

Geo 101, Fall 2000
REVIEW QUESTIONS FOR MIDTERM EXAM
Igneous Rocks and Volcanoes

THE EXAM WILL BE MONDAY 30 OCTOBER
OR TUESDAY 31 OCTOBER

These questions are to help you study for the exam. They are not to turn in. It will be helpful to work with another student or in small groups try to answer the review questions. If you can't find the answer in your notes or in the book, please come to office hours or email questions to the instructor.

The exam will be based on the review questions and the lecture notes. Note that some of the review questions are from the material in the text. The actual exam questions will be multiple choice (except for make-up exams).

You must take the exam in the lecture section for which you are registered. Any exceptions must be cleared with the instructor in advance.

Igneous Rock Characteristics

1. Please distinguish between magma and lava.

2. What is tephra? Please list some types of tephra.

3. Please define "plutonic rock"; define "volcanic rock."

4. Which has bigger crystals: volcanic rock, or plutonic rocks?

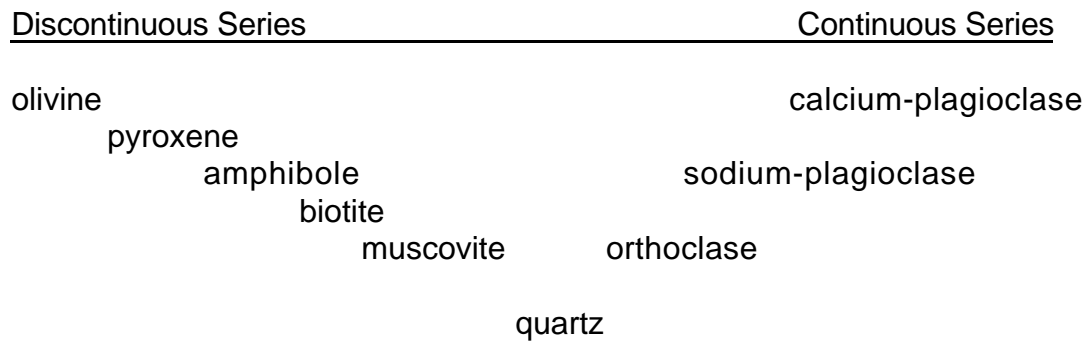
5. Please fill in the table with the appropriate rock names (composition names, not textures):

	Felsic	Intermediate	Mafic
Volcanic	_____	_____	_____
Plutonic	_____	_____	_____

6. Which are usually lighter in color: felsic rocks or mafic rocks?

7. Which have more silica (more silica rich minerals), felsic rocks or mafic rocks?
8. Which usually have more quartz: felsic rocks or mafic rocks?

Bowen's reaction series (for questions 9 to 12):



9. Which minerals have the most silica, those at the top of the chart, or those at the bottom? Which have the least silica?
10. Which minerals crystallize first as a magma cools?
11. Which minerals melt first as a rock is melted? (Melt at the lowest temperature.)
12. Which minerals are found in basalt or gabbro, those at the top of the chart, or those at the bottom? Which minerals are in granite or rhyolite?

Plate Tectonics and Igneous Rocks

13. What is the predominant kind of lava erupting at mid-ocean ridges (basalt, andesite or rhyolite)?
14. What kind of lava forms most of the ocean floor (basalt, andesite or rhyolite)?
15. At which type of plate boundary does andesite typically erupt?
HINT: The name comes from Andes mountains.

16. How is intermediate (andesitic) magma created (briefly)?
17. What kind of magma usually is formed by melting of continental crust?
18. What is the predominant kind of lava forming the volcanoes at ocean island hot spots such as Hawaii: basalt, andesite or rhyolite?

How Volcanoes Work

19. Magma rises if it has lower density than the rock around it, that is, if it is more bouyant. What effect does silica have on the bouyancy of magma? What is the effect of H₂O on bouyancy?
20. Sometimes, magma gets stuck despite its bouyancy, because it is too viscous (resists flowing).
 - a. What is the effect of silica on viscosity?
 - b. What is the effect of H₂O on viscosity?
21. Suppose you have four magmas: two are vapor rich, and two are vapor poor. Two are high in silica, two are poor in silica:
 - 1) vapor rich, silica rich
 - 2) vapor rich, silica poor
 - 3) vapor poor, silica rich
 - 4) vapor poor, silica poor

Which of these will probably erupt most explosively, if it erupts? Why?

Types of Volcanoes

22. Please sketch vertical profiles (outlines) of a shield volcano and a stratovolcano (composite cone). Why do these volcanoes have different shapes?
23. What type of lava makes a shield volcano: basalt, andesite or rhyolite?
24. What type of lava makes a stratovolcano (composite cone): basalt, andesite, or rhyolite?
25. Which erupts more explosively, mafic tephra, or felsic tephra? (See Question 21. Which has more silica?)
26. What is a caldera? How does a caldera form (what happens to the top of the mountain)?
27. Please give an example of a caldera. (HINT: There are two well-known calderas in Oregon and one very well known caldera in Wyoming.)
28. What is a volcanic dome? What is it made of?
29. Of what is a tephra cone (cinder cone) made? That is, what kind of tephra -- what name?
30. Please list some signs used by geologists (volcanologists) to predict a volcanic eruption. (Text, 108-112)
31. What is a lahar? (Text, 102-3)
32. What is an igneous dike? An igneous sill? How are they different from each other? Which is concordant?