

NABARD Gr. A 2022 Top 25 Questions on Soil

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1. In a waterlogged soil, concentration of _____ is high.
- A. Methane B. Ethane
C. Carbon dioxide D. carbon monoxide
E. None of these

Ans. A

Solution:

Wetlands are characterized by water-logged soils and distinctive communities of plant and animal species that have evolved and adapted to the constant presence of water. This high level of water saturation as well as warm weather is the cause of the high levels of methane production.

2. Which soil occurs for the most part in regions of arid and semi -arid areas.
- A. Saline soils B. Karewas soils
C. Red Soil D. Black Soil
E. None of these

Ans. A

Solution:

Salt affected soil or saline soil are found in arid and semi-arid regions. When the soil contains excess of sodium salts and clay complex contains exchangeable calcium, the soil is known as saline soil or white alkali or brown alkali soil. The process of accumulation of salts leading to the formation of soils is known as salinization.

- Saline soils contain usually chloride, sulphate, bicarbonates and nitrates of sodium.
- The presence of chloride and sulphate of sodium gives a white colour on the soil surface. When nitrates are in excess they give a brown colour to the soil.
- Exchangeable sodium percentage (ESP) is very low, being less than 15% of the total cation exchange capacity (C.E.C.). As a consequence of low ESP, generally pH varies between 7.5 and 8.5.

- Total soluble salt content is more than 0.1%. it is high enough to interfere with normal growth of most plant species.
- Saline soils remain in a flocculated condition (granulated). It is permeable to water and air.
- Saline soils usually have a surface crust of white salts, especially in the season when the net movement of soil moisture is upward. Salts dissolved in the soil water move up to the surface, where they are left as a crust when the water evaporates.

3. How does ploughing help in retaining sub-soil water?

- A. Improving the character of the sub-soil.
B. By breaking capillaries
C. Enabling the roots of plants to penetrate deeper
D. All of the above
E. None of these

Ans. D

Solution:

Ploughing helps in retaining sub-soil water by breaking capillaries which enables the roots of plants to penetrate deeper in search of nutrients thereby improving the character of sub-soil.

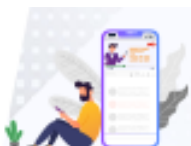
4. What is the estimated extent of salt affected soils in India?

- A. More than 7 less than 8
B. More than 8 less than 9
C. More than 6 less than 7
D. More than 5 less than 6
E. None of these

Ans. C

Solution:

According to report the estimated extent of salt affected soils in India is approx. 6.72 million hectares. Out of which 1.71 million ha is saline soil and 1.24 million ha is coastal salinity.



Extent and distribution of salt affected soils in India

Sr. No.	State	Saline soils (ha)	Alkali soils (ha)	Coastal saline soil (ha)	Total (ha)
1	Andhra Pradesh	0	196609	77598	274207
2	A & N islands	0	0	77000	77000
3	Bihar	47301	105852	0	153153
4	Gujarat	1218255	541430	462315	2222000
5	Haryana	49157	183399	0	232556
6	J & K*	0	17500	0	17500
7	Karnataka	1307	148136	586	150029
8	Kerala	0	0	20000	20000
9	Maharashtra	177093	422670	6996	606759
10	Madhya Pradesh	0	139720	0	139720
11	Orissa	0	0	147138	147138
12	Punjab	0	151717	0	151717
13	Rajasthan	195571	179371	0	374942
14	Tamil Nadu	0	354784	13231	368015
15	Uttar Pradesh	21989	1346971	0	1368960
16	West Bengal	0	0	441272	441272
	Total	1710673	3768159	1246136	6744968

5. Hydraulic conductivity of soil depends on
- Property of porous medium only
 - Void ratio of soil
 - Property of Porous medium and fluid
 - Both B and C
 - None of these

Ans. D

Solution:

Hydraulic conductivity, symbolically represented as, is a property of vascular plants, soils and rocks, that describes the ease with which a fluid (usually water) can move through pore spaces or fractures.

6. The process of removing soluble constituents from the soil layer by action of percolating water is known as:
- Diffusion
 - Percolation
 - Leaching
 - Infiltration
 - None of these

Ans. C

Solution:

Leaching refers to the depletion of soluble materials from the upper soil by downward-percolating water.

