

1 Compared to felsic igneous rocks, mafic igneous rocks contain greater amounts of

- (1) white quartz
- (2) aluminum
- (3) pink feldspar
- (4) iron

2 The diagram below shows how a sample of the mineral mica breaks when hit with a rock hammer.



This mineral breaks in smooth, flat surfaces because it

- (1) is very hard
- (2) is very dense
- (3) contains large amounts of iron
- (4) has a regular arrangement of atoms

3 Rocks are classified as igneous, sedimentary, or metamorphic based primarily on their

- (1) texture
- (2) crystal or grain size
- (3) method of formation
- (4) mineral composition

4 Which three minerals are most commonly found in the igneous rock granite?

- (1) amphibole, calcite, and hematite
- (2) amphibole, biotite mica, and gypsum
- (3) plagioclase feldspar, pyroxene, and olivine
- (4) plagioclase feldspar, potassium feldspar, and quartz

6 Which common rock is formed from the solidification of molten material?

- (1) rock gypsum
- (2) slate
- (3) rhyolite
- (4) coal

7 Which mineral is white or colorless, has a hardness of 2.5, and splits with cubic cleavage?

- (1) calcite
- (2) halite
- (3) pyrite
- (4) mica

8 An unidentified mineral that is softer than calcite exhibits a metallic luster and cubic cleavage. This mineral most likely is

- (1) galena
- (2) pyrite
- (3) halite
- (4) pyroxene

9 Which two rocks have the most similar mineral composition?

- (1) marble and rhyolite
- (2) limestone and basalt
- (3) quartzite and rock salt
- (4) granite and phyllite

10 Which type of rock most likely contains fossils?

- (1) scoria
- (2) gabbro
- (3) schist
- (4) shale

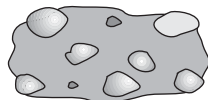
11 In which New York State landscape region is most of the surface bedrock composed of metamorphic rock?

- (1) Adirondacks
- (2) Catskills
- (3) Erie-Ontario Lowlands
- (4) Newark Lowlands

5 The diagram below shows four rock samples.



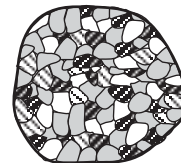
Sample A



Sample B



Sample C

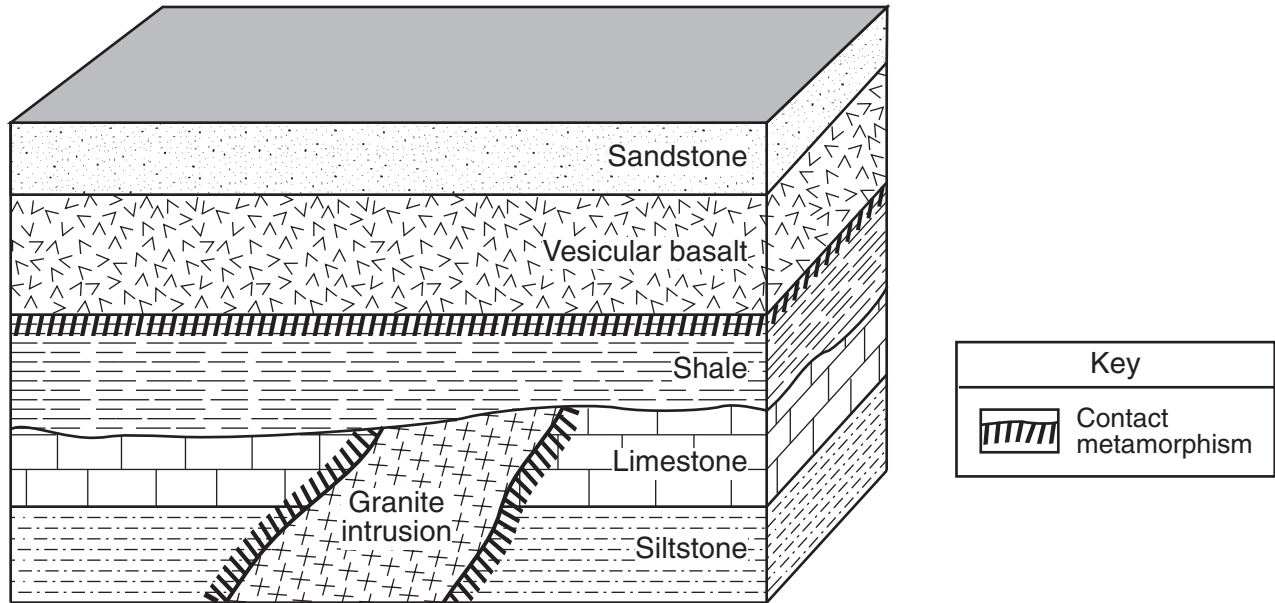


Sample D

Which sample best shows the physical properties normally associated with regional metamorphism?

