CHAPTER 7 Sedimentary Rocks

1. Detrital sediments are accumulations of transported solid particles of material(s) that was never in solution, whereas chemical sediments are accumulations of minerals extracted from solution by inorganic chemical processes and the activities of organisms.

2. Which of the following are chemical sediments?
   a. broken sea shells;  b. ions in solution;  c. quartz sand;  d. conglomerate;  e. graded bedding.

3. Sedimentary particles are designated in order of decreasing size as gravel, sand, silt, and clay.

4. What are the two meanings of the term "clay"?

5. A clay-sized sedimentary particle measures:
   a. greater than 2 in;  b. 2-10 cm;  c. 1/4-1/2 mm;  d. less than 1/256 mm;  e. 5 mm.

6. Sedimentary particles are rounded and sorted during transport although the degree of rounding and sorting depends on particle size, transport distance, and depositional process.

7. How does the gravel in sedimentary breccia differ from the gravel in conglomerate?

8. Sedimentary breccia is a rare rock type because:
   a. gravel is rounded quickly during transport;  b. clay is less abundant than other sedimentary particles;  
   c. feldspars are chemically unstable;  d. sand deposits are typically well sorted;  
   e. it forms only by evaporation of water.

9. Any area in which sediments are deposited is a depositional environment. Major depositional settings are continental, transitional, and marine, each of which includes several specific depositional environments.

10. Explain why the sediments in windblown sand dunes are better sorted than that in glacial deposits.

11. If an aggregate of sediments consists of particles that are all about the same size, it is said to be:
    a. well sorted;  b. poorly rounded;  c. completely abraded;  d. sandstone;  e. lithified.

12. Compaction, cementation and partial recrystallization are processes of lithification by which unconsolidated sediments become stones. Silica and calcium carbonate are the most common chemical cements, but iron oxide and iron hydroxide cements are important in some rocks.

13. What are the common chemical cements in sedimentary rocks, and how do they form?
14. The lithification process whereby dissolved mineral matter precipitates in the pore spaces in sediments is:
   a. compaction; b. rounding; c. bedding; d. weathering; e. cementation.

15. Sedimentary rocks are generally classified as detrital or chemical:

16. Distinguish clastic and crystalline textures. Give an example of a sedimentary rock with each texture.

17. Detrital sedimentary rocks consist of solid particles derived from preexisting rocks.

18. Why is quartz the predominant mineral in most sandstones? What is a sandstone called that contains at least 25% feldspar?

19. What are mudrocks, and why are some mudrocks called shale?

21. The most abundant detrital sedimentary rocks are:
   a. limestones; b. sandstones; c. evaporates; d. mudrocks; e. arkoses.

22. Chemical sedimentary rocks are derived from ions in solution by inorganic chemical processes or the biochemical activities of organisms. A subcategory called biochemical sedimentary rocks is recognized.

23. In what fundamental way do chemical sedimentary rocks differ from detrital sedimentary rocks?

24. Carbonate rocks contain minerals with the carbonate ion \((\text{CO}_3)^{2-}\) as in limestone and dolostone. Dolostone probably forms when magnesium partly replaces the calcium in limestone.

25. Compare and contrast limestone and dolostone.

26. Most limestones have a large component of calcite that was originally extracted from seawater by:
   a. inorganic chemical reactions; b. organisms; c. evaporation; d. chemical weathering; e. lithification.

27. Dolostone is formed by the addition of _________ to limestone.
   a. calcium; b. carbonate; c. magnesium; d. iron; e. sodium.

28. Evaporites include rock salt and rock gypsum, both of which form by inorganic precipitation of minerals from evaporating water.

29. What are the common evaporates, and how do they originate?
30. The most common evaporate rock is;
   a. rock gypsum;  b. chert;  c. bituminous coal;  d. rock salt;  e. siltstone.

31. Coal is a type of biochemical sedimentary rock composed of the altered remains of land plants.

32. Briefly describe the origin of coal.

33. Sedimentary facies are bodies of sedimentary rock that are recognizably different from adjacent ones.

34. Some sedimentary facies are geographically widespread because they were deposited during marine transgressions or marine regressions.

35. What are marine transgressions and regressions? Explain how a marine transgression can account for beach sand being deposited over a vast region.

36. The superposition of offshore facies over nearshore facies occurs when sea level rises and the shoreline migrates inland during a marine:
   a. superposition;  b. regression;  c. facies;  d. invasion;  e. transgression.

37. Sedimentary structures such as bedding, cross-bedding, and ripple marks commonly form in sediments when or shortly after they are deposited. Such features preserved in sedimentary rocks aid geologists in determining ancient current directions and depositional environments.

38. Name three sedimentary structures and explain how they form.

39. Which of the following can be used to determine paleocurrent direction?
   a. mud cracks;  b. graded bedding;  c. cross-bedding;  d. turbidity currents;  e. grain size.

40. Turbidity current deposition is responsible for most:
   a. bedding planes;  b. graded bedding;  c. wave-formed ripple marks;  d. sedimentary facies;
   e. marine regressions.

41. Sedimentary rocks are the host materials for most fossils. Fossils provide the only record of prehistoric life and are useful for correlation and environmental interpretations.

42. How can fossils be used to interpret ancient depositional environments?

43. Which of the following is a trace fossil?
   a. dinosaur tooth;  b. frozen mammoth;  c. worm burrow;  d. bird bone;  e. clam shell.

44. Depositional environments of ancient sedimentary rocks are determined by studying sedimentary textures and structures, examining fossils, and making comparisons with present-day depositional processes.
45. What kinds of data do geologists use to determine depositional environment?

46. Many sedimentary rocks including sand, gravel, evaporates, coal, and banded iron formations are important natural resources. Most oil and natural gas are found in sedimentary rocks.

47. Traps for petroleum and natural gas resulting from variations in the properties of sedimentary rocks are ______ traps.
   a. reservoir; b. stratigraphic; c. cap rock; d. structural; e. salt dome.

48. What is oil shale, and how can liquid oil be extracted from it?

49. Most of the known oil shales are in;
   a. the Soviet Union; b. China; c. Venezuela; d. the United States; e. Australia.

50. What are banded iron formations, and why are they an important resource?

51. In the United States most uranium for nuclear reactors is obtained from the mineral:
   a. aragonite; b. gypsum; c. kaolinite; d. halite; e. carnotite.

| bedding | graded bedding |
| bedded | lithification |
| plane | marine regression |
| biochemical sedimentary rock | marine transgression |
| carbonate rock | mud crack |
| cementation | paleocurrent |
| chemical sedimentary rock | ripple mark |
| elastic texture | rounding |
| compaction | sediments |
| cross-bedding | sedimentary facies |
| crystalline texture | sedimentary rock |
| depositional environment | sedimentary structure |
| detrital sedimentary rock | sorting |
| evaporate | fossil |