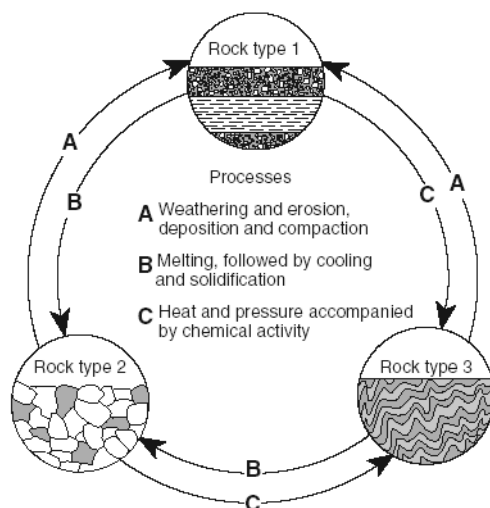


ROCKS AND MINERALS REVIEW 55

- Most rocks that form from fragmental rock particles are classified as
 - (1) extrusive igneous
 - (2) intrusive igneous
 - (3) clastic sedimentary
 - (4) chemical sedimentary
- Which property is most useful in distinguishing pyroxene from amphibole?
 - (1) sample size
 - (2) hardness
 - (3) type of luster
 - (4) angles of cleavage
- Which process led to the formation of thick salt deposits found in the bedrock at some locations in New York State?
 - (1) melting
 - (2) runoff
 - (3) condensation
 - (4) evaporation
- The diagram below represents geological processes that act continuously on Earth to form different rock types.



Which table correctly classifies each rock type?

Rock Type	Classification
1	sedimentary
2	metamorphic
3	igneous

(1)

Rock Type	Classification
1	metamorphic
2	igneous
3	sedimentary

(3)

Rock Type	Classification
1	sedimentary
2	igneous
3	metamorphic

(2)

Rock Type	Classification
1	igneous
2	metamorphic
3	sedimentary

(4)

- The table below shows some properties of four different minerals.

The minerals listed in the table are varieties of which mineral?

- (1) garnet
- (2) magnetite
- (3) quartz
- (4) olivine

Mineral Variety	Color	Hardness	Luster	Composition
flint	black	7	nonmetallic	SiO ₂
chert	gray, brown, or yellow	7	nonmetallic	SiO ₂
jasper	red	7	nonmetallic	SiO ₂
chalcedony	white or light color	7	nonmetallic	SiO ₂

6. The diagram shows the index minerals of Mohs hardness scale compared with the hardness of some common objects.

Which statement is best supported by the diagram?

- (1) A fingernail will scratch calcite but not gypsum.
- (2) Calcite will be scratched by a copper penny.
- (3) The mineral apatite will scratch topaz.
- (4) A steel file has a hardness of about 7.5.

Index Minerals	Common Objects
Diamond	10
Corundum	9
Topaz	8
Quartz	7
Orthoclase	6
Apatite	5
Fluorite	4
Calcite	3
Gypsum	2
Talc	1

Steel file	7.5
Glass	5.5
Copper penny	3.5
Fingernail	2.5

7. Which rock is sedimentary in origin and formed as a result of chemical processes?

- (1) granite
- (2) shale
- (3) breccia
- (4) dolostone

8. The photograph below shows an igneous rock. What is the origin and rate of formation of this rock?

- (1) plutonic with slow cooling
- (2) plutonic with rapid cooling
- (3) volcanic with slow cooling
- (4) volcanic with rapid cooling



9. The data table below shows the density of four different mineral samples.

A student accurately measured the mass of a sample of one of the four minerals to be 294.4 grams and its volume to be 73.6 cm³.

Which mineral sample did the student measure?

