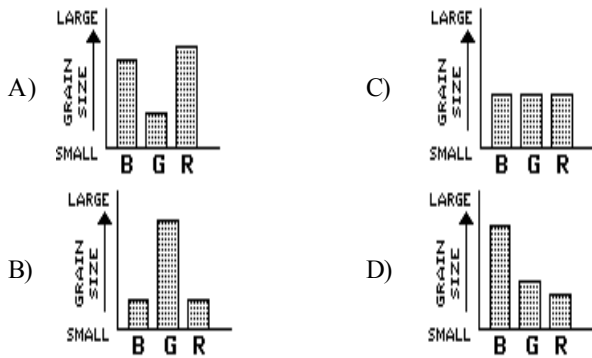


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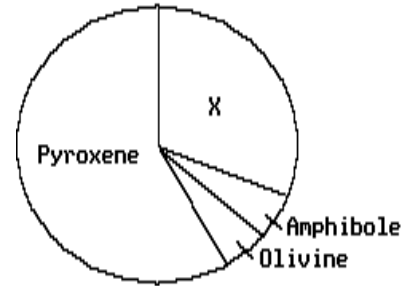
- 1) According to the *Earth Science Reference Tables*, which sedimentary rock would be formed by the compaction and cementation of particles 1.5 centimeters in diameter?
  - A) shale
  - B) conglomerate
  - C) siltstone
  - D) sandstone
- 2) Where is metamorphic rock frequently found?
  - A) along the interface between igneous intrusions and sedimentary bedrock
  - B) within large lava flows
  - C) on mountaintops that have horizontal layers containing marine fossils
  - D) as a thin surface layer covering huge areas of the continents
- 3) According to the *Earth Science Reference Tables*, which graph best represents the comparison of the average grain sizes in basalt, granite, and rhyolite?

**KEY TO GRAPH ABBREVIATIONS:** B - Basalt, G - Granite, R - rhyolite



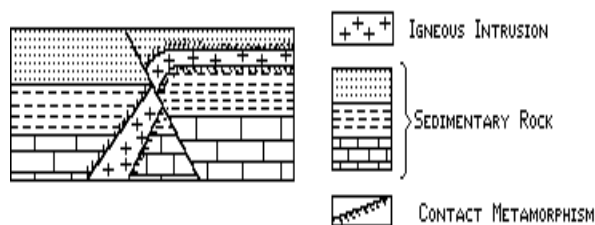
- 4) According to the *Earth Science Reference Tables*, which is a fine-grained igneous rock made up primarily of pyroxene and plagioclase feldspar?
  - A) granite
  - B) gabbro
  - C) basalt
  - D) rhyolite
- 5) According to the *Earth Science Reference Tables*, which characteristic determines whether a rock is classified as a shale, a siltstone, a sandstone, or a conglomerate?
  - A) the mineral composition of the sediments within the rock
  - B) the density of the sediments within the rock
  - C) the absolute age of the sediments within the rock
  - D) the particle size of the sediments within the rock

- 6) Which relative concentrations of elements are found in a felsic rock?
  - A) a high concentration of magnesium and a low concentration of aluminum
  - B) a high concentration of aluminum and a low concentration of iron
  - C) a high concentration of iron and a low concentration of aluminum
  - D) a high concentration of magnesium and a low concentration of iron
- 7) The grouping of rocks as igneous, sedimentary, and metamorphic is based primarily upon differences in
  - A) hardness
  - B) size
  - C) origin
  - D) age
- 8) The diagram below represents the percentage by volume of each mineral found in a sample of basalt. Which mineral is represented by the letter X in the diagram?



