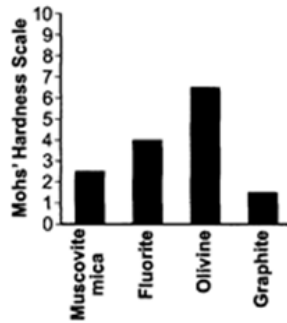


The graph below shows the hardness of four minerals.



1

1. Which mineral is hard enough to scratch calcite but is *not* hard enough to scratch amphibole (hornblende 5.5)?

- (1) muscovite mica
- (2) fluorite
- (3) olivine
- (4) graphite

2

2. Which two properties are most useful in distinguishing between galena and halite?

- (1) cleavage and color
- (2) luster and color
- (3) hardness and streak
- (4) streak and cleavage

List a use for both galena and halite

3

3. Mineral crystals of quartz, biotite mica, and amphibole are produced primarily by the

- (1) chemical reaction of elements in seawater
- (2) cooling and solidification of magma
- (3) deposition of sediments by a glacier
- (4) metamorphism of bituminous coal

4

4. Which mineral will scratch fluorite, galena, and pyroxene?

(1) graphite

(3) olivine

(2) calcite

(4) dolomite

5

5. Which mineral precipitates from oceans and forms rock salt?

(1) quartz

(3) halite

(2) fluorite

(4) olivine

5A. Which mineral is found in basalts ?

6

6. Which element, found in both biotite mica and muscovite mica, makes up the greatest percent by volume of Earth's crust?

(1) nitrogen

(3) potassium

(2) oxygen

(4) silicon

7

7. The most abundant metallic element by mass in Earth's crust makes up 8.23% of the crust (Al). Which group of minerals all normally contain this metallic element in their compositions?

- (1) garnet, calcite, pyrite, and galena
- (2) biotite mica, muscovite mica, fluorite, & halite
- (3) talc, quartz, graphite, and olivine
- (4) plagioclase feldspar, amphibole, pyroxene, and potassium feldspar

8

8. Earth has sedimentary bedrock of marine origin that is four billion years old. Which inference can be made from this information?

- (1) Earth had oceans four billion years ago.
- (2) Sedimentary rocks formed from magma when Earth cooled four billion years ago.
- (3) Most sedimentary rocks are at least four billion years old.
- (4) Life existed on Earth four billion years ago.

9

9. Which rock weathers most rapidly when exposed to acid rain?

- (1) quartzite
- (2) granite
- (3) basalt
- (4) limestone

10

Which of the following minerals is aquamarine?

- (1) Garnet
- (2) Beryl
- (3) Olivine
- (4) Topaz

10A. Name the gem form of mineral listed above that contains magnesium (Mg).

11

11. Which texture best describes an igneous rock that formed deep underground?

- (1) glassy
- (2) vesicular
- (3) fine grained
- (4) coarse grained

11 A. Name a rock that is both vesicular and fine grained.

12

Which mineral is least likely to be found on a beach?

- 1) Talc
- 2) Olivine
- 3) Plagioclase
- 4) Quartz
- 5) Magnetite

12A. Why ?

13

13. Obsidian's glassy texture indicates that it formed

- (1) slowly, deep below Earth's surface
- (2) slowly, on Earth's surface
- (3) quickly, deep below Earth's surface
- (4) quickly, on Earth's surface

14



14. This rock should be classified as

- (1) an intrusive igneous rock
- (2) an extrusive igneous rock
- (3) a bioclastic sedimentary rock
- (4) a clastic sedimentary rock

15

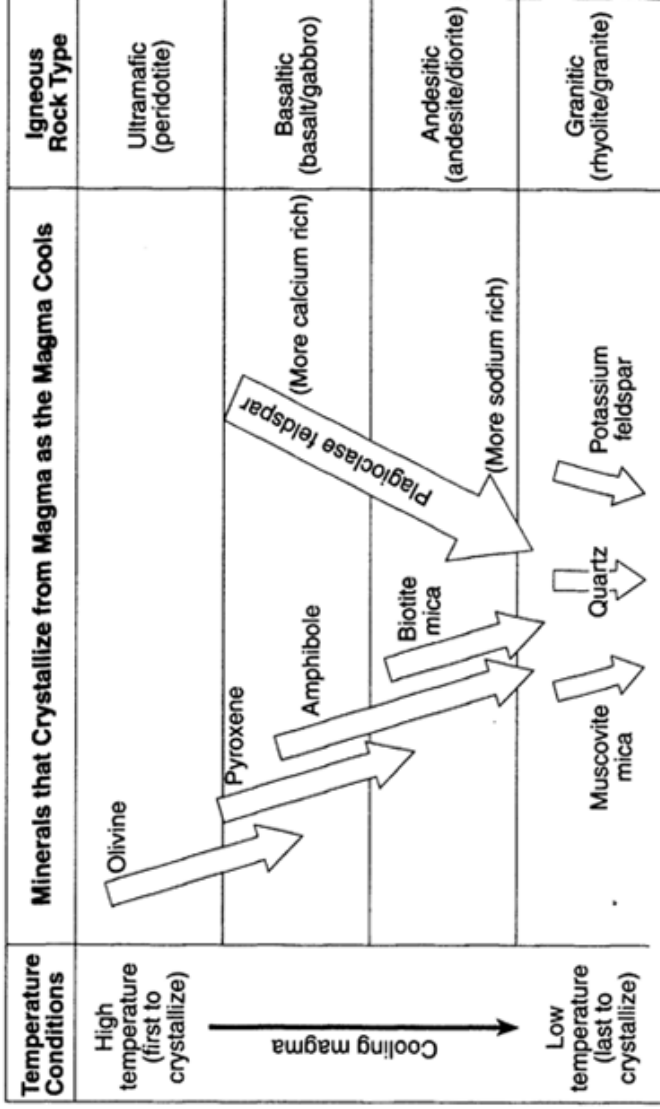
15. Which change would most likely occur if this rock became buried deep within Earth's crust and was subjected to intense heat and pressure, but did *not* melt?



- (1) The density of the pebbles and sand would decrease.
- (2) The rock would become a plutonic rock composed mostly of quartz.
- (3) The rock would become more felsic with a higher concentration of magnesium.
- (4) The pebbles would become distorted and the sand would be recrystallized.

The diagram of Bowen's Reaction Series below, which shows the sequence in which minerals crystallize as magma cools and forms different types of igneous rocks from the same magma. The arrow for each mineral represents the relative temperature range at which that mineral crystallizes.

Bowen's Reaction Series



16. According to Bowen's Reaction Series, how is the chemical composition of plagioclase feldspar found in basaltic rock different from the chemical composition of plagioclase feldspar found in granitic rock?

17. Describe the temperature conditions shown in Bowen's Reaction Series that explain why olivine and quartz are *not* usually found in the same igneous rock type.

18. Identify *one* similarity and *one* difference between the igneous rocks andesite & diorite.

1. _____

2. _____

Galena - _____ Halite - _____

3. _____

4. _____

5. _____

5A. _____

6. _____

7. _____

8. _____

9. _____

10. _____

10A. _____

11. _____

11A. _____

12. _____

12A. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. Similar _____

Different _____