Soil Science Reviewer Based On TOS (Module A: Soil Development)

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1. Which of the following accurately distinguishes the pedological approach from the edaphological approach in soil science?

a. Pedology studies soil in relation to plant growth, while edaphology studies soil as a natural body.

b. Pedology focuses on soil genesis and classification, whereas edaphology emphasizes soil as a medium for plant growth.

c. Pedology is concerned with soil fertility, whereas edaphology deals with soil weathering.

d. Pedology examines soil physics, while edaphology focuses strictly on soil microbiology.

2. According to the pedological concept, which of the following is considered the fundamental unit of soil classification?

a. Polypedon

b. Pedon

c. Soil profile

d. Soil horizon

3. Which component of an ideal loam soil constitutes the largest percentage by volume under optimal conditions for plant growth?

a. Organic matter

b. Mineral matter

c. Air space

d. Water

4. In the context of soil genesis, which of the following is considered an active factor of soil formation?

a. Topography

b. Parent Material

c. Climate

d. Time

5. What is the term for the sequence of distinct layers observed when a vertical cut is made into the earth's surface down to the parent rock?

a. Soil monolith

b. Soil horizon

c. Soil profile

d. Soil catena

6. Which soil horizon is primarily characterized by the maximum loss of silicate clays, iron, or aluminum, leaving a concentration of resistant sand and silt particles?

a. O horizon

b. A horizon

c. E horizon

d. B horizon

7. An edaphologist evaluating a soil's potential for crop production would be most concerned with which of the following properties?

a. Cation exchange capacity and nutrient availability

b. The age of the underlying bedrock

c. The classification of the pedon into a suborder

d. The genesis of the parent material

8. Which of the following environments is most conducive to the formation of organic soils (Histosols)?

a. Arid desert regions with high evaporation

b. Steep mountain slopes with rapid runoff

c. Waterlogged swamps and marshes with anaerobic conditions

d. Well-drained tropical savannas

9. When classifying organic horizons based on the degree of decomposition, which suffix indicates highly decomposed organic material where original plant parts are unrecognizable?

a. Oi

b. Oe

c. Oa

d. Op

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10. How do typical mineral soils structurally differ from typical organic soils?

a. Mineral soils have lower bulk density and higher water holding capacity.

b. Mineral soils contain more than 20% organic carbon by weight.

c. Mineral soils have higher bulk density and lower organic carbon content.

d. Mineral soils are formed exclusively from the accumulation of plant residues.

11. In tropical soil development, the process of laterization leads to the accumulation of which compounds in the soil profile?

a. Calcium carbonate and magnesium sulfate

b. Silicate clays and soluble salts

c. Iron and aluminum oxides

d. Un-decomposed organic matter

12. Which of the following is the true solum or the true soil containing the zones of eluviation and illuviation?

a. O, A, and E horizons only

b. A, E, and B horizons

c. B, C, and R horizons

d. A, B, and C horizons

13. What is the primary degradation risk for drained organic soils used for agriculture?

a. Salinization due to capillary action

b. Subsidence due to rapid oxidation of organic matter

c. Excessive accumulation of heavy metals

d. Transformation into a dense clay pan

14. Vasily Dokuchaev, widely regarded as the father of modern pedology, proposed that soil is a product of...

a. Strictly physical weathering of rocks.

b. The interaction of climate, organisms, parent material, topography, and time.

c. The random deposition of sediments by water and wind.

d. Human agricultural practices over millennia.



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15. In a well-drained tropical soil profile, what is the predominant clay mineral that contributes to its low cation exchange capacity?

a. Montmorillonite

b. Kaolinite

c. Vermiculite

d. Illite

16. The C horizon in a soil profile is best described as:

a. The zone of maximum biological activity.

b. The unconsolidated parent material undergoing little biological alteration.

c. The solid, unweathered bedrock.

d. The zone where leached materials accumulate.

17. Which of the following statements about soil as a natural resource is FALSE?

a. It acts as an environmental filter for water.

b. It is a renewable resource on a human time scale.

c. It serves as a medium for plant growth.

d. It is a habitat for millions of organisms.

