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Ch 5 Igneous Rocks Study Guide

SECTION 5.1 *What are igneous rocks?*

n your textbook, read about the nature of igneous rocks.
Use each of the terms below just once to complete the following statements.

A. basaltic **B. igneous rock** **C. rhyolitic**
D. lava **E. magma**

1. Molten rock inside Earth's crust is called_____
2. A(n) _____ is formed from the crystallization of magma.
3. Magma that flows out onto Earth's surface is called_____
4. Magma that has a low silica content is called_____
5. _____ magma has the highest silica content.

Using your textbook, read about the composition and origins of magma. For each statement below, select "A" for TRUE or "B" for FLASE.

A B 6. Magma is often a slushy mix of molten rock, gases, and mineralcrystals.

A B 7. The elements found in magma are quite different from those foundin Earth's crust.

A B 8. Silica is the most abundant compound found in magma.

A B 9. Magmas are classified as basaltic, andesitic, or rhyolitic.

A B 10. In the laboratory, rocks must be heated from 8000°C to 12 000°Cbefore they meh.

A B 11. Heat in the upper mantle and lower crust may come, in part, from the decay of radioactive elements.

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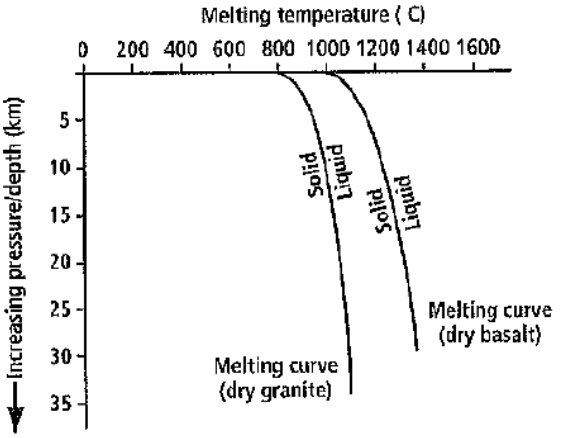
SECTION 5.1 *What are igneous rocks? continued*

Using your textbook, read about factors that affect magma formation.
Use the diagram to answer the following questions.



12. How does pressure affect the melting point of rock? (As pressure _____ so does the melting point.)
- A Increases
- B Decreases
- C Remains the same

13. Do all minerals have the same melting point?
- A YES
- B NO

14. How does temperature change with depth in Earth's crust? (Temperature _____ with depth)
- A Increases
- B Decreases
- C Remains the same

15. How does pressure change with depth?
- A Increases
- B Decreases
- C Remains the same

Using your textbook, read about how rocks melt. Use each of the terms below just once to complete the passage.

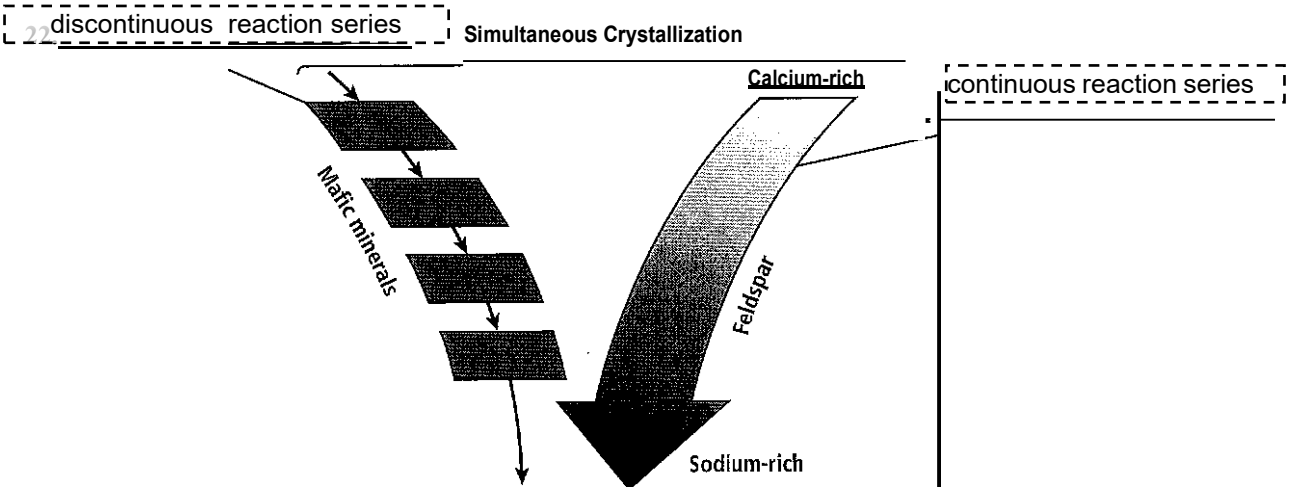
A Elements
B Fractional crystallization
C Melting points
D Reverse
E Partial melting

