Chapter 2: Soil Origin and Development

TRUE/FALSE

1. Physical weathering is the disintegration of rock by only temperature, water, and wind.

   ANS: F PTS: 1

2. Soil formation begins with rock.

   ANS: T PTS: 1

3. Levees are formed along river banks where coarse materials are deposited.

   ANS: T PTS: 1

4. Lacustrine deposits form under rapidly rushing water.

   ANS: F PTS: 1

5. Two important features of topography are slope and slope aspect.

   ANS: T PTS: 1

6. Frost wedging occurs when water freezes and expands in rocks or in cracks in the rock, causing it to break apart.

   ANS: T PTS: 1

7. The A, E, B, and O horizons make up the solum, which contains the most plant roots.

   ANS: T PTS: 1

MULTIPLE CHOICE

1. A pedon is a human device for studying soil. It is a section of soil 3 ft. × 3 ft. × ____ ft.
   a. 3
   b. 4
   c. 5
   d. 6

   ANS: C PTS: 1

2. A talus, sand and rocks that collect at the foot of a slope, is an example of colluvial material but includes all of the following EXCEPT ____.
   a. avalanches
   b. mudslides
   c. landslides
   d. waterslides

   ANS: D PTS: 1

3. Rock formed by pressure applied to lose materials is called ____.
   a. metamorphic
   b. sedimentary
   c. igneous

   ANS: B PTS: 1

4. When a river cuts deeply into a floodplain to flow at a lower elevation, the old floodplain is called a ____.
   a. river bank
   b. river terrace
   c. river delta
   d. river plain

   ANS: B PTS: 1

5. Organic soils contain ____% or more organic matter.
   a. 20
   b. 30
   c. 50
   d. 70

   ANS: A PTS: 1

6. All of the following are ways in which climate affects soil development EXCEPT ____.
   a. physical weathering
   b. chemical weathering
   c. amount of and decay of organic matter
   d. amount of sedimentary rock in parent material

   ANS: D PTS: 1

7. Roots growing into a crack in rock is called root ____.
   a. binding
   b. compaction
   c. rotting
   d. wedging

   ANS: D PTS: 1

8. The four soil-forming processes includes all of the following EXCEPT ____.
   a. loss
   b. translocation
   c. addition
   d. transformation
   e. transpiration

   ANS: E PTS: 1

YES/NO

1. Does topography change soil formation by changing water movement and soil temperature?

   ANS: Y PTS: 1

2. Are loess soils made up of wind-deposited silt, and are they important agricultural soils in much of Iowa, Illinois, and neighboring states?

   ANS: Y PTS: 1

3. Can human activity be considered a soil-forming factor?

   ANS: Y PTS: 1

4. Is metamorphic rock formed by extreme cold and pressure?

   ANS: N PTS: 1

5. Does slope aspect refer to the degree of incline?

   ANS: N PTS: 1

COMPLETION

1. Pedology is the study of soil formation, classification, and mapping. Soil formation is also known as soil _____.

   ANS: genesis

   PTS: 1

2. The three types of bedrock are igneous, metamorphic, and _____.

   ANS: sedimentary

   PTS: 1

3. Deltas form when rivers flowing into an ocean and deposit sediments at the mouth of the river. Delta soil has very _____ particles and tends to be wet. The Mississippi River Delta of Louisiana and the Rio Grande Valley of Texas and Mexico are examples.

   ANS: small

   PTS: 1

4. Soil genesis begins with rock breaking into smaller particles that provide the _____ materials.

   ANS: parent

   PTS: 1

5. _____ rock is the basic material of the Earth's crust.

   ANS: Igneous

   PTS: 1

6. Flood waters spreading over large, flat areas called _____can leave deposits of fine particles.

   ANS: floodplains

   PTS: 1

7. Except for a surface layer of plant debris, mineral soils contain less than _____% organic matter.

   ANS:
   20
   twenty

   PTS: 1

8. Organisms that can impact soil are burrowing animals, earthworms, and nitrogen-fixing _____.

   ANS: bacteria

   PTS: 1

9. Caliche is a hard subsoil layer cemented by _____.

   ANS: lime

   PTS: 1

MATCHING

Match the following terms with the appropriate definition.

a. Dissolution
b. Hydrolysis
c. Hydration

1. Minerals react with the hydrogen in water molecules and split the water
2. Water molecules join with the crystalline structure of minerals
3. Minerals dissolve in water

1. ANS: B PTS: 1
2. ANS: C PTS: 1
3. ANS: A PTS: 1

Match the following types of master horizons with the best description.

a. A
b. B
c. C
d. E
e. O
f. R

4. Greatest eluvation; depleted in clay, chemicals, organic matter; light colored
5. Topsoil; organic matter accumulates; dark colored
6. Subsoil; “zone of accumulation” (illuviation)
7. Wholly or partially decayed plant and animal debris; undisturbed soil; example—forest
8. Underlying hard bedrock; may be cracked, fractured; intrudes into soil
9. “Parent” material of soil; little touched by soil-forming processes

4. ANS: D PTS: 1
5. ANS: A PTS: 1
6. ANS: B PTS: 1
7. ANS: E PTS: 1
8. ANS: F PTS: 1
9. ANS: C PTS: 1

Match the following terms with the best description.

a. Alluvial fan
b. Illuviation
c. Colluvium
d. Eluviation
e. Alluvial soil
f. Eolian deposit

10. Soil parent materials moved by sliding or rolling down a slope; scattered in hilly or mountainous areas
11. Soil parent materials carried by wind
12. "Zone of accumulation" where chemicals leached out of the A and E horizon accumulate
13. Parent materials were carried and deposited in moving fresh water to form sediments
14. Form below hills and mountain ranges where streams flowing down-slope deposit material in a fan shape at the base
15. Soil losses of clay, iron, and other materials in downward moving water

10. ANS: C PTS: 1
11. ANS: F PTS: 1
12. ANS: B PTS: 1
13. ANS: E PTS: 1
14. ANS: A PTS: 1
15. ANS: D PTS: 1

Match the following terms with the best description.

a. Glacial drift
b. Glacial outwash
c. Glacial till

16. Coarser material from glacier meltwater that was deposited near the glacier and in nearby streams and rivers
17. Clay, sand, rocks, and other materials that were picked up, crushed and ground, and deposited elsewhere by glaciers
18. Debris dropped in place to form deposits during glacier melting

16. ANS: B PTS: 1
17. ANS: A PTS: 1
18. ANS: C PTS: 1

Match the following terms with the appropriate definition.

a. Soil genesis
b. Soil horizon
c. Soil profile

19. A vertical section through the soil extending into unweathered parent material and exposing all the horizons
20. Soil formation
21. Horizontal layers that develop as a soil ages

19. ANS: C PTS: 1
20. ANS: A PTS: 1

21. ANS: B PTS: 1

ESSAY

1. Discuss how subdivisions of master horizons are indicated.

   ANS:
   As soils age they may develop horizon positions and properties that are between master horizons. Such transitional layers are identified by two master letters with the dominant one written first. An AB layer lies between the A and B horizons but is most like the A horizon. Layers can be further identified by a lowercase letter suffix denoting a trait of the layer (Ap). Numbers can be used to indicate further subdivisions (Bt1).

   PTS: 1

2. Describe how time affects soil change.

   ANS:
   Initially a thin layer of soil appears on the parent material. As soil ages, biological processes tend to increase nitrogen content. The passage of time transforms soil so it is less and less like its parent material. Mature soils are generally productive, but as time passes, weathering, erosion, leaching, and misuse can make a soil less productive. An old soil can even become the parent material for a new soil.

   PTS: 1