

2022 Area 1 Envirothon - Soil Test

Section 1: General Soil Knowledge

- 1) Soil texture is defined as the relative proportions of three mineral constituents in a mass of soil. What are these three constituents?
 - a. Clay, loam, sand
 - b. Loam, sand, silt
 - c. Sand, silt, clay
 - d. Clay, gravel, silt

- 2) What soil material is fine grained, primarily composed of silt-size particles, and deposited by wind?
 - a. Loam
 - b. Loess
 - c. Leachate
 - d. Alluvium

- 3) What soil parent material is deposited by running water?
 - a. Colluvium
 - b. Alluvium
 - c. Gravel
 - d. Sand

- 4) There are five soil forming factors. Which of the following is a soil forming factor?
 - a. Biological activity
 - b. Parent material
 - c. Climate
 - d. All the above

- 5) Topsoil is a mixture of mineral soil and organic matter. Which of the following choices best describes the makeup of organic matter?
 - a. Bacteria and fungi
 - b. Plant and animal material occupying water filled pore space
 - c. Dead and decaying plant and animal material
 - d. Residual waste products from respiration

- 6) Soil pH is an important soil property affecting plant growth. Which of the following statements concerning soil pH is the most correct?
 - a. Soil pH is not affected by parent material.
 - b. Soil pH cannot be changed by soil amendments.
 - c. Soil pH is independent of other soil properties.
 - d. Soil pH is a measure of soil acidity.

- 7) Soil pH is expressed on a scale of 0 – 14. Soil pH affects the plant availability of nutrients within the soil. Most field crops are best suited to a pH range of:
- 2.0 - 3.0
 - 4.0 - 5.0
 - 6.0 - 7.0
 - 8.0 - 9.0
- 8) Wetlands are an integral part of the natural landscape. Wetlands can filter out pollutants as well as retain water, which helps to prevent flooding. It is estimated that Ohio has lost more than 90% of its original wetlands. Poorly drained soils with low oxygen conditions due to saturation are found in wetlands. What are these soils referred to as?
- Hydraulic soils
 - Hydric soils
 - Griffinitic soils
 - Hydroponic soils
- 9) Inherent soil properties are properties that are not easily changed. Human use and management of the soil has little to no impact on these soil properties. Which of the following is an example of an inherent soil property?
- Organic matter
 - Bulk density
 - Texture
 - Structure
- 10) On April 27, 1935, Congress passed Public Law 74-46, in which it recognized that "the wastage of soil and moisture resources on farm, grazing, and forest lands . . . is a menace to the national welfare," and it directed the Secretary of Agriculture to establish the Soil Conservation Service (SCS) as a permanent agency in the USDA. In 1994, Congress changed the SCS's name to the NRCS to better reflect the broadened scope of the agency's concerns.

NRCS stands for the:

- Natural Recreation Creation Service
 - Natural Resources Conservation Service
 - National Resources Control Service
 - National Railroad Construction Service
- 11) What is the natural soil process, which humans can accelerate, that is the main reason the NRCS exists today?
- Erosion
 - Plate tectonics
 - Flooding
 - Acid rain

12) In Ohio, non-point source pollution plays a significant role in the water quality of the state's lakes and streams. Nutrient runoff, particularly phosphorus, has been identified as a culprit for nutrient loading in these waters. Conservation practices can help to reduce the amount of runoff from agricultural fields. Which of the following practices will help reduce soil erosion and nutrient runoff?

- a. Filter strips
- b. Cover crops
- c. Residue and tillage management
- d. All the above

13) Soil health is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. Key principles that lead to improved soil health are:

- Maximize soil cover (keep more residue on the soil surface)
- Minimize soil disturbance (disturbance can be physical, chemical, and biological)
- Maximize living roots (keep growing crops in the soil as much as possible)
- Maximize biodiversity (use crop rotations and diverse cover crops)

Which of the following choices would be an indication of a healthy soil when a test pit is dug:

- a. Redoximorphic features
- b. Earthworm burrows throughout the soil profile
- c. Fragipan
- d. The "A" horizon is thin/shallow

14) A well-designed soil health management system includes a variety of conservation practices. Which of the following practices do not specifically help maximize soil cover?