18. What diagnostic subsurface horizon is characterized by a significant accumulation of illuvial silicate clay?

a. Cambic horizon

b. Spodic horizon

c. Argillic horizon

d. Calcic horizon

19. Under high rainfall conditions typical in the tropics, basic cations (Ca, Mg, K) are leached downwards. This process results in:

a. An increase in soil pH.
b. The formation of calcareous hardpans.
c. A decrease in soil pH and increased acidity.
d. No significant change in soil chemical properties.

20. Which subordinate horizon distinction is used to indicate a plowed layer or artificial disturbance in the topsoil?

a. t
b. g
c. p
d. x

21. In the context of environmental degradation, organic soils are particularly vulnerable to which phenomenon when exposed to aerobic conditions?

a. Mineralization and greenhouse gas emission
b. Spodic horizon formation
c. Laterite hardening
d. Podzolization

22. Which weathering process involves the reaction of water with minerals to form new clay minerals and soluble salts, effectively splitting the water molecule?

a. Hydration
b. Hydrolysis
c. Oxidation
d. Carbonation

23. The B horizon is often referred to as the zone of:

a. Eluviation
b. Illuviation
c. Biomass accumulation
d. Parent material

24. Which soil order is typical of highly weathered, old soils in tropical environments characterized by high concentrations of iron and aluminum oxides?

a. Mollisols
b. Vertisols
c. Oxisols
d. Inceptisols

25. When examining a soil profile, what does a mottled appearance (gray and red/yellow spots) typically indicate?

a. High organic matter content
b. Fluctuating water table and poor drainage
c. Recent volcanic ash deposition
d. Extreme drought conditions

26. The conversion of essential elements from organic forms to inorganic forms that plants can take up is known as:

a. Immobilization
b. Mineralization
c. Nitrification
d. Denitrification

27. What is the primary factor that limits the long-term fertility of heavily weathered tropical soils despite supporting lush rainforests?

a. Most nutrients are stored in the living biomass rather than the soil.
b. The soils lack sufficient rainfall to dissolve nutrients.
c. The soils have an unusually high pH.
d. The soils are composed mainly of unweathered primary minerals.

28. Which physical property of organic soils makes them highly valued for container gardening and greenhouse media?

a. High bulk density
b. High shrink-swell potential
c. High porosity and water-holding capacity
d. High specific gravity

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29. Which term describes the unconsolidated mass of rock material or soil above the solid bedrock?

a. Solum
b. Regolith
c. Pedon
d. Catena

30. A pedologist is mapping an area and finds a soil with a dark surface horizon rich in organic matter and basic cations, formed under grassland vegetation. Which soil order does this likely belong to?

a. Spodosols
b. Mollisols
c. Andisols
d. Gelisols

31. What does the subordinate distinction 'g' (e.g., Bg) represent in a soil horizon designation?

a. Accumulation of gypsum
b. Strong gleying indicating prolonged saturation
c. Illuvial accumulation of organic matter
d. Presence of plinthite

32. Which of the following parent materials is transported and deposited by gravity?

a. Alluvium
b. Colluvium
c. Aeolian
d. Till

33. Why is the continuous practice of slash-and-burn (kaingin) agriculture detrimental to tropical soil profiles?

a. It causes the rapid depletion of the organic matter layer and exposes the soil to severe erosion.
b. It significantly increases the clay content of the topsoil.
c. It causes the soil to become permanently waterlogged.
d. It prevents the process of laterization.

34. The concept that soil properties are a function of climate, organisms, relief, parent material, and time was formulated mathematically as S = f(cl, o, r, p, t) by whom?

a. Justus von Liebig
b. Hans Jenny
c. Vasily Dokuchaev
d. Curtis Marbut

35. Which of the following horizon sequences represents a typical well-developed forest soil profile?

a. O - A - E - B - C - R
b. A - B - C - E - O - R
c. C - R - B - A - O
d. O - E - A - C - B - R

36. What is the defining characteristic of a transition horizon in a soil profile?

a. It contains properties of two master horizons, but the properties of one dominate.
b. It is a completely distinct layer that has no relationship to adjacent horizons.
c. It is solely composed of unweathered bedrock.
d. It only occurs in artificial or anthropogenic soils.

37. In the context of the edaphological approach, what is the primary role of soil structure?

a. To classify the soil into a specific taxonomic order.
b. To determine the chronological age of the soil.
c. To regulate aeration, water movement, and root penetration.
d. To map the spatial distribution of the pedon.

