Soil Science Reviewer Based On TOS (Module E: Soil Survey and Soil Classification)

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1. When applying Hans Jenny's fundamental equation of soil formation, which combination of factors provides the primary energy fluxes and biogeochemical driving forces that act upon the parent material?

a. Climate and organisms

b. Topography and time

c. Parent material and climate

d. Organisms and time

2. A researcher is studying a hillslope where soil properties vary continuously from the summit to the footslope due to erosion and deposition processes. This specific sequence of soils, varying primarily due to topography, is classified as what?

a. Chronosequence

b. Lithosequence

c. Biosequence

d. Catena

3. In evaluating the influence of parent material on soil formation, which transport mechanism is responsible for the deposition of colluvium?

a. Flowing water

b. Wind currents

c. Gravitational forces

d. Glacial ice movement

4. How does the effective precipitation factor differ from total precipitation when controlling soil formation?

a. It only accounts for precipitation that falls during the growing season.

b. It represents the portion of water that actually penetrates the soil profile and drives leaching.

c. It calculates precipitation minus the volume of water stored in plant tissues.

d. It measures the water that runs off the surface without infiltrating the soil.

5. A soil scientist observes a sequence of river terraces where the parent material and climate are identical, but the soils on the higher terraces are highly weathered while those on the lowest terrace show minimal profile development. This landscape represents which pedogenic concept?

a. Climosequence

b. Toposequence

c. Chronosequence

d. Lithosequence

6. Which of the following is a primary advantage of conducting a comprehensive soil survey prior to implementing a large-scale agricultural development project?

a. It eliminates the need for future fertilizer applications.

b. It predicts the inherent capability and limitations of the land for specific uses.

c. It alters the genetic potential of the crops to be planted.

d. It permanently stabilizes the soil moisture regime of the region.

7. A mapping crew encounters a landscape where two distinct soil series are so intricately intermingled that they cannot be delineated separately at a mapping scale of 1:24,000. Which soil mapping unit is most appropriate to describe this area?

a. Soil consociation

b. Soil association

c. Soil complex

d. Undifferentiated group

8. For the purpose of intensive, site-specific farm management and precision agriculture, which map scale is most suitable for publishing the resulting detailed soil survey?

a. 1:1,000,000

b. 1:250,000

c. 1:100,000

d. 1:10,000

9. When planning land use using soil survey data, an undifferentiated group is mapped when two or more soil taxa are grouped together. What is the primary justification for utilizing this specific mapping unit?

a. The soils are practically impossible to distinguish in the field.

b. The soils have similar management requirements and behave similarly for the anticipated land use.

c. The mapper did not have adequate time to separate the distinct soil types.

d. The soils occur in a highly intricate, repeating pattern that prohibits separation.

10. Which major feature sets the USDA Soil Taxonomy apart from earlier pedological classification systems, such as the 1938 classification?

a. It classifies soils strictly based on the prevailing climatic zone.

b. It relies exclusively on the presumed genesis of the soil.

c. It utilizes quantitatively defined diagnostic horizons with specific measurable criteria.

d. It categorizes soils based solely on their geographic location.

11. In the structural hierarchy of the USDA Soil Taxonomy, which category utilizes particle-size class, mineralogy class, and soil temperature regime as primary differentiating characteristics?

a. Great Group

b. Subgroup

c. Family

d. Series

12. An agronomist analyzes a dark-colored surface horizon that is 30 centimeters thick, contains 2 percent organic carbon, and exhibits a base saturation of 35 percent. Based on these parameters, which diagnostic epipedon is present?

a. Mollic

b. Umbric

c. Ochric

d. Melanic

13. A diagnostic subsurface horizon is characterized by a significant illuvial accumulation of silicate clays. In Soil Taxonomy, this horizon is identified as what?

a. Cambic horizon

b. Spodic horizon

c. Argillic horizon

d. Oxic horizon

14. When deriving the names of the soil orders in the USDA Taxonomy, the formative element -ept is utilized for soils exhibiting early stages of profile development. This formative element corresponds to which soil order?

a. Entisols

b. Inceptisols

c. Alfisols

d. Spodosols

15. Which of the following correctly illustrates the basis for naming a soil suborder?

a. It combines a formative element for a moisture or temperature regime with the formative element of the order.

b. It uses the name of a town or geographic landmark where the soil was first discovered.

c. It strings together adjectives describing the parent material and the soil order.

d. It utilizes the particle size class prefix followed by the great group name.

