

## GEOL 1121 – Earth Materials, Processes and Environments Review for Exam 3

The following is an attempt at a study guide for Exam 3. This exam will only cover information from Chapters 8 and 9.

**Chapter 8 Vocabulary:** aureole, contact metamorphism, differential pressure, dynamic metamorphism, fluid activity, foliated texture, geothermal gradient, heat, hydrothermal alteration, index mineral, lithostatic pressure, metamorphic, metamorphism, metamorphic facies, metamorphic grade, metamorphic zone, nonfoliated texture, recrystallization, regional metamorphism, shock metamorphism, ultra-high pressure metamorphism

### Chapter 8 Questions

1. What are the four agents of metamorphism? You should be able to discuss where each agent might originate (for example, heat can be the result of a lava flow, etc.). In addition, you should be able to discuss the role each of the agents of metamorphism plays in transforming any rock into a metamorphic rock.
2. Know all SEVEN types of metamorphism as defined in class and be able to describe which agents of metamorphism are most important in each case and their relative size (low, medium or high).
3. What are the factors that affect contact metamorphism?
4. How do metamorphic rocks record the influence of differential pressure in their structures and mineral textures?
5. If plate tectonic movement did not exist, could there still be metamorphism? Explain.
6. How are index minerals used to determine metamorphic grade.
7. How is a metamorphic zone related to metamorphic index minerals or facies?
8. Discuss how a foliation develops in a metamorphic rock.
9. What two things are necessary for a foliation to form?
10. Can lithostatic pressure produce a foliation? Explain your answer.
11. You should be able to identify BY DESCRIPTION the metamorphic rocks on p. 190 and tell me if the rock is foliated or non-foliated, its grade and a possible parent rock.
12. Know the rock cycle and be able to draw it as a triangular diagram (as shown in class).
13. List two metallic and two non-metallic metamorphic resources.

**Chapter 9 Vocabulary:** body wave, body wave magnitude, crust, discontinuity, earthquake, earthquake intensity, earthquake magnitude, elastic rebound theory, epicenter, focus, inner core, local magnitude, Love wave, mantle, Modified Mercalli Intensity Scale, Mohorovicic discontinuity, moment magnitude, outer core, P-wave, P-wave shadow zone, Rayleigh wave, reflection, refraction, Richter, S-wave, S-wave shadow zone, seismic moment, seismograph, seismology, seismic wave, surface wave, surface wave magnitude, tsunami, Wadati-Benioff zone

### Chapter 9 Questions

1. Be able to describe correctly the motions of the various earthquake waves.
2. What are some of the fundamental differences in body and surface waves? Between P- and S-waves? Between Rayleigh and Love waves?
3. Be able to describe the basic operation of a modern seismograph.
4. How many detectors are in our seismic vault? What types are they? How are they oriented (NE-SW? E-W? Vertical?).
5. If an earthquake occurs directly north (or south, east, west) of our seismic station, on which of our instruments would each type of seismic wave be recorded?
6. Describe how the location of an earthquake epicenter is determined.

7. What are the different magnitude scales? How are they different from each other? Which is the most accurate and reliable for describing the true size of an earthquake?
8. Be able to determine the approximate amplitude and energy release differences between earthquakes of different magnitudes.
9. How is seismic intensity measured? Is this a quantitative or qualitative measure?
10. What are the destructive effects of earthquakes?
11. What factors determine the seismic intensity of a particular event at a given location?
12. Why do insurance companies use the Modified Mercalli intensity scale instead of a magnitude scale in classifying earthquakes?
13. Describe how a tsunami is generated by an earthquake.
14. Describe the two types of earthquake prediction.
15. What is the "Parkfield Experiment"? What type of earthquake study is this experiment?
16. Is there any good way currently to predict earthquakes?
17. What can be done to minimize earthquake hazards?
18. The structure of the Earth's interior was deduced from measurements of seismic waves. Be able to describe how, when and by whom each of the following discoveries were made:
  - a) the existence of the core
  - b) the discovery of the mantle
  - c) the discovery that the core is – at least in part – liquid
  - d) the existence of an solid, inner core
19. Describe how velocities vary in the mantle. Why do they vary so much? (see p.229-230).
20. Describe oceanic vs. continental crust in terms of rock type, thickness, and density.