- (1) corundum
- (2) galena
- (3) hematite
- (4) quartz

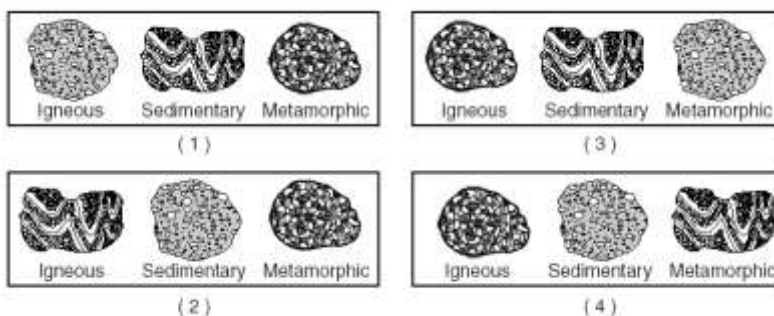
Data Table

Mineral	Density (g/cm ³)
corundum	4.0
galena	7.6
hematite	5.3
quartz	2.7

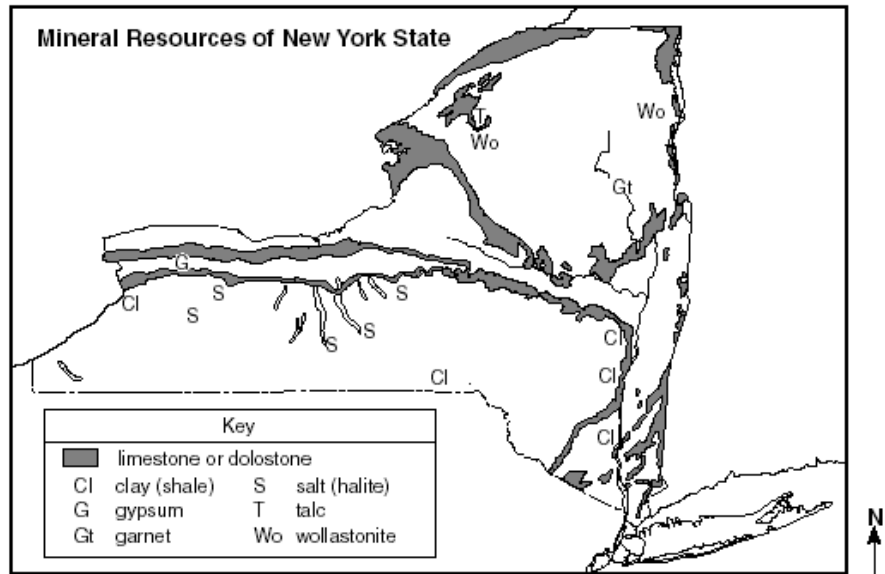
10. Which mineral has a metallic luster, a black streak, and is an ore of iron?

- (1) galena
- (2) magnetite
- (3) pyroxene
- (4) graphite

11. In which set are the rock drawings labeled with their correct rock types?

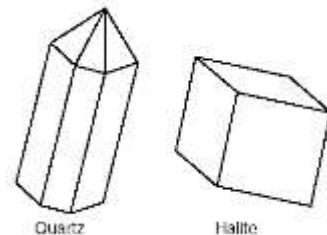


Base your answers to questions 12 through 14 on the map below, which shows areas where certain minerals were mined in significant amounts during 1989.



12. The garnet found in the Adirondacks of New York State are usually associated with
- | | |
|-----------------------------|----------------------------|
| (1) sedimentary rocks | (3) extrusive igneous rock |
| (2) intrusive igneous rocks | (4) metamorphic rocks |
13. What is a common use for the mineral that is mined at the southern end of the two largest Finger Lakes?
- | | |
|--------------------------|-----------------------|
| (1) making talcum powder | (3) polishing jewelry |
| (2) vulcanizing rubber | (4) melting ice |
14. The gypsum deposits in New York State were formed
- | | |
|---------------------------------------|--------------------------------|
| (1) as a result of volcanic eruptions | (3) in a shallow ocean |
| (2) as a result of metamorphism | (4) in a glacial outwash plain |
15. When granite melts and then solidifies, it becomes
- | | |
|------------------------|------------------------|
| (1) a sedimentary rock | (3) a metamorphic rock |
| (2) an igneous rock | (4) sediments |

16. The diagrams below show the crystal shapes of two minerals. Quartz and halite have different crystal shapes primarily because
- | |
|---|
| (1) light reflects from crystal surfaces |
| (2) energy is released during crystallization |
| (3) of impurities that produce surface variations |
| (4) of the internal arrangement of the atoms |