- 9) According to the *Earth Science Reference Tables*, which is a sedimentary rock that forms as a result of precipitation from seawater?
  - A) plagioclase feldspar
  - B) mica
  - C) potassium feldspar
  - D) quartz
- 9) According to the *Earth Science Reference Tables*, which is a sedimentary rock that forms as a result of precipitation from seawater?
  - A) shale
  - B) gypsum
  - C) conglomerate
  - D) basalt
- 10) According to the *Earth Science Reference Tables*, which sedimentary rock is composed of fragmented skeletons and shells of sea organisms compacted and cemented together?
  - A) shale
  - B) sandstone
  - C) gypsum
  - D) limestone
- 11) According to the *Earth Science Reference Tables*, rhyolite is an example of a
  - A) polymineralic sedimentary rock
  - B) polymineralic igneous rock
  - C) monomineralic sedimentary rock
  - D) monomineralic igneous rock

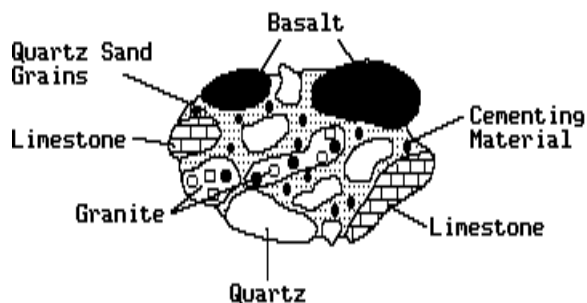
- 12) The best evidence for determining the cooling rate of an igneous rock during its solidification is provided by
- the disintegration of radioactive substances
  - the crystal size of its minerals
  - index fossils
  - faults in the rock
- 13) According to the "Scheme for Igneous Rock Identification" in the *Earth Science Reference Tables*, basalt contains the *greatest* quantity of which mineral?
- mica
  - quartz
  - pyroxene
  - potassium feldspar
- 14) The diagram below represents a portion of the Earth's crust. Which statement best explains why portions of the sedimentary rock layers have the symbol for contact metamorphism?



- Faulting changed the rocks before the igneous intrusion occurred.
  - As the molten material cooled, energy was absorbed by the igneous intrusion.
  - The rock layers were eroded at the interface between the igneous intrusion and the sedimentary rocks.
  - The sedimentary layers were altered by heat at the interface between the igneous intrusion and sedimentary rocks.
- 15) According to the "Scheme for Igneous Rock Identification" in the *Earth Science Reference Tables*, which statement best describes the percentage of plagioclase feldspars in a sample of gabbro?
- Gabbro always contains less plagioclase than pyroxene.
  - Gabbro contains no plagioclase feldspars.
  - Plagioclase feldspars always make up 25% of a gabbro sample.
  - The percentage of plagioclase feldspar in gabbro can vary.
- 16) According to the *Earth Science Reference Tables*, which property would be most useful for identifying igneous rocks?
- types of fossils present
  - kind of cement
  - number of minerals present
  - mineral composition
- 17) Which rocks would most likely be separated by a transition zone of altered rock (metamorphic rock)?
- granite and limestone
  - sandstone and limestone
  - conglomerate and siltstone
  - shale and sandstone
- 18) Most igneous rocks form by which processes?
- erosion and deposition
  - heat and pressure
  - melting and solidification
  - compaction and cementation
- 19) A river carrying pebbles, sand, silt, and clay flows into the ocean. The sediments are sorted by size as they are deposited at different distances from shore. Which sedimentary rock will most likely form from the sediment deposited farthest from shore?
- conglomerate
  - sandstone
  - siltstone
  - shale
- 20) The recrystallization of unmelted material under high temperature and pressure results in
- volcanic rock
  - igneous rock
  - metamorphic rock
  - sedimentary rock
- 21) Which statement best describes a general property of rocks?
- All rocks contain fossils.
  - Most rocks have a number of minerals in common.
  - All rocks contain minerals formed by compression and cementation.
  - Most rocks are composed of a single mineral.
- 22) According to the *Earth Science Reference Tables*, sedimentary rocks formed by compaction and cementation of land-derived sediments are classified on the basis of
- particle size
  - rate of formation
  - composition
  - type of cement
- 23) Which characteristic provides the best evidence about the environment in which a rock was formed?
- the size of the rock
  - the thickness of the rock
  - the texture of the rock
  - the color of the rock
- 24) According to the *Earth Science Reference Tables*, the sedimentary rock, gypsum, forms as a result of
- evaporation of seawater
  - metamorphism of limestone
  - weathering of siltstone
  - faulting and folding of shale