- (1) A
- (2) B
- (3) C
- (4) D

Base your answers to questions 12 through 13 on the geologic cross section below. Radioactive dating indicates that the granite intrusion is 279 million years old and the vesicular basalt is 260 million years old. The rock layers have not been overturned.

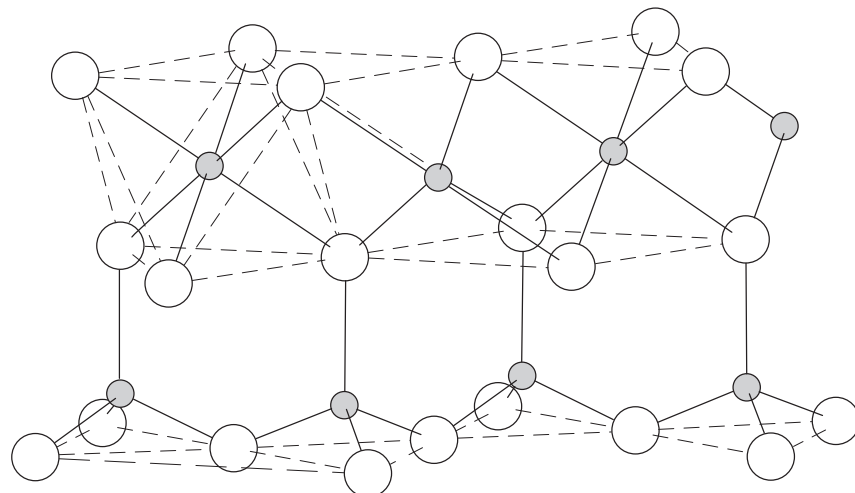


12 The granite intrusion caused part of the limestone layer to undergo metamorphism. What metamorphic rock would most likely be found in this zone of contact metamorphism?

