**EES 2510: Review Questions for Exam 2**

**Exam 2: Tuesday October 23 during regular class time (11 AM – 12:20 PM)**

**Chapter 6 *Sedimentary Rocks***

1 What are four steps that explain the formation of sedimentary rocks?

2 How does mechanical weathering differ from chemical weathering?

3 What is the most common and effective agent for transporting sediment?

4 What are the three main categories of depositional environments?

5 What are the two processes by which sediment is lithified (converted into sedimentary rock)?

6 How do clastic (detrital) sedimentary rocks differ from chemical sedimentary rocks?

7 Why are detrital sediments and the rocks formed from them classified by the size of the particles (grains they contain)?

8 What are sedimentary structures and how are they useful?

9 What is indicated by the sedimentary structure *cross beds*?

10 What is indicated by the sedimentary structure *graded beds*?

11 What is a fossil? What are two ways in which fossils are useful?

12 What is indicated by the sedimentary structure *beds* (*strata)*?

13 What is a sedimentary basin?

14 What plate tectonic setting creates: passive margin basins? foreland basins? intracontinental basins? rift basins?

14 Explain the process of *transgression*.

15 Explain how the vertical sequence of sedimentary rock layers records the history of an area.

16 Name some of the resources that are found in sedimentary rocks.

17 Explain what is required to form a reservoir holding natural gas or oil.

18 Explain how an unconventional reservoir holding natural gas differs.

**Chapter 7 *Metamorphism and Metamorphic Rocks***

1 What is *metamorphism*?

2 What are the two areas of continents likely to contain metamorphic rocks?

3 What are four *agents of change* in metamorphism?

4 What are *sources of heat* that can change existing rock?

5 What effects does heat have on the transformation of minerals?

6 Explain how *fluids* may be involved in metamorphism? What is a likely source of these fluids?

7 Describe *uniform (lithostatic)* pressure. How does this differ from *directed* *(differential)* pressure?

8 Explain the *three characteristics* that are used to *classify* metamorphic rocks.

9 How does *foliated texture* differ from *nonfoliated texture*?

10 What are three examples of *nonfoliated* metamorphic rocks?

11 Describe what is meant by *“intensity of change”* in metamorphic rocks.

12 In what *two ways* is the intensity of change determined for a metamorphic rock? (ans: rock type as a broad category and index minerals as subdivisions in a category)

13 Be sure you can name four types of foliated metamorphic rocks, describe their important characteristics, and arrange them in order of increasing intensity of metamorphism.

14 What are *“index minerals”* and why are they important?

15 Explain how mapping the distribution of metamorphic grade can be useful.

16 Describe how metamorphism is related to plate tectonics.

**Chapter 8 *Earthquakes and Earth’s Interior***

1 What are *earthquakes*? How can they be related to breaking a stick? What is the time scale for the build-up of stress at a fault? What is the time frame for release of that stress?

2 Know these important terms: *seismometer, seismogram, focus, epicenter, body waves (P & S), surface waves.*

3 Explain how a seismometer works.

4 Which does more damage, *body waves* or *surface waves*?

5 In what two ways do *P waves* differ from *S waves*?

6 How are earthquakes *located*?

7 What are two ways of describing the size of earthquakes?

7 Using the Richter Magnitude scale, how much larger is an earthquake of magnitude 6.5 than an earthquake of magnitude 4.5

7 How can it be useful to map the variations in the *intensity* of an earthquake in a region?

8 Describe the relationship between magnitude and frequency of earthquakes. Can you give this as a mathematical equation?

9 How are earthquakes used to understand the *interior of the earth*?

10 What *characteristics* can be determined by studying the travel of earthquake waves?

11 How is this study similar to *CAT scans*?

12 What feature of earthquake wave travel is used to identify the *asthenosphere*?

13 What feature of earthquake wave travel is used to identify the *average composition* of the mantle?

14 What feature(s) of earthquake wave travel is used to identify the *outer core*?

15 What feature of earthquake wave travel is used to identify the *inner core*?

16 What four features determine the risk due to earthquakes within an area?

17 What areas in the U.S. have the highest risk?

18 What is the risk like in Ohio?

19 Describe four ways that earthquakes can cause damage.

20 Describe how wastewater injection can cause earthquakes. Where in the U.S. has this been a concern?

**Chapter 5 Volcanoes and Volcanic Hazards**

1 Describe how magma can be generated by these plate tectonic processes: convergent margins with oceanic crust on both plates; convergent margins with oceanic crust and continental crust; divergent margins within oceanic crust; divergent margins within continental crust.

2 The origins you described for the previous question are all located on the margin of lithospheric plates. Describe an additional way that magma can be generated within a lithospheric plate, far from its edges.

3 Describe the basic anatomy of a volcano (name at least seven features).

4 Describe the three materials expelled from volcanoes during eruptions.

5 What are pillow lavas? Why are they particularly important in understanding the formation of ancient volcanic rocks in which they are found?

6 What feature in volcanic rocks is evidence that gas was emitted from the cooling magma?

7 How do estimates of the amount of CO2 expelled by volcanoes during a year compare with the amount generated by burning fossil fuels?

8 What is pyroclastic debris? What are two sources? What is the range in size of individual particles?

9 What factors determine whether a volcano will erupt in an *effusive style* or an *explosive style*?

10 How do mafic and felsic magmas differ? Why do they differ?

11 What is *viscosity*? Why is it important in the study of volcanoes? What are three factors that control the viscosity of magma?

12 What are three types of volcanoes? How do they differ? What determines the type of volcano that will form?

13 Be able to sketch these three types all at the same scale. Label the features on each.

14 What is a caldera?

15 Why are composite volcanoes also called stratovolcanoes? What are the two materials that compose the alternating layers for which this type of volcano is named?

16 Describe five hazards from volcanoes.

17 Describe the eruption of Mt. Vesuvius in AD 79 and its impact on the city of Pompeii.

18 Why are ash layers important to scientists trying to reconstruct earth history?

19 What are flood basalts? Why are they important?

20 How can volcanic eruptions affect weather on the scale of years? How can they affect climate on the scale of centuries or longer?

21 Describe the process thought to create both flood basalts and chains of volcanoes.

**Supplemental lecture on shale gas/fracking and global carbon cycles**

1 Explain why some shales are considered unconventional reservoirs for oil and gas.

2 What are the names of two formations in Ohio that yield gas and oil from shale?

3 Describe the two technological developments that allow natural gas to be extracted from unconventional shale reservoirs.

4 What are the potential impacts of shale gas development in a region (positive and negative)?

5 How do fossil fuels affect the atmosphere and global climate?

***Details for Exam 2:***

***Part 1. Choose from among the alternatives the phrase or sentence that best completes it. Write your choice next to the question number*** *(likely: 2 points each; 15 questions total; 30%)****.***

***Part 2. In the space provided, clearly write the word, phrase, or number that completes the following statements.*** *(likely: 2 points each; 15 questions total; 30%)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is the most common chemical sedimentary rock.

***Part 3. Word Analysis. Examine the words and/or phrases for each question below and determine the relationship among the majority of words/phrases. Circle the option that does not fit the pattern.*** *(likely 2 points each; 5 questions total; 10%)*

mudstone siltstone limestone sandstone

***Part 4. Critical thinking and discussion questions. Use complete sentences, correct spelling, and the information presented in both the textbook and in lectures to answer the questions below***. *(likely 3 questions, 10% earch; 30%)*

Would earthquakes of similar Richter magnitudes but with epicenters in different areas cause approximately the same levels of damage? In your explanation, consider both geologic and human factors. (10 points)