Because different minerals have different (16) _____, not all parts of a rock melt at the same time. The process whereby same minerals melt at low temperatures while other minerals remain solid is called (17) _____. As each group of minerals melts, different (18) _____ are added to the magma mixture changing its composition. When the magma cools, it crystallizes in the (19) _____ order of partial melting. The process wherein different minerals form at different temperatures is called (20) ____, As each group of minerals crystallizes, it removes elements from the remaining magma instead of adding new elements.

SECTION 5.1 *What are igneous rocks? continued*

In your textbook, read about Bowen's ·reaction series.

Label the diagram using either *continuous reaction series* or *discontinuous 1·eaction series.*



Answer the following questions. Use the diagram to answer questions 21 and 22.

21. The first feldspars to form are rich in what mineral?

A Calcium rich
B Sodium rich
C Mafic rich
D Feldspar rich

22. The second feldspars to form are rich in what mineral?

A Calcium rich
B Sodium rich
C Mafic rich
D Feldspar rich

What causes a zoned crystal?

A when magma cools to quickly and the calcium rich cores cannot react completely, a zoned crustal form

How is quartz formed?

A As more magma separates from crystals, it becomes more concentrated in silica, aluminum and potassiummake quartz

SECTION 5.2 *Classification of Igneous Rock*

In your textbook, read about the mineral composition of igneous rocks.

(A) (B) (C) (D)

Complete the table by filling in one of the following terms: *granitic, basaltic, intermediate,* or *ultramafic.*

23. May be formed by fractional crystallization of olivine and pyroxene

A Granitic
B Basaltic
C Intermediate
D Ultramafic

24. Contains moderate amounts of biotite, amphibole, and pyroxene

A Granitic B Basaltic C Intermediate D Ultramafic

25. Light-colored, high silica content, contains quartz

A Granitic B Basaltic C Intermediate D Ultramafic

26. Contains plagioclase, biotite, amphibole, pyroxene, and olivine

A Granitic B Basaltic C Intermediate D Ultramafic

27. Peridotite and Dunites are examples

A Granitic B Basaltic C Intermediate D Ultramafic

28. Dark-colored, low silica content, rich in iron and magnesium

A Granitic B Basaltic C Intermediate D Ultramafic

29. Diorite in an example

A Granitic B Basaltic C Intermediate D Ultramafic

30. Gabbro is an example

A Granitic B Basaltic C Intermediate D Ultramafic

31. Granite is an example

A Granitic B Basaltic C Intermediate D Ultramafic

32. Low silica content, very high iron and magnesium content

A Granitic B Basaltic C Intermediate D Ultramafic

33. Does obsidian, a glassy rock, have a large grain size or a small grain size

A Large grain size
B Small grain size

34. Is obsidian an intrusive or extrusive igneous rock?

A Intrusive igneous rock
B Extrusive igneous rock

How does the texture of gabbro compare to that of obsidian?

The texture of gabbro would be rough for it b/c it has a large grain size, where OBSIDIAN would be smooth

35. Is gabbro an intrusive or extrusive igneous rock?

A INTRUSIVE
B EXTRUSIVE

SECTION 5.2 *Classification of Igneous Rocks, continued*

In your textbook, read about classifying igneous rocks. For each item in Column A, write the letter of the matching item in Column B

Column A	Column B
36. Rock such as peridotite, which has low silica content and very high levels of iron and magnesium	A Granitic
	B Basaltic
37. Rock with two different-sized grains of the same mineral	C Ultramafic
38. Rock such as gabbro, which is dark-colored, has low silica content> and is rich in iron and magnesium	D Porphyritic
39. Vein of extremely large-grained minerals	E Pegmatite
Rare type of ultramafic rock that can contain diamonds	*kimberlite*
40. Rock such as granite, which is light-colored and has high silica content	