- 25) Large rock salt deposits in the Syracuse area indicate that the area once had
- many terrestrial animals
  - a range of volcanic mountains
  - large forests
  - a warm, shallow sea
- 26) Extremely small crystal grains in an igneous rock are an indication that the crystals formed
- from an iron-rich magma
  - under high pressure
  - deep below the surface of the Earth
  - over a short period of time
- 27) A fine-grained igneous rock contains 11% plagioclase, 72% pyroxene, 15% olivine, and 2% amphibole. According to the *Earth Science Reference Tables*, this rock would most likely be classified as
- rhyolite
  - gabbro
  - basalt
  - granite
- 28) Large crystal grains in an igneous rock indicate that the rock was formed
- under low pressure
  - over a long period of time
  - near the surface
  - at a low temperature
- 29) According to the *Earth Science Reference Tables*, some sedimentary rocks form as the direct result of the
- melting of minerals
  - solidification of molten magma
  - cementation of rock fragments
  - recrystallization of material
- 30) Which rock is most likely a nonsedimentary rock?
- a rock composed of distorted light-colored and dark-colored mineral bands
  - a rock consisting of layers of rounded sand grains
  - a rock containing dinosaur bones
  - a rock showing mud cracks
- 31) According to the "Scheme for Igneous Rock Identification" in the *Earth Science Reference Tables*, compared to basalt, granite is
- more fine grained in texture
  - lighter in color
  - more mafic in composition
  - greater in density
- 32) According to the *Earth Science Reference Tables*, which minerals could *both* be contained in the rocks gabbro and granite?
- quartz and pyroxene
  - plagioclase and nepheline
  - mica and hornblende
  - potassium feldspar and olivine

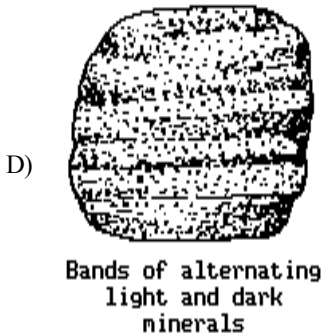
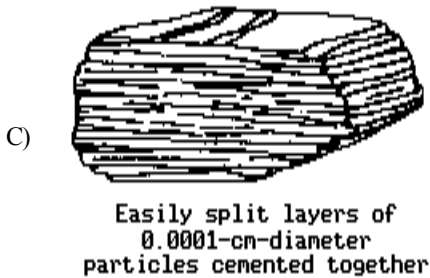
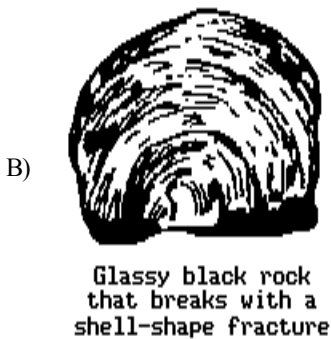
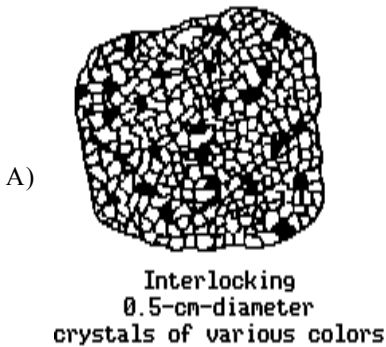
- 33) Sand collected at a beach contains a mixture of pyroxene, olivine, hornblende, and plagioclase feldspar. According to the *Earth Science Reference Tables*, the rock from which this mixture of sand came is best described as
- light-colored with a felsic composition
  - light-colored with a mafic composition
  - dark-colored with mafic composition
  - dark-colored with a felsic composition
- 34) The diagram below represents a conglomerate rock. Some of the rock particles are labeled.



