

Soils Station: 2018 Area IV Envirothon

By: George Derringer, Resource Soil Scientist, Natural Resources Conservation Service

- 1) Topsoil properties at this site are an indication of soil parent material. What is the depth of topsoil, to the nearest four inches, of the soil at the pit?**
 - a) 4 inches
 - b) 8 inches
 - c) 12 inches
 - d) 16 inches

- 2) Soil texture affects water holding capacity, nutrient retention, infiltration of water and other soil functions. These functions determine a soil's suitability to recreational and other uses. What is the soil texture between 23 and 29 inches deep in the pit?**
 - a) Silt loam
 - b) Loam
 - c) Silty clay loam
 - d) Clay

- 3) Soil drainage class refers to the depth of water saturation in a soil profile, and is usually indicated by the depth and extent of gray colors. The soil in the pit is in which USDA soil drainage class?**
 - a) Somewhat poorly drained
 - b) Moderately well drained
 - c) Well drained
 - d) Very poorly drained

- 4) The structure of a soil involves the shape (or type), grade and size of soil aggregates found in the soil, and is a measure of soil health. What is the structure of the soil at the pit between 18 and 23 inches deep?**
 - a) Sub-angular blocky
 - b) Granular
 - c) Platy
 - d) Massive

- 5) The soil in the pit has been formed in parent material deposited by the Wisconsin continental glacier approximately 24,000 to 18,000 years ago. What is the type of parent material for the soil layers in the pit between 18 and 29 inches deep?**
 - a) Loess
 - b) Alluvium
 - c) Glacial till
 - d) Glacial outwash

- 6) Soil contains various restrictive layers which limit or stop root development from growing deeper. What soil horizon is the deepest which shows evidence of rooting in the soil in the pit?**
 - a) IIB22t, 18-29 inches
 - b) IIB23t, 29-35 inches
 - c) IIB24t, 35-38 inches
 - d) IIIBC, 38-47 inches

- 7) The stability of soil aggregates varies in different soil horizons. This soil property is a measure of soil health. Which horizon below contains the most stable aggregates of the sub-angular blocky soil structure type?**
 - a) Ap1, 0-4 inches
 - b) IIB22t, 18-29 inches
 - c) IIB24t, 35-38 inches
 - d) IIIBC, 38-47 inches

- 8) Soil pores of various sizes and origins result from the activity of soil biology. Other dynamic soil features also change with biological activity. Which soil horizon has the most evidence of biological action?**
- a) Ap1, 0-4 inches
 - b) IIBt1, 8-13 inches
 - c) IIB21t, 13-18 inches
 - d) IIB22t, 18-29 inches
- 9) Many pores established from biological activity are important indicators of increasing organic matter content and mixing in soil. What feature in the subsoil at the pit is evidence of this?**
- a) Clay films
 - b) Earthworm burrow
 - c) Redoximorphic feature
 - d) Iron depletions
- 10) Map Unit Descriptions indicate the named components typical for the map unit in the soil survey area. Which component below is the dominant component for the soil at the pit?**
- a) Brookston
 - b) Celina
 - c) Crosby
 - d) Miamian
- 11) The depth to the seasonally-high water table is used for determining the natural drainage class of the soil. Iron depletions indicate this depth. What is the depth to iron depletions at the pit?**
- a) 10 inches
 - b) 20 inches
 - c) 25 inches
 - d) 35 inches
- 12) Soil organic matter and soil health improve as organic carbon enters the soil. Which feature below is NOT a result of organic carbon entering the soil at the pit?**
- a) Formation of masses of oxidized iron
 - b) Decomposition of plant residues
 - c) Additions of root exudates in subsoil
 - d) Presence of living and dead microorganisms
- 13) Moist bulk density is a dynamic soil property which indicates soil compaction, as well as pore space available for water and roots, which all may be improved by good management. Which soil property below will NOT be improved by good management (and is an inherent soil property)?**
- a) Pore space
 - b) Soil texture
 - c) Soil structure
 - d) Organic matter
- 14) Soils with higher organic matter in their topsoil and thicker topsoil yield better crops than soils with lower organic matter, and thinner topsoil. Compare the soils below on the Soil Health –Organic Matter interpretations and the Map Unit Descriptions (for topsoil depth) and select the soil below with the highest yield potential (if tile drainage is installed).**
- a) Bp
 - b) CeB
 - c) CoB
 - d) MIB