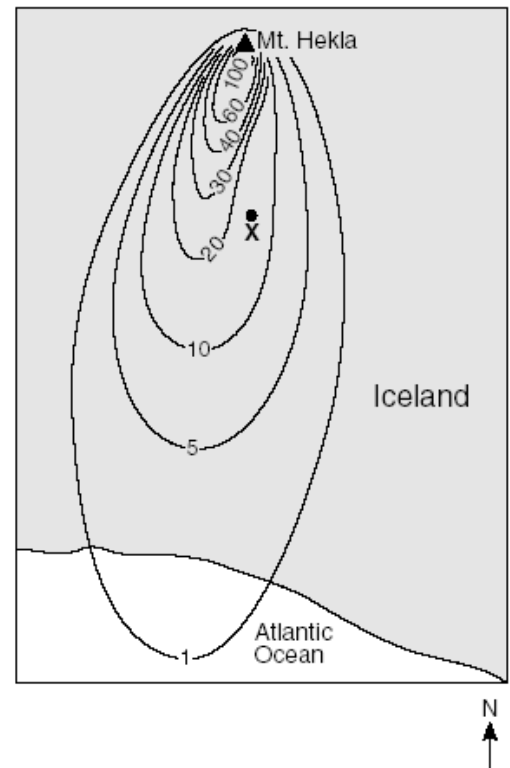


17. Which mineral is most frequently found in both granitic continental crust and basaltic oceanic crust?
- | | |
|------------------------|--------------------------|
| (1) olivine | (3) plagioclase feldspar |
| (2) potassium feldspar | (4) quartz |
18. Which igneous rock has a vesicular texture and contains the minerals potassium feldspar and quartz?
- | | |
|---------------|------------|
| (1) andesite | (3) pumice |
| (2) pegmatite | (4) scoria |
19. Which texture best describes an igneous rock that formed deep underground?
- | | |
|---------------|--------------------|
| (1) glassy | (3) fine grained |
| (2) vesicular | (4) coarse grained |

20. Marble is classified as which type of rock?
- | | |
|--|----------------------------------|
| (1) land-derived sedimentary rock | (3) foliated metamorphic rock |
| (2) chemically formed sedimentary rock | (4) nonfoliated metamorphic rock |
21. Which two minerals have cleavage planes at right angles?
- | | |
|-------------------------------------|-------------------------|
| (1) biotite mica and muscovite mica | (3) quartz and calcite |
| (2) sulfur and amphibole | (4) halite and pyroxene |
22. What is the origin of fine-grained igneous rock?
- | | |
|---|--|
| (1) lava that cooled slowly on Earth's surface | (3) silt that settled slowly in ocean water |
| (2) lava that cooled quickly on Earth's surface | (4) silt that settled quickly in ocean water |
23. Which processes most likely formed the shale bedrock found near Ithaca, New York?
- | | |
|-------------------------------|-----------------------------------|
| (1) uplift and solidification | (3) heat and pressure |
| (2) burial and compaction | (4) melting and recrystallization |
24. Which rock was organically formed and sometimes contains fossilized plant impressions?
- | | |
|-----------------|-------------|
| (1) rock gypsum | (3) breccia |
| (2) phyllite | (4) coal |
25. The mineral graphite is often used as
- | | |
|-----------------|--------------------------|
| (1) a lubricant | (3) a source of iron |
| (2) an abrasive | (4) a cementing material |

Base your answers to questions 26-27 on the map below. The ▲ represents Mt. Hekla, a volcano in Iceland. The isolines represent the thickness of ash, in centimeters, that settled on Earth's surface after a volcanic eruption of Mt. Hekla on March 29, 1947. Point X is a location on the surface of the ash.

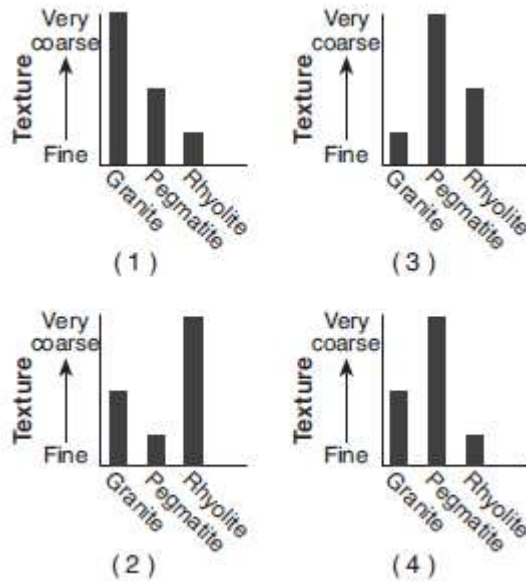
26. In addition to the ash, solid rock formed on Mt. Hekla from the lava extruded during this eruption. This rock is most likely
- (1) light-colored metamorphic
 - (2) dark-colored metamorphic
 - (3) fine-grained igneous
 - (4) coarse-grained igneous
27. The rock that formed from the eruption was mafic and rich in pyroxene and olivine. Which rock could be found around Mt. Hekla as a result of this eruption?
- (1) sandstone
 - (2) marble
 - (3) rhyolite
 - (4) scoria



28. 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

29. Which mineral precipitates from oceans and forms rock salt?
- (1) quartz (3) halite
 (2) fluorite (4) olivine

30. Which graph best represents the textures of granite, pegmatite, and rhyolite?



31. The table shows the hardness of four common materials.

Which statement best describes the hardness of the mineral dolomite?