Which conclusion is best made about the rock particles?

- They are the same age.
- They originated from a larger mass of igneous rock.
- They have different origins.
- They all contain the same minerals.

35) The diagrams below represent four rock samples. Which rock took the longest time to solidify from magma deep within the Earth?



36) Which observation about an igneous rock would support the inference that the rock cooled slowly underground?

- A) The rock has well-defined layers.
- B) The rock has large crystals.
- C) The rock is about 50 percent plagioclase feldspar.
- D) The rock is light in color and low in density.

37) Limestone is a sedimentary rock which may form as a result of

- A) biologic processes
- B) melting
- C) recrystallization
- D) metamorphism

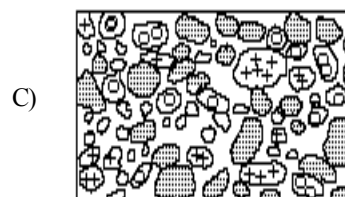
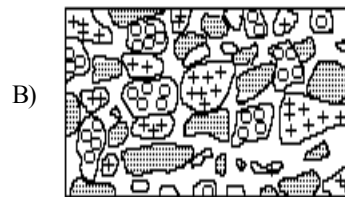
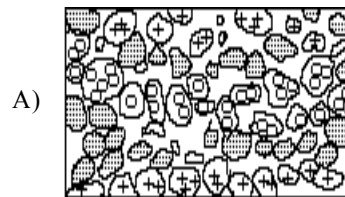
38) Metamorphic rocks result from the

- A) erosion of rocks
- B) compression and cementation of soil particles
- C) cooling and solidification of molten magma
- D) recrystallization of rocks

39) Which rock was formed by the compaction and cementation of particles 0.07 centimeter in diameter? [Refer to the *Earth Science Reference Tables*.]

- A) sandstone
- B) basalt
- C) limestone
- D) shale

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



41) According to the *Earth Science Reference Tables*, a rock that forms directly from land-derived sediments is

- A) gabbro
- B) granite
- C) sandstone
- D) dolostone

42) According to the *Earth Science Reference Tables*, rhyolite and granite are alike in that they both are

- A) felsic
- B) fine-grained
- C) dark-colored
- D) mafic

- 43) According to the *Earth Science Reference Tables*, which is the best description of the properties of basalt?
- A) fine-grained and felsic  
 B) coarse-grained and mafic  
 C) coarse-grained and felsic  
 D) fine-grained and mafic
- 44) An igneous rock which has crystallized deep below the Earth's surface has the following approximate composition: 70% pyroxene, 15% plagioclase, and 15% olivine. According to the *Earth Science Reference Tables*, what is the name of this igneous rock?
- A) gabbro  
 B) rhyolite  
 C) basalt  
 D) granite
- 45) What is the main difference between metamorphic rocks and most other rocks?
- A) Many metamorphic rocks contain a high amount of oxygen-silicon tetraheda.  
 B) Many metamorphic rocks contain only one mineral.  
 C) Many metamorphic rocks have an organic composition.  
 D) Many metamorphic rocks exhibit banding and distortion of structure.
- 46) A sediment contains particles that range in diameter from 2 to 4 centimeters. According to the *Earth Science Reference Tables*, which sedimentary rock would be formed when this sediment is compressed and cemented together?
- A) sandstone  
 B) shale  
 C) siltstone  
 D) conglomerate
- 47) According to the *Earth Science Reference Tables*, which mineral is most abundant in gabbro?
- A) quartz  
 B) mica  
 C) pyroxene  
 D) potassium feldspar
- 48) According to the *Earth Science Reference Tables*, which minerals are found in the igneous rocks gabbro and basalt?
- A) pyroxene and potassium feldspar  
 B) orthoclase and quartz  
 C) olivine and quartz  
 D) olivine and pyroxene
- 49) The metamorphism of a sandstone rock will cause the rock
- A) to occupy a greater volume  
 B) to be melted  
 C) to become more dense  
 D) to contain more fossils
- 50) A group of students collected rounded, well-sorted mineral particles from a stream that flowed over only coarse-grained igneous bedrock. They sorted the particles by mineral type and then mixed equal volumes of all four minerals together and poured the mixture into a tube of water. The data table below lists the minerals. Figure A shows the deposit formed on the bottom of the tube as a result of the deposition of the particles.