13 Describe the rate of cooling that must occur for magma to form vesicular basalt.

14 The diagram below represents a part of the crystal structure of the mineral kaolinite.

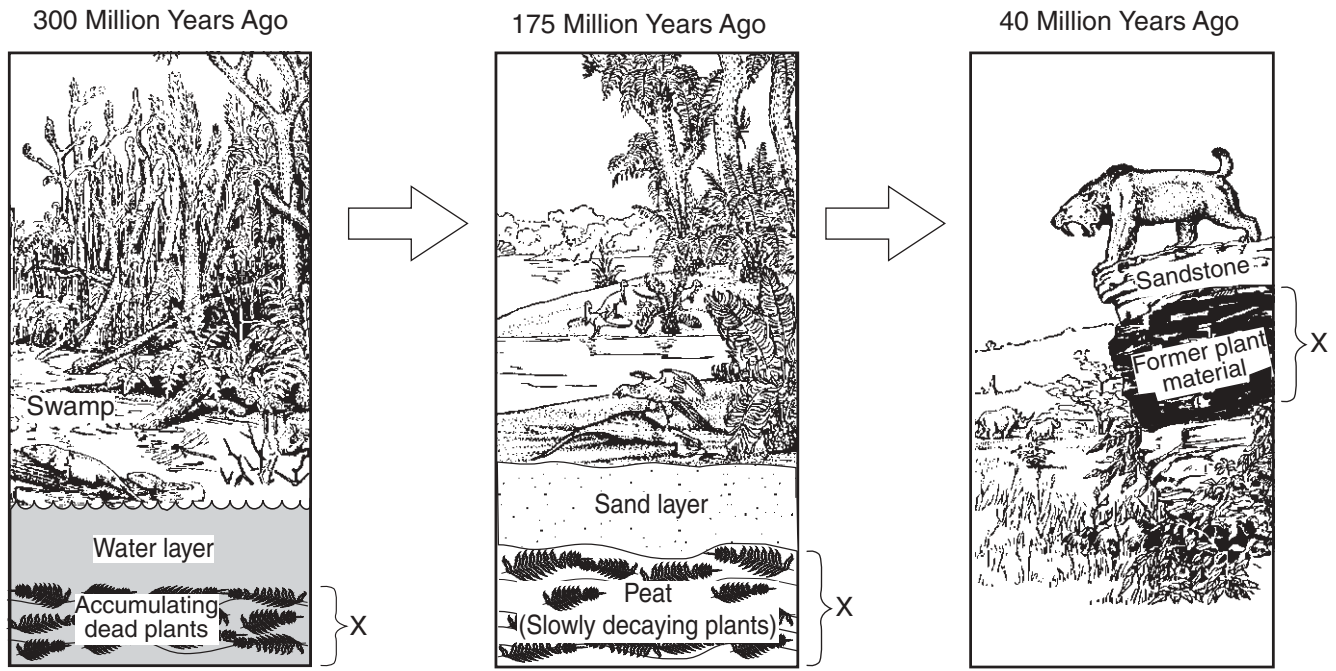
Structure of Kaolinite



An arrangement of atoms such as the one shown in the diagram determines a mineral's

- (1) age of formation
- (2) infiltration rate
- (3) physical properties
- (4) temperature of formation

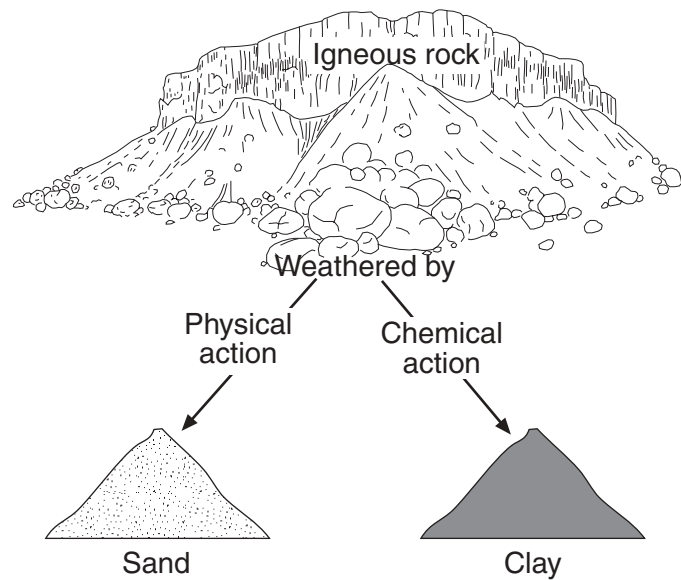
15 The sequence of diagrams below represents the gradual geologic changes in layer X, located just below Earth's surface.



Which type of sedimentary rock was formed at layer X?

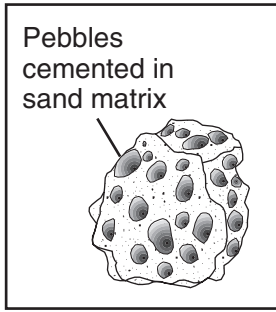
- (1) conglomerate
- (2) shale
- (3) rock salt
- (4) coal

Base your answers to question 16 on the diagram below, which shows igneous rock that has undergone mainly physical weathering into sand and mainly chemical weathering into clay.

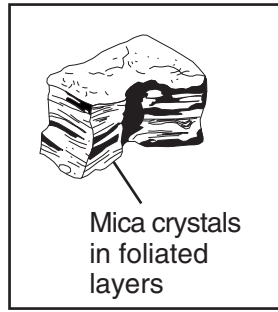


16 If the igneous rock is a layer of vesicular andesite, identify three types of mineral grains that could be found in the sand.

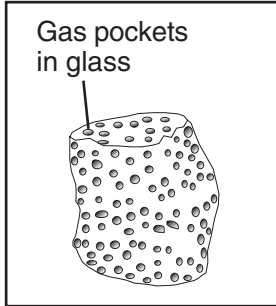
17 Which rock most probably formed directly from lava cooling quickly at Earth's surface?