7. Which one of the following statements best describes erosion?
- the process by which weathered rock and mineral particles are removed from one area and transported elsewhere

- movement of weathered rock and regolith toward the base of a slope
- disintegration and decomposition of rocks and minerals at the surface
- the combined processes of leaching, eluviation, and mass wasting
- None of the above

Ans. A

Solution:

1. Soil erosion is a naturally occurring process that affects all landforms. In agriculture, soil erosion refers to the wearing away of a field's topsoil by the natural physical forces of water and wind through forces associated with farming activities such as tillage.

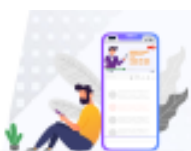
2. Erosion, whether it is by water, wind or tillage, involves three distinct actions – soil detachment, movement and deposition. Topsoil, which is high in organic matter, fertility and soil life, is relocated elsewhere "on-site" where it builds up over time or is carried "off-site" where it fills in drainage channels. Soil erosion reduces cropland productivity and contributes to the pollution of adjacent watercourses, wetlands and lakes.

8. Sum of specific yield and specific retention is equal to the
- Porosity
 - Void ratio
 - Degree of saturation
 - Storage coefficient
 - None of these.

Ans. A

Solution:

- Porosity-The amount of pore space is known as porosity.
- Specific yield-The actual volume of water that can be extracted by the force of gravity from a unit volume is known as specific yield.
- Specific retention- The fraction of water held back is known as specific retention.
- Thus, Porosity = specific yield + specific retention



9. The drainable porosity of soil is important parameter for designing
- Surface drainage system
 - Surface irrigation system
 - Drip irrigation system
 - Sub-surface drainage system
 - All of the above

Ans. D

Solution:

The drainable porosity is one of the most important parameters for sub-surface drainage design. At present time in most drainage formulas the specific yield is taken to be a constant value. As the existing concepts of specific yield differ greatly, the methods for estimating this parameter also vary.

10. Permeability is measure of
- Available soil moisture
 - Porosity
 - Water holding and transmitting capacity
 - Ability to transmit water
 - None of these

Ans. D

Solution:

Soil permeability is the property of the soil to transmit water and air and is one of the most important qualities

11. A soil is characterised as Group C soil if it has: -
- Very low infiltration rate
 - Low infiltration rate
 - Moderate infiltration rate
 - High infiltration rate
 - None of these

Ans. B

Solution:

Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. Where A's generally have the smallest runoff potential and Ds the greatest.

• **Group A** is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

• **Group B** is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and consists chiefly or moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.

• **Group C** soils are sandy clay loam. They have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.

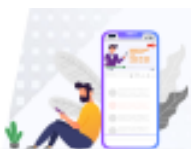
• **Group D** soils are clay loam, silty clay loam, sandy clay, silty clay or clay. This HSG has the highest runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high-water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

12. The main cause of sheet erosion is
- Raindrop splash
 - Strong winds
 - Tillage
 - Cultivation of cereal crops
 - None of these

Ans. A

Solution:

Rainfall and the surface run-off which may result from rainfall, produces four main types of soil erosion: splash erosion, sheet erosion, rill erosion, and gully erosion. Splash erosion is generally seen as the first and least severe stage in the soil erosion process, which is followed by sheet erosion, then rill erosion and finally gully erosion (the most severe of the four). Sheet erosion is the transport of loosened soil particles by overland flow.



13. Consider the following statement about badlands/ravines
- I. They are formed because of rill erosion.
 - II. In India, ravines are found in Chambal region.
 - III. Badlands are fit for the cultivation of crops.
- A. Only I B. Only II
C. Both I and II D. Both II and III
E. All of the above

Ans. C

Solution:

Badlands are a type of dry terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water. Badlands are partially characterized by their thin to nonexistent regolith layers. The regolith profiles of badlands in arid climates are likely to resemble one another. In these regions, the upper layer is typically composed of silt, shale, and sand (a byproduct of the weathered shale). The formation of badlands is a result of two processes: deposition and erosion. The process of deposition describes the accumulation, over time, of layers of mineral material. Different environments such as seas, rivers, or tropical zones, deposit different sorts of clays, silts, and sand.

14. Soil erosion is three phase phenomena:
- I. Detachments
 - II. Transportation
 - III. Deposition
- A. Only I B. Only II
C. Both I and III D. All of the above
E. None of these.