DATA TABLE

| MINERAL                | AVERAGE PARTICLE DIAMETER |
|------------------------|---------------------------|
| Plagioclase feldspar   | 0.2 cm                    |
| Quartz                 | 0.2 cm                    |
| Hornblende (Amphibole) | 0.2 cm                    |
| Olivine                | 0.2 cm                    |

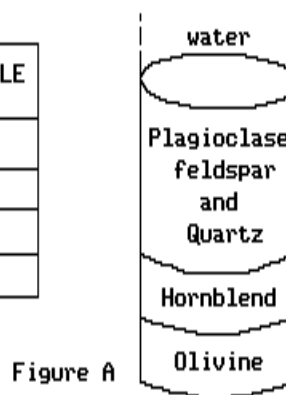
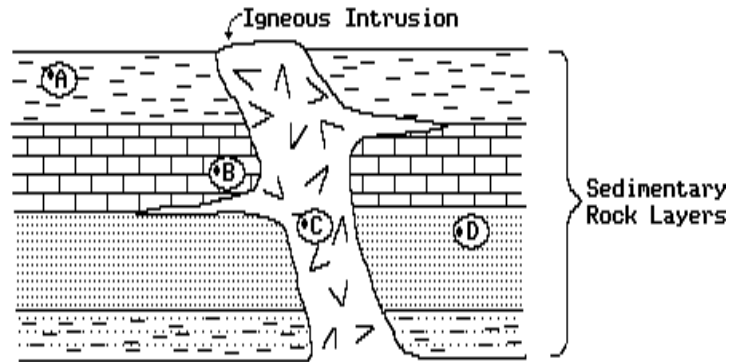


Figure A

The mineral particles collected by the students were most likely weathered from

- A) rhyolite and basalt rocks  
 B) gabbro and granite rocks  
 C) gabbro rocks, only  
 D) rhyolite rocks, only

- 51) The diagram below shows an igneous rock intrusion in sedimentary rock layers.

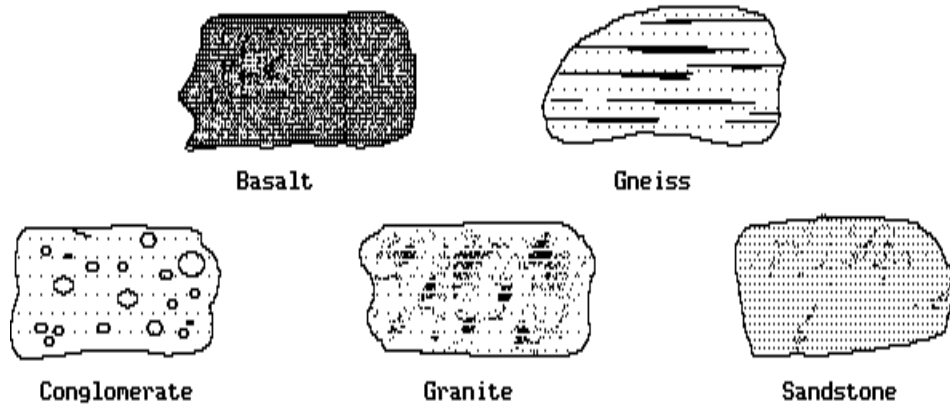


At which point would metamorphic rock most likely be found?