In your textbook, read about the texture of igneous rocks. Answer the following questions

Why do geologists make thin sections?
to identify minerals by grain

Describe the differences in how an intrusive igneous rock and an extrusive igneousrock?
Intrusive has time to form with more fractional crystallization (crystal have time to grow), Extrusive DOES NOT have time to form fractional crystallization nor have time to grow

Why can minerals that form early in fractional crystallization grow distinctcrystal shapes form?
There is insufficient time to grow large crystals

41. What does a rock with a porphyritic texture look like?
A It has large size phenocryst surrounded by groundmass
Bit has small size phenocryst surrounded by groundmass

How do porphyritic textures form?
slowly cooling magma would rise and cover large crystals with groundmass

SECTION 5.2 *Classification of Igneous Rocks, continued*

In your textbook, read about igneous rocks as resources.
Circle the letter of the choice that best completes the statement or answers the question.

42. Igneous rocks are strong because of their?
A temperature.
B color.
C water content.
D interlocking grain textures

43. Which of the following is one of the most durable igneous rocks?
A Granite
B Sandstone
C marble
D limestone

44. Igneous rocks tend to be
A radioactive.
B full of gold
C Resistant to weathering.
D vulnerable to weathering

.

45. Igneous intrusions often are associated with valuable
A radioactive elements.
B ore deposits.
C oil reservoirs.
D fossil deposits

46. Ore deposits such as gold sometimes are found as a(n)
A vein.
B extrusion.
C obsidian deposit.
D molten rock.

47. Metal-rich quartz veins are formed at the end of
A volcanic eruptions.
B radioactive decay.
C magma crystallization
D the cooling of Earth's crust

48. What are pegmatites?

A veins of extremely large-grained minerals
B magmas of differing densities
C microscopic) interlocking crystal grains
D small volcanoes

49. What are kimberlites?

A felsic rocks
B mafic rocks
C intermediate rocks
D ultramafic rocks

50. Diamonds can form only

A under very low pressure
B under very high pressure.
C above ground.
D near radioactive elements.

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CHAPTER 5 CHAPTER ASSESSMENT

Igneous Rocks

Reviewing Vocabulary

Write the term that best completes the statement.

Bowen's reaction series	igneous rock	**kimberlite**
pegmatite	porphyritic	**ultramafic**

1. Rock formed from the crystallization of magma is called _____
2. _____ illustrates the relationship between cooling magma and mineral formation.
3. A(n) _____ rock, such as dunite, has low silica content and very **high** iron and magnesiun1 content.
4. A rock that has grains of two different sizes has _____ texture.
5. A(n) _____ is a vein of extremely large-grained minerals.
6. A rare, ultramafic rock that might contain diamonds is a(n) _____

Compare and contrast each pair of related terms.

7. intrusive igneous rock> extrusive igneous rock

8. magma, lava

9. granitic, basaltic

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CHAPTER 5 CHAPTER ASSESSMENT

Understanding Main Ideas (Part A)

Circle the letter of the choice that best completes the statement.

1. Igneous rocks are formed when magma
a. erodes.
b. undergoes radioactive decay.
c. crystallizes.
d. weathers.

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

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

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

5. 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.

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

In the space at the left, wi·ite *true* if the statement is true; if the statement is false, change the italicized word or phrase to make it true.

_____ **7.** Different minerals melt and crystallize at *different* temperatures.

_____ **8.** Igneous rocks can be identified by their *physical properties* of crystal size and texture.

_____ **9.** Igneous rocks are *rarely* used as building materials because of their strength, durability, and beauty.

_____ **10.** Dia1nonds are sometimes found in igneous intrusions known as *kimberlites.*

Understanding Main Ideas (Part B)

Answer the following questions.

1. What is partial melting? Explain how partial melting affects igneous rock formation.

2. What is fractional crystallization? Does it add or remove elements from magma? Explain your answer.

3. What relationship does Bowen's reaction series illustrate? What crystallization patterns did Bowen discover in feldspars and iron-rich minerals?

4. What are the three main groups of igneous rocks? What are the characteristics of each group?

5. Why would crystals formed early in magma crystallization have larger, better-shaped crystals than those that formed later?

6. What is porphyritic texture? What sequence of events produces porphyritic texture in rocks?