16. A soil order is characterized by highly weathered profiles in tropical regions, containing a diagnostic subsurface horizon rich in iron and aluminum oxides with very low cation exchange capacity. What is the formative element used for naming this order?

a. -ult

b. -ox

c. -alf

d. -and

17. If a soil is classified as a Typic Hapludalf, the term Hapludalf represents which category in the Soil Taxonomy system?

a. Suborder

b. Great Group

c. Subgroup

d. Family

18. The soil order known for deep, dark, organic-matter-rich surface horizons that formed primarily under grassland vegetation derives its name from a Latin word meaning soft. Which order is this?

a. Histosols

b. Mollisols

c. Vertisols

d. Spodosols

19. When mapping soils for an urban development project involving deep excavations, what critical information does a soil survey provide that remote sensing alone cannot?

a. Current surface vegetation cover

b. Broad regional drainage patterns

c. Depth to bedrock and seasonal high water table

d. General climatic conditions

20. According to the principles of Soil Taxonomy, the lowest category of classification, which represents a highly specific and narrowly defined concept grouping pedons with very similar profiles, is known as the what?

a. Soil Family

b. Soil Phase

c. Soil Series

d. Soil Consociation

21. An extension worker in a semi-arid environment is reviewing a soil profile that exhibits a subsoil horizon with a significant secondary accumulation of calcium carbonate. This feature is typical of which diagnostic endopedon?

a. Calcic horizon

b. Natric horizon

c. Gypsic horizon

d. Salic horizon

22. Which of the following describes the central concept of the Alfisol order?

a. Soils with an argillic horizon and a high to medium base saturation.

b. Soils with an argillic horizon and a very low base saturation.

c. Soils formed entirely of decomposed organic materials.

d. Soils with a spodic horizon formed under coniferous forests.

23. In determining the soil moisture regime for classifying a suborder, which regime describes a soil that is dry in all parts for 45 or more consecutive days following the summer solstice, typical of Mediterranean climates?

a. Udic

b. Ustic

c. Xeric

d. Aridic

24. When analyzing the influence of organisms on soil formation, how does coniferous forest vegetation primarily differentiate soil development compared to deciduous forest vegetation?

a. Coniferous vegetation accelerates base cycling, raising the soil pH.

b. Coniferous vegetation produces acidic litter that promotes rapid leaching and podzolization.

c. Coniferous vegetation limits root depth, preventing the formation of an argillic horizon.

d. Coniferous vegetation fixes atmospheric nitrogen, rapidly transforming the soil into a Mollisol.

25. In the derivation of the soil orders, the order characterized by a high content of swelling-type clays that exhibit deep cracking during dry seasons derives its name from the Latin verto, meaning to turn. Which formative element denotes this order?

a. -and

b. -ert

c. -ent

d. -ept

26. A diagnostic surface horizon that is too thin, too light in color, or too low in organic carbon to be mollic or umbric is classified as what type of epipedon?

a. Histic

b. Melanic

c. Anthropic

d. Ochric

27. Which soil order is characterized by having virtually no diagnostic subsurface horizons, representing the youngest stage of soil development on recent geological deposits?

a. Inceptisols

b. Entisols

c. Aridisols

d. Andisols

28. During a reconnaissance soil survey, mapping units are generally established at a broader scale. Which of the following best describes the primary utility of a reconnaissance soil survey?

a. Designing site-specific variable rate fertilizer applications.

b. Determining exact property tax assessments for small farm parcels.

c. Regional land use planning and identifying areas suitable for broad agricultural expansion.

d. Locating exact placement for residential septic drain fields.