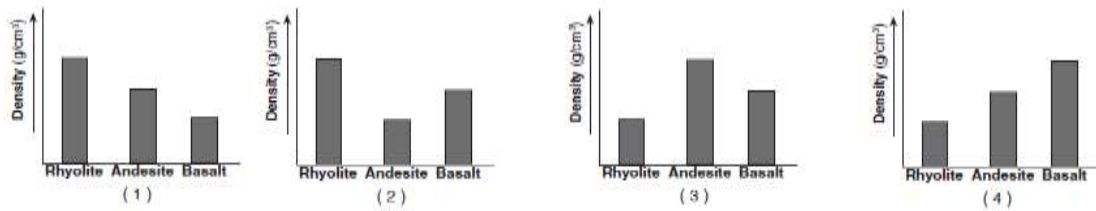
- (1) Dolomite can scratch window glass, but cannot be scratched by a fingernail.
 (2) Dolomite can scratch window glass, but cannot be scratched by a steel nail.
 (3) Dolomite can scratch a copper penny, but cannot be scratched by a fingernail.
 (4) Dolomite can scratch a copper penny, but cannot be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

Hardness of Four Materials

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

32. A student obtains a cup of quartz sand from a beach. A saltwater solution is poured into the sand and allowed to evaporate. The mineral residue from the saltwater solution cements the sand grains together, forming a material that is most similar in origin to
- (1) an extrusive igneous rock (3) a clastic sedimentary rock
 (2) an intrusive igneous rock (4) a foliated metamorphic rock
33. Silicate minerals contain the elements silicon and oxygen. Which list contains only silicate minerals?
- (1) graphite, talc, and selenite gypsum (3) calcite, dolomite, and pyroxene
 (2) potassium feldspar, quartz, and amphibole (4) biotite mica, fluorite, and garnet

34. Which graph best represents the relative densities of three different types of igneous rock?



Base your answers to questions 35 through 37 on the graph, which shows the crustal temperature and pressure conditions under which three different minerals with the same chemical composition (Al₂SiO₅) crystallize.

35. Under which crustal temperature and pressure conditions will andalusite form?

- (1) 300°C and 6000 atmospheres
- (2) 500°C and 2000 atmospheres
- (3) 600°C and 4000 atmospheres
- (4) 700°C and 8000 atmospheres

36. Which mineral has a chemical composition most similar to andalusite, sillimanite, and kyanite?

- (1) pyrite
- (2) gypsum
- (3) dolomite
- (4) potassium feldspar

37. If bedrock at a collisional plate boundary contains andalusite crystals, these crystals are changed into sillimanite and/or kyanite as temperature and pressure conditions increase. What is this process called?

- (1) weathering
- (2) solidification
- (3) metamorphism
- (4) cementation

38. Most New York State sandstone bedrock was formed

- (1) in Earth's interior where temperatures exceeded the melting point of quartz
- (2) on Earth's surface from the cooling of molten lava
- (3) in a delta from sand grains deposited, buried, and cemented together by minerals
- (4) in a desert when heat and metamorphic pressure caused quartz crystals to fuse together

39. Most rock gypsum is formed by the

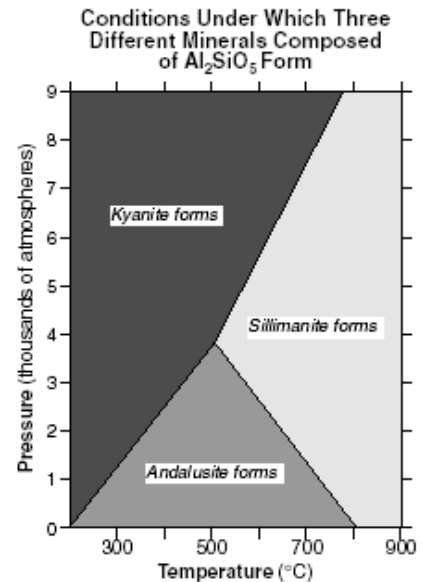
- (1) heating of previously existing foliated bedrock
- (2) cooling and solidification of lava
- (3) compaction and cementation of shells and skeletal remains
- (4) chemical precipitation of minerals from seawater

40. The three statements below are observations of the same rock sample:

- The rock has intergrown crystals from 2 to 3 millimeters in diameter.
- The minerals in the rock are gray feldspar, green olivine, green pyroxene, and black amphibole.
- There are no visible gas pockets in the rock.