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38. Which of the following organic soil materials (peats) has the lowest bulk density and highest water content, with highly visible plant fibers?

a. Sapric
b. Hemic
c. Fibric
d. Humic

39. What specific weathering process is primarily responsible for the red and yellow colors commonly observed in highly weathered tropical B horizons?

a. Reduction of iron
b. Oxidation of iron to form hematite and goethite
c. Dissolution of calcium carbonate
d. Carbonation of feldspars

40. Which of the following is NOT considered a process of soil genesis?

a. Additions (e.g., organic matter accumulation)
b. Losses (e.g., leaching of soluble salts)
c. Translocations (e.g., eluviation and illuviation)
d. Transpiration (e.g., water loss from plant leaves)

41. A typical soil profile developed under tropical rainforest conditions often lacks a distinct O horizon. What is the main reason for this?

a. Tropical rainforests do not produce enough leaf litter.
b. Heavy rainfall washes all organic matter into the rivers.
c. High temperatures and moisture promote rapid decomposition of organic materials.
d. Herbivorous animals consume the litter before it can accumulate.

42. What type of parent material is deposited by wind and typically consists of silt-sized particles?

a. Alluvium
b. Moraine
c. Loess
d. Colluvium

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43. Which soil horizon is characterized by the accumulation of humified organic matter intimately mixed with the mineral fraction?

a. O horizon
b. A horizon
c. E horizon
d. C horizon

44. What is the primary difference in function between the E horizon and the B horizon?

a. The E horizon is a zone of loss (eluviation), while the B horizon is a zone of gain (illuviation).
b. The E horizon contains bedrock, while the B horizon contains organic matter.
c. The E horizon is formed by humans, while the B horizon is naturally occurring.
d. The E horizon stores water, while the B horizon drains water completely.

45. In identifying soils, a pedologist uses color as an indicator. A very dark brown to black soil color in the A horizon typically indicates:

a. High accumulation of calcium carbonate
b. High organic matter content
c. Severe leaching of all nutrients
d. Presence of unweathered quartz

46. Regarding the degradation of the environment, how do poorly managed mineral soils primarily contribute to water pollution?

a. Through the emission of methane gases.

b. Through erosion and agricultural runoff carrying sediments and fertilizers into waterways.

c. Through the spontaneous combustion of organic layers.

d. Through the physical subsidence of the bedrock.

47. Which of the following statements best describes an organic soil as opposed to a mineral soil containing organic matter?

a. It must be completely black in color.

b. It contains more than 12% to 18% organic carbon by weight, depending on clay content, occupying a significant depth.

c. It is any soil that has been treated with organic fertilizers.

d. It contains exactly 5% organic matter by volume.

48. The physical breakdown of rocks into smaller particles without changing their chemical composition is called:

a. Chemical weathering

b. Biological weathering

c. Mechanical weathering

d. Pedoturbation

49. Which unique soil material found in tropical soils hardens irreversibly into ironstone when exposed to repeated wetting and drying?

a. Caliche

b. Plinthite

c. Fragipan

d. Gypsic layer

50. Why is the study of soil genesis crucial for the applied science of edaphology?

a. Because edaphologists need to know the name of the soil to sell it.

b. Because understanding how a soil formed provides insights into its physical and chemical properties, which dictate its capacity to support crops.

c. Because pedology is the only way to determine the current moisture content of the soil.

d. Because edaphologists are required by law to use pedological terms.

Detailed Answer Key

Q1: **b**	Q2: **b**	Q3: **b**	Q4: **c**	Q5: **c**
Q6: **c**	Q7: **a**	Q8: **c**	Q9: **c**	Q10: **c**
Q11: **c**	Q12: **b**	Q13: **b**	Q14: **b**	Q15: **b**
Q16: **b**	Q17: **b**	Q18: **c**	Q19: **c**	Q20: **c**
Q21: **a**	Q22: **b**	Q23: **b**	Q24: **c**	Q25: **b**
Q26: **b**	Q27: **a**	Q28: **c**	Q29: **b**	Q30: **b**
Q31: **b**	Q32: **b**	Q33: **a**	Q34: **b**	Q35: **a**
Q36: **a**	Q37: **c**	Q38: **c**	Q39: **b**	Q40: **d**
Q41: **c**	Q42: **c**	Q43: **b**	Q44: **a**	Q45: **b**
Q46: **b**	Q47: **b**	Q48: **c**	Q49: **b**	Q50: **b**

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