29. A researcher is examining the naming convention of a subgroup classified as an Aquic Paleudult. What does the adjective Aquic signify in this classification?

a. It represents the central concept of the great group.

b. It indicates an intergrade to soils that are wetter than the central concept.

c. It signifies that the soil is formed predominantly from volcanic ash.

d. It identifies the soil as having an aridic moisture regime.

30. Which fundamental principle differentiates an Ultisol from an Alfisol in the USDA Soil Taxonomy system?

a. Ultisols lack an argillic horizon entirely.

b. Ultisols have a mollic epipedon while Alfisols have an ochric epipedon.

c. Ultisols have a base saturation of less than 35 percent at a specified depth, while Alfisols have a higher base saturation.

d. Ultisols form exclusively in arid environments.

31. In evaluating the formation of Spodosols, which pedogenic process is most responsible for the translocation of organic matter and sesquioxides into the diagnostic subsurface horizon?

a. Gleization

b. Podzolization

c. Calcification

d. Salinization

32. A farmer operates on a landscape mapped as a soil consociation. What is the expectation regarding the purity of this specific mapping unit?

a. The mapped area consists of at least 50% of the named soil, and dissimilar inclusions are generally less than 15%.

b. The mapped area contains exactly equal proportions of three different soil series.

c. The mapped area is guaranteed to be 100% pure with no inclusions of any other soil types.

d. The mapping unit represents a landscape where soil properties are entirely random.

33. How did the developers of Soil Taxonomy derive the names for the ten original soil orders to ensure international applicability?

a. By utilizing descriptive phrases strictly in English.

b. By combining syllables derived predominantly from Latin and Greek roots.

c. By naming them after the prominent scientists who discovered them.

d. By utilizing localized agronomic terms from various indigenous languages.

34. A soil profile in a wetland area consists almost entirely of partially decomposed plant materials accumulating faster than they decay. Under which order will this soil be classified?

a. Histosols

b. Andisols

c. Gelisols

d. Vertisols

35. What is the primary role of ground truthing during the execution of a soil survey utilizing satellite imagery?

a. To physically calibrate the satellite sensors in space.

b. To verify that the spectral signatures on the imagery correctly correlate with actual field soil properties.

c. To apply fertilizers to test the spectral response of crops.

d. To map the topography using traditional surveying transits.

36. Which diagnostic subsurface horizon is characterized by an accumulation of silicate clay and a high exchangeable sodium percentage (greater than 15 percent), commonly exhibiting columnar structure?

a. Argillic

b. Kandic

c. Natric

d. Spodic

37. In a climosequence study across a massive continent, how does the depth to a calcic horizon generally respond to an increase in mean annual precipitation?

a. The depth to the calcic horizon decreases.

b. The calcic horizon forms directly at the surface.

c. The depth to the calcic horizon increases as carbonates are leached deeper into the profile.

d. The depth remains constant regardless of precipitation.

38. A diagnostic epipedon is dark-colored, very high in organic matter, saturated with water for 30 consecutive days or more during the year, and is relatively thin compared to deep peat deposits. What is this epipedon?

a. Histic

b. Mollic

c. Plaggen

d. Melanic

39. The formative element -od is utilized to denote the order of soils characterized by illuvial accumulations of amorphous mixtures of organic matter and aluminum. What is the name of this order?

a. Mollisol

b. Spodosol

c. Aridisol

d. Inceptisol

40. When assessing the influence of time on soil formation, which of the following best describes an old soil in pedological terms?

a. A soil deposited merely 1,000 years ago.

b. A soil exhibiting a lack of B horizon development.

c. A soil showing advanced weathering, deep leaching of bases, and expression of a prominent oxic or argillic horizon.

d. A soil located at the summit of a recently formed volcanic cone.

