Name: _____ Class: _____ Date: _____ ID: A

Igneous Rocks Short Study Guide

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. As the water content of rock increases, the melting point ____.
a. first increases, then decreases
b. remains the same
c. decreases
d. increases

____ 2. A model that illustrates the predictable patterns of mineral formation from cooling magma is ____.
a. Bowen's reaction series
b. crystal separation
c. layered intrusion formation
d. mineral composition

____ 3. Intrusive igneous rocks form ____.
a. fine-grained rocks
b. when a molten mass of rocks cools quickly
c. on Earth's surface
d. coarse-grained rocks

____ 4. Rocks are formed when magma ____.
a. erodes
b. undergoes radioactive decay
c. crystallizes
d. weathers

____ 5. Igneous rocks that cool slowly beneath Earth's crust are ____.
a. extrusive
b. intrusive
c. sedimentary
d. always magnetic

____ 6. Igneous rocks that cool quickly on Earth's surface are ____.
a. extrusive
b. intrusive
c. metamorphic
d. always magnetic

____ 7. Extrusive rocks, which cool more rapidly than intrusive rocks, are generally more ____.
a. coarsely grained
b. finely grained
c. radioactive
d. magnetic

____ 8. Factors that affect a rock's melting point include ____.
a. pressure and water content
b. value as a gem
c. rarity
d. usefulness as a building material

____ 9. Valuable ore deposits and gem crystals are often associated with ____.
a. oceans
b. oil deposits
c. thin crustal areas
d. igneous intrusions

Matching

Match each item with the correct statement below.

a. felsic
b. kimberlite
c. lava
d. mafic
e. pegmatite
f. porphyritic
g. ultramafic

____ 10. Magma that flows out onto Earth's surface
____ 11. Dark-colored rock such as gabbro that is rich in iron and magnesium
____ 12. Rock that is very high in iron and magnesium
____ 13. Vein of extremely large-grained minerals
____ 14. Ultramafic rock that can contains diamonds

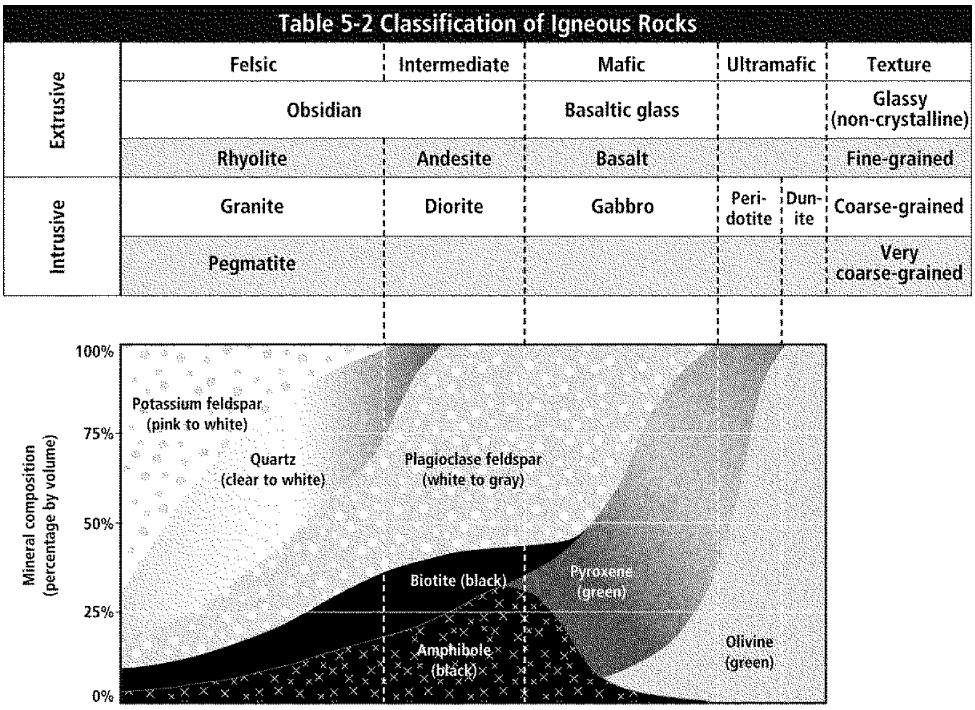
Short Answer

15. A group of igneous rocks are found. The rocks all have very low silica contents. Based on this characteristic alone, to what group of igneous rocks do these rocks likely belong?

