Lithosphere and Hydrosphere – EASC 100

EXAM II

1. (4) What are the two most important forces in the formation of metamorphic rocks?

2. (6) What difference(s) would you expect in the forces affecting rocks altered by contact metamorphism and those metamorphosed during subduction? What differences would you expect between the rock formed from a shale that was altered by contact metamorphism and a shale that was metamorphosed during subduction?

3. (3) What gases produced in volcanic eruptions contribute to acid rain? Is there an anthropogenic (manmade) source for these gases? If so, what is it?

4. (4) How is the chemical (not mineral) composition of a rock changed during metamorphosis?
5. If you found long, linear belts of metamorphic rocks in Western Montana that were dated as being 800 million year old, what type of geologic setting would you conclude had been there 800 million years ago?

6. What is a metamorphic index mineral?

7. What is meant by ‘foliation’ in a metamorphic rock? How is it formed?

8. Identify the following rocks as metamorphic (M), sedimentary (S), igneous (IV), or igneous intrusive(II): Circle the proper letter identifying the rock type

   a. Limestone  M  S  IV  II
   b. Slate      M  S  IV  II
   c. Shale      M  S  IV  II
   d. Sandstone  M  S  IV  II
   e. Granite    M  S  IV  II
   f. Scoria     M  S  IV  II
   g. Conglomerate M  S  IV  II
   h. Obsidian   M  S  IV  II
   i. Diorite    M  S  IV  II
   j. Schist     M  S  IV  II
   k. Basalt     M  S  IV  II
   l. Tillite    M  S  IV  II
   m. Gneiss     M  S  IV  II
   n. Siltstone  M  S  IV  II
   o. Rhyolite   M  S  IV  II
   p. Marble     M  S  IV  II
   q. Dolostone  M  S  IV  II
   r. Quartzite  M  S  IV  II
   s. Chert      M  S  IV  II
   t. Coal       M  S  IV  II
9. (2) What is the difference between weathering and erosion?

10. (4) What are the two most important gases in the atmosphere that contribute to weathering of rocks and what do they do?

11. (4) What are the two basic types of weathering?

12. (4) How do plants contribute to weathering?

13. (6) What weathering products (minerals and ions) would you expect from the decomposition of
   A. Feldspars?
   
   B. From ferromagnesian minerals, e.g. olivine, pyroxenes and amphiboles?
   
   C. From a granite
14. (4) Please place the following minerals in order of most easily weathered (1) to most refractory (8) under conditions at the Earth’s surface. Note: Refractory means it doesn’t weather easily.

Limestone, _____  Quartz, _____  Ca-plagioclase _____

Olivine, _____  K-feldspar, _____  Biotite, _____

Clays, _____  Pyrite _____

15. (4) Why are some of these minerals more easily weathered than others?

16. (3) What are the three basic types of sedimentary rocks?

17. (4) What changes in sediments (and the rocks formed from them) do we expect to see as we move farther and farther from the parent or source rock?

18. (4) What is cross-bedding? In what type of rocks do we often see it? How is it formed? If you want, draw a small diagram of cross-bedding.

19. (3) What is a turbidite? Where is it formed, how is it formed and what textural characteristics are used to suggest that a particular bed may be a turbidite?

20. (3) What is an evaporite and where is it formed? Please give an example of an evaporite mineral?
21. (2) If you see a coal bed in a road cut, what environment can you conclude was once present at that location?

22. (2) What kind of rock is formed in a landslide or debris flow?

23. (6) You look at a roadcut and see the following rock layers: 1. at the bottom is a sandstone with asymmetric crossbeds, 2. on top of that is a coal bed, 3. followed by another sandstone, but this time with symmetric crossbeds, 4. on top of that is a shale. What four types of environments do these reflect and what was happening to the relative sea level at the time?

24. (3) What is the difference between evaporation and transpiration?

25. (2) What is a drainage basin?

26. (4) What happens to sediment when a river reaches a lake or the ocean? What geologic feature will develop there?