This rock sample is most likely

- (1) sandstone
- (2) gabbro
- (3) granite
- (4) phyllite



Base your answers to questions 41 through 44 on the two tables below and on your knowledge of Earth Science. Table 1 shows the composition, hardness, and average density of four minerals often used as gemstones. Table 2 lists the minerals in Moh's Scale of Hardness from 1 (softest) to 10 (hardest).

Table 1

Gemstone Mineral	Composition	Hardness	Average Density (g/cm ³)
emerald	Be ₃ Al ₂ (Si ₆ O ₁₈)	7.5–8	2.7
sapphire	Al ₂ O ₃	9	4.0
spinel	MgAl ₂ O ₄	8	3.8
zircon	ZrSiO ₄	7.5	4.7

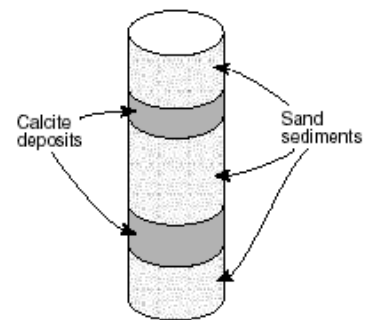
Table 2

Moh's Scale of Hardness
1 talc
2 gypsum
3 calcite
4 fluorite
5 apatite
6 feldspar
7 quartz
8 topaz
9 corundum
10 diamond

KEY

Al = aluminum	O = oxygen
Be = beryllium	Si = silicon
Mg = magnesium	Zr = zirconium

41. Part of a gemstone's value is based on the way the gemstone shines in reflected light. The way a mineral reflects light is described as the mineral's
- (1) fracture (3) luster
(2) hardness (4) streak
42. Sapphire is a gemstone variety of which mineral on Moh's scale of hardness?
- (1) corundum (3) fluorite
(2) diamond (4) topaz
43. The hardness and density of each gemstone is based primarily on the gemstone's
- (1) internal arrangement of atoms (3) oxygen content
(2) geologic time of formation (4) natural abundance
44. Which gemstone minerals contain the two most abundant elements by mass in Earth's crust?
- (1) emerald and spinel (3) sapphire and spinel
(2) emerald and zircon (4) sapphire and zircon
45. 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



46. Which intrusive igneous rock could be composed of approximately 60% pyroxene, 25% plagioclase feldspar, 10% olivine, and 5% amphibole?
- (1) granite (3) gabbro
(2) rhyolite (4) basalt
47. Which process could lead directly to the formation of pumice rock?
- (1) precipitation of minerals from evaporating seawater
(2) metamorphism of unmelted rock material
(3) deposition of quartz sand
(4) explosive eruption of lava from a volcano

48. The rock shown below has a foliated texture and contains the minerals amphibole, quartz, and feldspar arranged in coarse-grained bands. Which rock is shown?

- (1) slate
(2) dunite
(3) gneiss
(4) quartzite



49. Which type of rock most likely contains fossils?

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

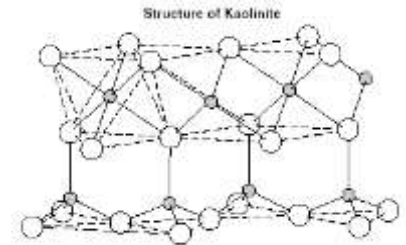
50. Which physical characteristic best describes the rock phyllite?

- (1) glassy texture with gas pockets
(2) clastic texture with angular fragments
(3) bioclastic texture with cemented shell fragments
(4) foliated texture with microscopic mica crystals

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



52. Which home-building material is made mostly from the mineral gypsum?

- (1) plastic pipes
(2) window glass
(3) drywall panels
(4) iron nails

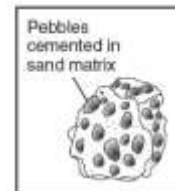
53. Which three minerals are most commonly found in the igneous rock granite?

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

54. Which nonfoliated rock forms only in a zone of contact metamorphism?

- (1) conglomerate
(2) hornfels
(3) pegmatite
(4) quartzite

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



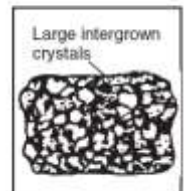
(1)



(3)



(2)



(4)