- A) *A*                      B) *B*                      C) *C*                      D) *D*

Questions 52 through 55 refer to the following:

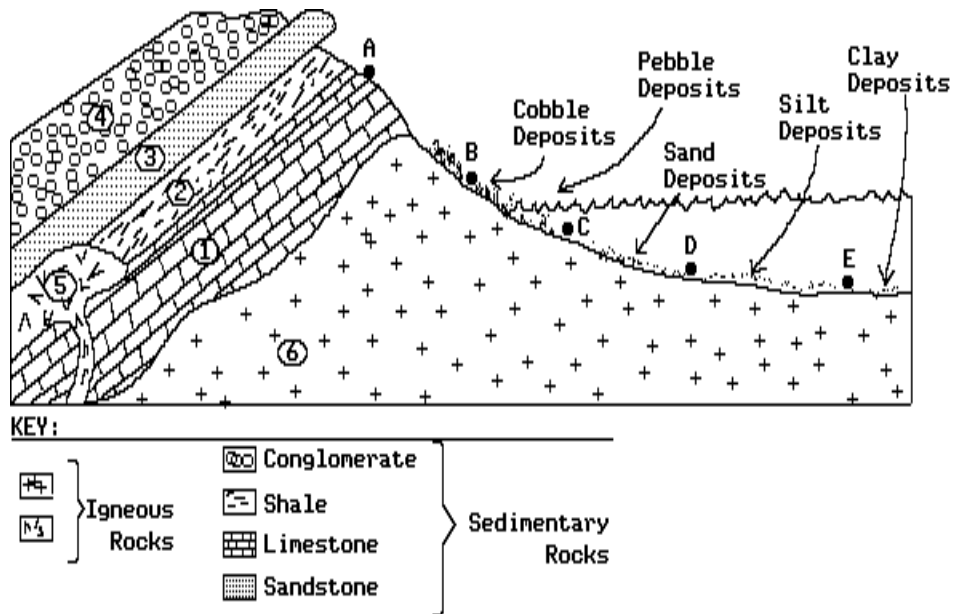
The diagrams below illustrate five rock samples (including metamorphic gneiss). [Refer to the *Earth Science Reference Tables*.]



- 52) The granite most likely was formed by the process of  
 A) melting and solidification  
 B) erosion and deposition  
 C) heating and metamorphism  
 D) compaction and cementation
- 53) Which rock is composed of sediments that have a range of sizes and that originate from different rock types?  
 A) basalt                      C) conglomerate  
 B) granite                      D) gneiss
- 54) Which rock was formed by the compression and cementation of sediments with particle sizes ranging from 0.08 to 0.1 centimeter?  
 A) basalt                      C) sandstone  
 B) granite                      D) conglomerate
- 55) Which rock shows banding that formed as a result of recrystallization of unmelted material under high temperature and pressure?  
 A) granite                      C) sandstone  
 B) conglomerate                      D) gneiss

Questions 56 through 58 refer to the following:

The diagram below represents a cross section of a portion of the Earth's crust. The letters indicate points on the Earth's surface. The numbers identify specific rock units.



- 56) Igneous rock unit 6 is a dark-colored mafic rock with large grains. According to the *Earth Science Reference Tables*, it is probably
- A) gabbro                      C) granite  
B) rhyolite                     D) basalt
- 57) According to the *Earth Science Reference Tables*, rock unit 2 is composed of sediment particles that have the same size range as the particles deposited near point
- A) E              B) B              C) D              D) C
- 58) The crystal size of the minerals contained in rock unit 6 is much larger than the crystal size in rock unit 5. The best explanation for this observation is that the rocks in the two units
- A) cooled at different rates  
B) contain different minerals  
C) are of greatly different ages  
D) contain different-sized sediments