Compare and contrast each pair of related terms or phrases.

16. intrusive igneous rock, extrusive igneous rock
17. magma, lava
18. Which rock type or feature forms when rapid cooling of magma does not allow its calcium-rich core to react completely with the magma?
19. What is partial melting? Explain how partial melting affects igneous rock formation.
20. What is fractional crystallization? Does it add or remove elements from magma? Explain your answer.
21. Why would crystals formed early in magma crystallization have larger, better-shaped crystals than those that formed later?

The diagram shows the proportions of minerals in common igneous rocks. Use the diagram to answer the following questions.



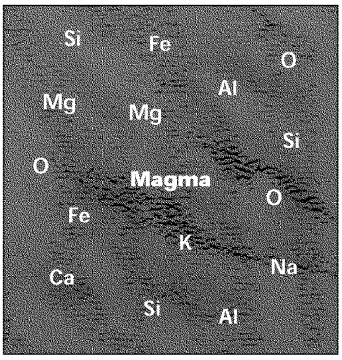
22. What four groups of igneous rocks are shown in the diagram?

23. What categories of rock grain are shown on the diagram?

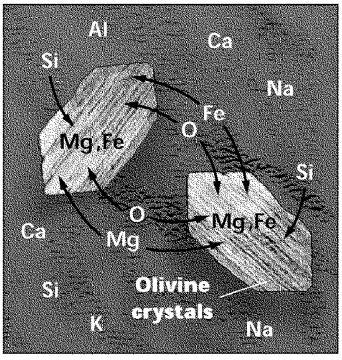
24. Rock Sample A is coarse-grained, 90 percent olivine, and 10 percent pyroxene. What is the name of the rock? What group is it in?

Problem

25. According to the diagram below, what elements are removed from this particular magma during fractional crystallization? What effect does this have on the overall proportions of the remaining elements—Al, Ca, Si, O, Na, and K—in the magma?



Molten Magma



Fractional Crystalization

Igneous Rocks Short Study Guide
Answer Section

MULTIPLE CHOICE

1. C
2. A
3. D
4. C
5. B
6. A
7. B
8. A
9. D

MATCHING

10. C
11. D
12. G
13. E
14. B

SHORT ANSWER

15. The rocks are either mafic or ultramafic igneous rocks, depending on how high the levels of iron and magnesium are.
16. Both describe the formation of igneous rock. Fine-grained rocks that cool quickly on Earth's surface are extrusive igneous rocks. Coarse-grained igneous rocks that cool slowly beneath Earth's surface are intrusive igneous rocks.
17. Both are molten rock. Magma is molten rock below Earth's surface, while lava is magma that flows out onto Earth's surface.
18. a zoned crystal
19. Partial melting describes how different minerals melt at different temperatures. The resulting magma and the rocks that form when the magma cools have a different chemical composition than that of the original rock.
20. Fractional crystallization describes how different minerals form at different temperatures. It removes elements because as the minerals crystallize, they are no longer part of the magma.
21. Early-forming, slower-cooling minerals may have time to form larger, well-shaped crystals because crystallization occurs in an unconfined space, while later-forming, quick-cooling crystals have irregular shapes because they form in a confined space and lack time to form.
22. felsic, intermediate, mafic, ultramafic
23. coarse-grained, fine-grained, and very coarse-grained

24. It is peridotite. It is categorized as ultramafic.

PROBLEM

25. Mg and Fe are removed and crystallized. This increases the overall proportion of all other elements in the magma.