- 15) The hydrologic soil group assigned to a soil indicates the soil's potential to have water runoff, and pose a water pollution problem. Which soil below has the slowest infiltration rate, and poses the greatest threat to water pollution in the undrained condition?**
- a) CoA
 - b) Bp
 - c) MIB
 - d) MIC₂
- 16) Two kinds of water tables (a saturated zone in the soil) occur in soils found at the Possum Creek MetroPark. The two kinds are perched or apparent water tables. Which soil below has free water in all layers from the soil surface to the greatest depth of observation?**
- a) CoA
 - b) CeB
 - c) Bp
 - d) MIB
- 17) Hydric soils suffer oxygen depletion in the upper 12 inches during the growing season, and develop anaerobic conditions that supports growth of hydrophytic vegetation. Which soil map unit below located at Possum Creek MetroPark has the most hydric components?**
- a) CeB
 - b) MIB
 - c) MIB₂
 - d) CoA
- 18) Depth to the seasonal water table in soil is a hazard which can prevent adequate functioning of a septic tank absorption field. Which soil below is best suited for treatment of septic tank effluent if four feet of leachable soil is required above the water table? (Hint: 25 cm = 10 inches)**
- a) MIB
 - b) CeB
 - c) MIA
 - d) CoB
- 19) The A-1 rating dominates the Area of Interest selected to generate the Pasture and Hayland Suitability Group rating provided. These soils are excellent for production of forage. Which limitation shown below applies to some forage mixes planted on these soils?**
- a) Droughtiness
 - b) Low pH in subsoil
 - c) Seasonal water table
 - d) Stones on the soil surface
- 20) The quantity of water a soil is capable of storing for use by plants is called the available water capacity. Which soil property below is NOT a property indicated as an important factor affecting this storage of water?**
- a) Bulk density
 - b) Soil texture
 - c) Natural drainage class
 - d) Soil Structure
- 21) The soils found on Possum Creek MetroPark are well suited for Forestland Management. However, most soils are rated severe for which hazard shown below?**
- a) Water erosion
 - b) Wetness
 - c) Depth to a restrictive layer
 - d) Low strength

- 22) The Miamian, MLB map unit is rated somewhat limiting for construction of small commercial buildings. Which soil property below would NOT affect this type of construction on this soil?**
- a) Slope
 - b) Linear extensibility
 - c) Depth to a water table
 - d) Depth of maximum frost penetration
- 23) The Miamian, MIA map unit is rated not limiting for construction of a home with a basement. Which procedure below would NOT be needed by MetroParks before building a home on this soil?**
- a) Install reinforced concrete footings on undisturbed soil about 7 feet deep
 - b) Complete a site investigation to validate interpretations and confirm soil identity
 - c) Record soil test logs for soil compressibility interpretation
 - d) Develop a site grading plan to prevent ponding of surface water.
- 24) The process of soil formation involves the development of layers in a soil profile over time through weathering of the original parent material. What is the typical parent material of the official Miamian soil series?**
- a) Loess over glacial outwash
 - b) Loess over glacial till
 - c) Glacial till over bedrock
 - d) Glacial till over glacial outwash
- 25) Soils are deposited in or developed into layers, which are called horizons. Five or six master horizons may exist in a mineral soil profile. Which master horizon below is NOT used when it begins at a depth well below normal depths of observation?**
- a) R horizon: Bedrock
 - b) A horizon: Topsoil
 - c) B horizon: Subsoil
 - d) C horizon: Substratum