41. To differentiate soil temperatures at the Family category level, a soil with a mean annual temperature of 15 degrees Celsius or higher, but lower than 22 degrees Celsius, is classified under which temperature regime?

a. Cryic

b. Mesic

c. Thermic

d. Hyperthermic

42. Which inherent advantage does a soil survey map provide to agricultural engineers planning a subsurface tile drainage system?

a. It determines the precise economic cost of the plastic tiles.

b. It identifies spatial variations in soil texture, depth to restrictive layers, and natural drainage classes.

c. It predicts the exact yield of the crop post-installation.

d. It maps the genetic variations of the weeds present in the field.

43. In the context of soil classification, a Cambic horizon is a weakly developed diagnostic subsurface horizon. It is the defining feature of which classic soil order?

a. Entisols

b. Inceptisols

c. Oxisols

d. Histosols

44. A soil profile is examined in a desert ecosystem. It exhibits an ochric epipedon and a subsurface horizon of gypsum accumulation. Under the classic ten-order taxonomy system, this soil is classified as a what?

a. Aridisol

b. Vertisol

c. Mollisol

d. Alfisol

45. Which of the following elements is explicitly excluded from being a defining factor in forming a Soil Series, despite its importance in the broader taxonomic categories?

a. Arrangement and thickness of horizons

b. Color and structure of horizons

c. Specific geographic location name where it was first mapped

d. Mineralogy of the parent material

46. A land capability classification system derived from soil survey data typically assigns land to different classes. In standard systems, Class I land signifies what?

a. Land with severe limitations requiring extreme conservation practices.

b. Land suitable only for wildlife habitat or recreation.

c. Land with few limitations that restrict its use for cultivated crops.

d. Land that is permanently inundated with water.

47. The names of the six categories in Soil Taxonomy follow a specific structural logic. Which sequence correctly represents the categories from the most general to the most specific?

a. Order, Great Group, Suborder, Family, Subgroup, Series

b. Order, Suborder, Great Group, Subgroup, Family, Series

c. Series, Family, Subgroup, Great Group, Suborder, Order

d. Order, Suborder, Subgroup, Great Group, Series, Family

48. In deriving the order name Mollisol, what pedogenic characteristic does the prefix denote?

a. The presence of deep, wide cracks.

b. The soft, friable nature of the dark, organic-rich surface horizon.

c. The highly weathered nature of the mineral fraction.

d. The presence of an argillic subsurface horizon.

49. A soil taxonomist identifies a pedon as a Fine, smectitic, thermic Typic Haplustert. What information does the term Fine convey at the Family level?

a. The predominant clay mineralogy

b. The mean annual soil temperature

c. The particle-size class of the control section

d. The moisture regime of the subgroup

50. When assessing topography as a factor of soil formation, how does a steep backslope primarily alter the pedogenic process compared to a level summit?

a. It accelerates illuviation rates due to increased water ponding.

b. It significantly increases the rate of organic matter accumulation.

c. It enhances surface runoff and erosion, typically resulting in a shallower, less developed soil profile.

d. It promotes rapid formation of a calcic horizon.

Detailed Answer Key

Q#	Ans	Q#	Ans	Q#	Ans	Q#	Ans	Q#	Ans
1	**a**	11	**c**	21	**a**	31	**b**	41	**c**
2	**d**	12	**b**	22	**a**	32	**a**	42	**b**
3	**c**	13	**c**	23	**c**	33	**b**	43	**b**
4	**b**	14	**b**	24	**b**	34	**a**	44	**a**
5	**c**	15	**a**	25	**b**	35	**b**	45	**c**
6	**b**	16	**b**	26	**d**	36	**c**	46	**c**
7	**c**	17	**b**	27	**b**	37	**c**	47	**b**
8	**d**	18	**b**	28	**c**	38	**a**	48	**b**
9	**b**	19	**c**	29	**b**	39	**b**	49	**c**
10	**c**	20	**c**	30	**c**	40	**c**	50	**c**