that formed as a result of the recrystallization of unmelted material under high temperature and pressure?
    (1) gneiss (3) granite
    (2) conglomerate (4) sandstone

Base your answers to **questions 50-54** on your knowledge of Earth science, the Earth Science Reference Tables, and the table below. The table provides data about the texture and mineral composition of four different igneous rock samples having the same volume.

Rock	*Texture*	Potassium feldspar	Quartz	Plagioclase feldspar	Biotite	Hornblende	Pyroxene
A	coarse	62%	20%	7%	7%	4%	0%
B	coarse	24%	40%	19%	10%	7%	0%
C	fine	6%	16%	41%	14%	23%	0%
D	fine	0%	0%	50%	0%	6%	44%

50. Which igneous rock sample contains the most quartz by volume?
(1) A (2) B (3) C (4) D

51. According to the rock cycle diagram in the Earth Science Reference Tables, all four rock samples have undergone
(1) compaction and sedimentation
(2) solidification from a molten state
(3) volcanic eruption
(4) deposition and burial

52. Which two igneous rocks most likely formed closest to the surface of the Earth?
(1) A and B
(2) C and D
(3) B and C
(4) A and D

53. Which rock sample is probably basalt?
(1) A (2) B (3) C (4) D

54. Which rock sample has the greatest density and also contains the most magnesium?
(1) A (2) B (3) C (4) D

Base your answers to **questions 55-58** on your knowledge of Earth science, the *Earth Science Reference Tables*, and the data below for five different rock samples.

Data Table

ROCK SAMPLE	ORIGIN	CRYSTAL SIZE OR GRAIN SIZE	OTHER CHARACTERISTIC
1	igneous	no crystals	glassy
2	igneous	coarse	light color
3	igneous	fine	dark color
4	sedimentary	0.0003 cm in diameter	contains dinosaur footprints
5	metamorphic	coarse	shows banding

55. Which sedimentary rock is most likely represented by rock sample 4?
(1) conglomerate
(2) sandstone
(3) breccia
(4) shale

56. Which non-sedimentary rock was formed by the most rapid cooling of molten rock on the Earth's surface?
(1) 1
(2) 2
(3) 3
(4) 5

57. Which rock sample most likely is granite?
(1) 1
(2) 2
(3) 3
(4) 5

58. The banding characteristic of rock 5 probably was caused by
(1) erosion and deposition
(2) heat and pressure
(3) melting and solidification
(4) burial and cementation

Base your answers to **questions 59-62** on the *Earth Science Reference Tables*, the descriptions of five different rock samples, A through E, in the table below, and your knowledge of Earth science.

Rock Sample	Description
A	a gray rock consisting of particles of uniform size (0.05 cm in diameter) cemented together
B	a light-colored felsic rock consisting of coarse-grained intergrown crystals (pink, white, and black) evenly distributed throughout the sample
C	a rock consisting of light and dark intergrown crystals with the crystals aligned in alternating light and dark wavy bands
D	a black mafic rock consisting of fine-grained dark, intergrown crystals evenly distributed throughout the sample
E	a soft white rock consisting of one uniform material containing fossil shells

59. Which rocks are most likely sedimentary rocks?
(1) A and B
(2) B and D
(3) A and E
(4) D and E

60. Which rock was most likely formed from molten material that cooled and solidified deep within the Earth's crust?
(1) A
(2) B
(3) E
(4) D

61. The crystal alignment in rock C is most likely due to
(1) compaction and cementation of sediments
(2) erosion and deposition of sediments
(3) melting and solidification of molten rock material
(4) metamorphism of unmelted rock material

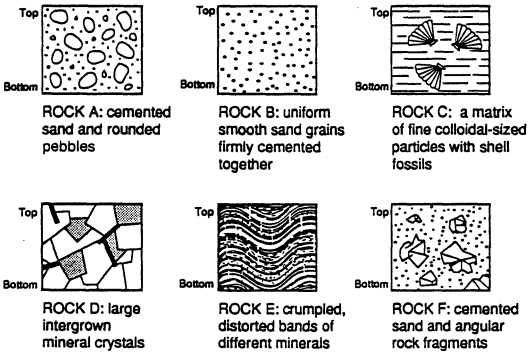
62. Rock sample A would be classified as
(1) shale
(2) sandstone
(3) granite
(4) basalt

63. The environment in which rock E was originally formed was most likely
(1) at or near the Earth's surface
(2) deep underground
(3) near erupted volcanic material
(4) under high temperature and pressure

64. Between which two rock types would a geologist find a transition zone of metamorphic rock?
(1) shale and sandstone
(2) limestone and shale
(3) granite and limestone
(4) limestone and sandstone

65. Which of the following rocks is monomineralic?
(1) rhyolite
(2) schist
(3) sandstone
(4) dunite

Base your answers to **questions 66-70** on the *Earth Science Reference Tables*, the diagrams below of five rock samples, and your knowledge of Earth science.



66. Which rock was probably formed from a preexisting rock that was changed by heat and pressure, but not melted?
    (1) A (3) E
    (2) B (4) F

67. Analysis of rock D shows that it is composed of the minerals quartz, feldspar, hornblende, and biotite mica. Rock D is probably
    (1) granite (3) gabbro
    (2) basalt (4) rhyolite

68. Which rock is represented by sample C?
    (1) granite (3) limestone
    (2) gneiss (4) rhyolite

69. Which rock consists of sediments with an average diameter of 0.01 centimeter?
    (1) A (3) C
    (2) B (4) D

70. Which processes most likely formed rock F?
    (1) melting and solidification (3) faulting and volcanic activity
    (2) heating and application of pressure (4) burial and cementation

71. Which order of metamorphic rocks indicate their formation with increasing pressure and depth?
    (1) slate, phyllite, schist, gneiss
    (2) slate, gneiss, phyllite, schist
    (3) gneiss, phylitte, schist, slate
    (4) gneiss, schist, phyllite, slate