Chapter 20

Multiple Choice Questions

1. The major factors that affect soil development are __________.
   a. climate, vegetation and slope
   b. time, climate and pressure
   c. time, vegetation and heat
   d. time, vegetation and climate

2. Finely divided, partially decomposed organic matter found in soils is called __________.
   a. humus
   b. horizon
   c. ped
   d. oxides

3. The term __________ describes all forms of mineral matter that are suitable for transformation into soil.
   a. regolith
   b. weathered rock
   c. parent material
   d. bedrock

4. Red or yellow soils generally are created by the presence of __________.
   a. organic colloids
   b. calcium
   c. magnesium
   d. iron oxides

5. Dark brown or black color soil often indicates:
   a. a very young soil
   b. considerable moisture
   c. a large amount of humus
   d. the presence of iron oxides

6. The relative proportion of sand, silt and clay in a soil refers to its __________.
   a. profile
   b. horizon
   c. structure
   d. texture
7. The finest of all soil particles are called ___________.
   a. clays
   b. silts
   c. colloids
   d. primary minerals

8. Colloids are important to soil formation because ___________.
   a. they allow for easy transportation of water
   b. they allow for breaks in the soil so that water and gases can travel through it
   c. they attract base ions which act as nutrients for plants
   d. of their positive charge, which allows them to attract acidic compounds

9. The most important bases are:
   a. calcium, magnesium, potassium, and sodium
   b. iron oxides and aluminum oxides
   c. hydrogen and aluminum
   d. calcium, carbon, and oxygen

10. What type of soil may lack peds?
    a. iron oxides soil
    b. soil with a high clay content
    c. soil with a high sand content
    d. organic soil

11. ___________ minerals are compounds present in unaltered rock. These are mostly silicate minerals.
    a. Parent
    b. Secondary
    c. Primary
    d. Tertiary

12. In terms of the properties of soils, the most important secondary minerals are ___________.
    a. aluminum oxides
    b. clay minerals
    c. calcium ions
    d. sesquioxides
13. Usually, a fertile soil will have __________.
   a. a low pH
   b. a very high content of sodium
   c. a low colloid content
   d. a high base status

14. What is the best soil texture in terms of water availability for plants?
   a. clay soils
   b. sandy soils
   c. silt soils
   d. loamy soils

15. What is the most important factor in determining water need (\(E_p\))? 
   a. storage capacity
   b. precipitation
   c. capillary tension
   d. temperature

16. In the soil water budget, when precipitation exceeds water use (\(E_a\)):
   a. the water need is decreased
   b. a water surplus exists
   c. a soil water shortage is created
   d. a storage withdrawal occurs

17. Distinctive horizontal layers that differ in physical composition, chemical composition, organic content, or structure are called __________.
   a. horizons
   b. peds
   c. soil profiles
   d. soils

18. The display of horizons on a vertical cross section through the soil is termed a __________.
   a. soil profile
   b. soil strata chart
   c. soil layer
   d. soil ped
19. The usual vertical sequence of horizons in a soil from the surface downward is
   a. O, A, B, C, E
   b. A, B, C, E, O
   c. O, A, E, B, C
   d. A, E, B, C, O

20. Which soil horizon usually has the maximum accumulation of silicate clay materials
    and/or of sesquioxides and organic matter?
   a. A
   b. E
   c. B
   d. C

21. Which of the following definitions describes the soil-forming process of leaching?
   a. the addition of material to the soil body
   b. surface erosion carries sediment away from the upper-most layers of soil
   c. seeping water dissolves soil materials and moves them to deeper soil levels or to
      the groundwater
   d. the transport of clay particles from the B horizon to the E horizon

22. Two processes of ____________ that operate simultaneously are eluviation and
    illuviation.
   a. relocation
   b. soil enrichment
   c. leaching
   d. translocation

23. __________ occurs in dry climates when dissolved carbonate matter is carried down
    to the B horizon.
   a. Translocation
   b. Calcification
   c. Illuviation
   d. Eluviation

24. What process slowly destroys irrigated soils in arid regions, and is responsible for the
    decline of the Sumerian civilization?
   a. desertification
   b. aquaification
   c. waterlogging
   d. salinization
25. __________ are quite closely related to the Oxisols in outward appearance and environment of origin. They are reddish to yellowish in color.
   a. Spodosols
   b. Ultisols
   c. Mollisols
   d. Aridisols

26. __________ are black in color and have a high clay content in which deep vertical cracks develop during the dry season.
   a. Vertisols
   b. Spodosols
   c. Mollisols
   d. Andisols

27. __________, formed in the cold boreal forest climate, beneath a needle-leaf forest, have a unique property - a B horizon of accumulation of reddish mineral matter with a low capacity to hold bases.
   a. Alfisols
   b. Oxisols
   c. Spodosols
   d. Mollisols

28. __________ are soils in which more than half of the parent mineral matter is volcanic ash. These soils have a high carbon content, so they appear very dark in color.
   a. Oxisols
   b. Andisols
   c. Alfisols
   d. Enitsols

29. Because of their loose texture and very high base status, __________ are among the most naturally fertile soils in the world.
   a. spodosols
   b. andisols
   c. mollisols
   d. histosols

30. __________, soils of the desert climate, are dry for long periods of time.
   a. Spodosols
   b. Mollisols
   c. Entisols
   d. Aridisols
**True/False Questions**

31. True/False   The fertilization effect of CO₂ appears to be greater when plants are under greater stress, for example from warmer temperatures and drought.

32. True/False   The higher the temperature, the faster the decay process of organic soil components.

33. True/False   The soil consists of matter in all three states - solid, liquid, and gas.

34. True/False   Regolith is not a form of parent material for soil; rather, it is the major source of soil colloids.

35. True/False   Soil color can come from the parent material, but it most likely comes from soil-forming processes.

36. True/False   A loam is a mixture containing a substantial proportion of each of the three grades of mineral particle sizes.

37. True/False   Soil colloids are extremely fine particles that may be mineral or organic.

38. True/False   Highly acid soils (pH of eight or greater) are commonly found in warm, humid climates.

39. True/False   Aluminum oxide, bauxite, iron oxide, and limonite are all examples of secondary minerals.

40. True/False   The wilting point is the water storage level below which plants will wilt.

**Short Answer Essay Questions**

41. Explain the six factors involved in the soil-water balance.
42. Describe the process of translocation (eluviation and illuviation) in the formation of soil.
43. Why is soil texture important?
44. Describe the three soil orders (Oxisols, Ultisols, and Vertisols) that dominate the vast land areas of the low latitudes.
45. Where are Alfisols found, and what general characteristics do they display?