- a. Residue and tillage management
- b. Nutrient management
- c. Prescribed grazing
- d. Cover crops

15) Building site development soil interpretations rate soils for their suitability and identify limitations concerning many different potential land uses. Limitation rating classes include "not limited", "somewhat limited", and "very limited". Which statement best describes a rating of "very limited"?

- a. It is impossible to construct a building on this soil.
- b. This soil is well suited to building construction.
- c. It is possible to construct a building on this soil, but only with major reclamation, special design, and expensive installation.
- d. Building construction on this soil is expected to result in good performance and very low maintenance.

Section 2: Soil Survey, Site, and Current Issue

- 16) Which of the following soil map units constitutes 40.0 acres on this site?
- Bo (Bono silty clay)
 - Lc (Latty silty clay, till substratum, 0-1% slope)
 - To (Toledo silty clay, 0-1% slopes)
 - NpA (Nappanee silty clay loam, 0-3% slopes)**
- 17) Parent material influences many soil properties, and this information can be useful in making land use decisions. To (Toledo silty clay, 0-1% slopes) formed from what type of parent material?
- Clayey glaciolacustrine deposits**
 - Glacial drift
 - Sandy outwash
 - Loess
- 18) You are planning to build a solar array using a soil-based anchor system. Choosing the most appropriate site for construction is very important. Which of these soil limiting features (rating reasons) is listed for every soil map unit on this site?
- Steel corrosion
 - Depth to saturated zone**
 - Ponding
 - Slope
- 19) Sewage treatment systems are important for both rural and urban communities. Which soil is least limited for this waste management use?
- Tp (Toledo silty clay, 0-1% slopes, flooded)
 - To (Toledo silty clay, 0-1% slopes)
 - Npa (Nappanee silty clay loam, 0-3% slopes)**
 - All soils on this site are rated as "Very Limited" for this use
- 20) The application of manure and disposal of food processing waste on cropland is a common practice in this area of the state. For NpA (Nappanee silty clay loam, 0-3% slopes), what are the two most severely rated soil limiting features (rating reasons)?
- Leaching, Slow water movement
 - Too acid, Depth to saturated zone
 - Too acid, Leaching
 - Depth to saturated zone, Slow water movement**
- 21) Planting trees that are not adapted to the soil conditions of a site can result in poor growth or seedling failure. Which of the following trees is recommended as a tree to manage for To (Toledo silty clay, 0-1% slopes)?
- Red maple**
 - Northern red oak
 - Eastern white pine
 - Black cherry

- 22) Landscape position influences soil properties and is important in determining land use. What landform is the soil pit located on?
- Upland hillslope
 - Outwash plain
 - Upland flat
 - Floodplain
- 23) What is the depth of the topsoil (inches) within the soil pit?
- 0-4
 - 4-8
 - 8-12
 - Greater than 12
- 24) Soil structure is the arrangement of primary soil particles into aggregates. What is the soil structure at a depth of 16 inches?
- Blocky
 - Massive
 - Granular
 - Single grain
- 25) What is the USDA soil texture of the topsoil? Utilize the soil provided in the bucket near the pit.
- Sandy clay
 - Silt loam
 - Clay loam
 - Silty clay
- 26) _____ and _____ are the two macrobiotic processes that occur in all methods to decompose domestic wastewater.
- Aerobic and aerated
 - Absorption and aerobic
 - Organic and absorption
 - Aerobic and anaerobic
- 27) Geological carbon sequestration is the process of storing carbon dioxide in
- Direct air capture
 - Graphene production
 - Underground geologic formations
 - Scientifically engineered molecules