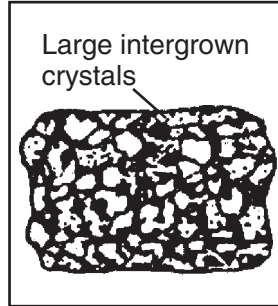
(1)



(3)



(2)



(4)

18 An extrusive igneous rock with a mineral composition of 35% quartz, 35% potassium feldspar, 15% plagioclase feldspar, 10% biotite, and 5% amphibole is called

- (1) rhyolite
- (2) granite
- (3) gabbro
- (4) basaltic glass

19 The table below shows the hardness of four common materials.

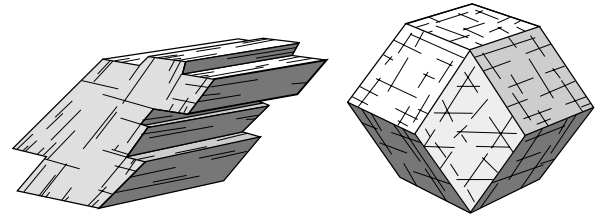
Hardness of Four Materials

Material	Hardness
human fingernail	2.5
copper penny	3.0
window glass	4.5
steel nail	6.5

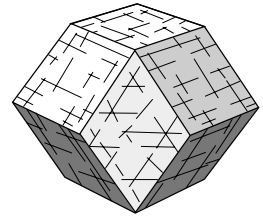
Which statement best describes the hardness of the mineral dolomite?

- (1) Dolomite can scratch window glass, but cannot be scratched by a fingernail.
- (2) Dolomite can scratch window glass, but cannot be scratched by a steel nail.
- (3) Dolomite can scratch a copper penny, but cannot be scratched by a fingernail.
- (4) Dolomite can scratch a copper penny, but cannot be scratched by a steel nail.

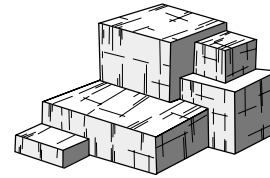
20 Halite has three cleavage directions at 90° to each other. Which model best represents the shape of a broken sample of halite?



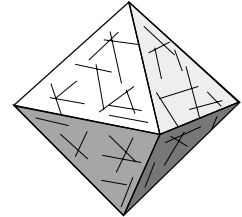
(1)



(3)

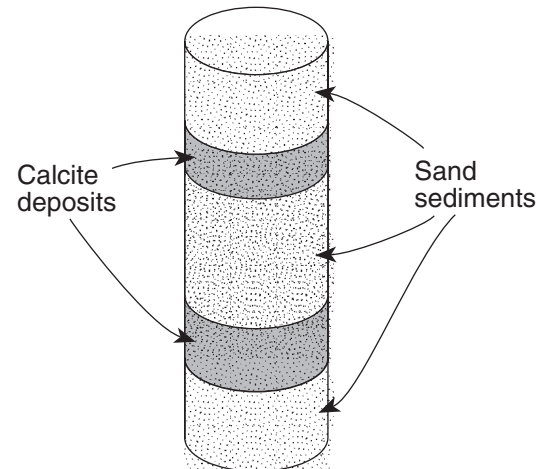


(2)



(4)

21 The diagram below shows a drill core of sediment that was taken from the bottom of a lake.



Which types of rock would most likely form from compaction and cementation of these sediments?

- (1) sandstone and limestone
- (2) shale and coal
- (3) breccia and rock salt
- (4) conglomerate and siltstone

22 Wavy bands of light and dark minerals visible in gneiss bedrock probably formed from the

- (1) cementing together of individual mineral grains
- (2) cooling and crystallization of magma
- (3) evaporation of an ancient ocean
- (4) heat and pressure during metamorphism

Base your answers to questions 23 through 25 on the data table below, which shows some characteristics of four rock samples, numbered 1 through 4. Some information has been left blank. All answers must be recorded in your answer booklet.

Data Table

Rock Sample Number	Composition	Grain Size	Texture	Rock Name
1	mostly clay minerals		clastic	shale
2	all mica	microscopic, fine	foliated with mineral alignment	
3	mica, quartz, feldspar, amphibole, garnet, pyroxene	medium to coarse	foliated with banding	gneiss
4	potassium feldspar, quartz, biotite, plagioclase feldspar, amphibole	5 mm		granite

23 State a possible grain size, in centimeters, for most of the particles found in sample 1.

24 Write the rock name of sample 2.

25 Write a term or phrase that correctly describes the texture of sample 4.