Ans. D

Solution:

Soil erosion is three phase phenomena, consisting of the detachment of individual soil particles from the soil mass and their transport by erosive agents such as running water and wind. When sufficient energy is no longer available with the

erosive agents to transport the particles, then the third phase called as 'deposition' takes place. Thus, soil erosion may be defined as detachment, transportation and deposition of soil particles from one place to another under the influence of wind, water or gravity forces.

15. Gully erosion is the:
- A. First stage of soil erosion
 - B. Last stage of soil erosion
 - C. It is the third stage of soil erosion
 - D. It is the second stage of soil erosion
 - E. None of these.

Ans. B

Solution:

Rainfall and the surface run-off which may result from rainfall, produces four main types of soil erosion: splash erosion, sheet erosion, rill erosion, and gully erosion.

16. The sequence of soil erosion is
- A. Splash, Sheet, Rill, Gully
 - B. Sheet, Splash, Gully, Rill
 - C. Sheet, Gully, Rill
 - D. Gully, Rill, Splash, Sheet
 - E. None of these

Ans. A

Solution:

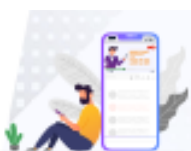
Rainfall and the surface run-off which may result from rainfall, produces four main types of soil erosion: splash erosion, sheet erosion, rill erosion, and gully erosion.

17. The ideal/preferred ratio of primary nutrient NPK in Soil for our country is
- A. 4:2:1. B. 2:4:1
 - C. 6:3:1 D. 2:2:1
 - E. 1:1:1

Ans. A

Solution:

The existing Nitrogen - Phosphorous - Potassium (NPK) consumption ratio in the country is skewed at 8.2:3.2:1 (2012-13) as against the preferred ratio of 4:2:1. A great variability is observed in fertilizer



consumption among States from 250 kg / hectare (ha) in Punjab, 212 kg / ha in Bihar, 207 kg / ha in Haryana to 4.8 kg / ha in Nagaland and 2 kg / ha in Arunachal Pradesh, during 2012-13. However, imbalanced application of fertilizers has caused deficiency of primary nutrients (i.e. NPK), secondary nutrients (such as Sulphur), and micronutrients (boron, zinc, copper etc.), in most parts of country.

18. Percolation rate of water is the least in
- Sandy Soil
 - Clayey Soil
 - Loamy Soil
 - All of the above
 - None of these

Ans. B

Solution:

Soil acts as a sponge to take up and retain water. Movement of water into soil is called infiltration, and the downward movement of water within the soil is called percolation, permeability or hydraulic conductivity. Pore space in soil is the conduit that allows water to infiltrate and percolate. It also serves as the storage compartment for water. Percolation rate (mL/min) = Amount of water in mL/Time taken to percolate. The percolation rate of water in sandy soil is fastest and in clayey soil is slowest.

19. Soil Horizon can be defined as
- A factor influencing how soil is formed
 - A layer parallel to soil surface
 - An organism found within the soil
 - A technique used to map soils
 - None of these

Ans. B

Solution:

A **soil horizon** is a layer parallel to the **soil** surface, whose physical characteristics differ from the layers above and beneath. Each **soil** type usually has three or four **horizons**. **Horizons** are defined in most cases by obvious physical features, chiefly colour and texture.

20. Why is organic matter (humus) an important part of soil?
- It helps to improve water infiltration
 - It can break down organic pollutants
 - It converts nitrogen in the air into nitrates used by plants
 - It is rich in nutrients, which is important for fertility
 - None of the above

Ans. D

Solution:

Humus significantly affects the bulk density of soil and contributes to its retention of moisture and nutrients. Humus is the dark organic matter that forms in soil when dead plant and animal matter decays. Humus has many nutrients that improve the health of soil and fertility.

21. Which of the following is NOT a common reason why soil maps are used?
- To determine the land drainage capabilities of an area
 - To determine the suitability of soils for particular crops
 - To identify soils and their properties
- Only I
 - Only II
 - Both I and II
 - Both II and III
 - All of the above

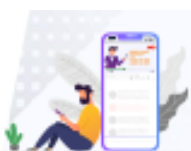
Ans. E

Solution:

Soil mapping or soil maps are generally used to simply identify soils and their properties, but are sometimes required for more specific purposes, such as determining the suitability of a soil for particular crops, or the land drainage capabilities of an area.

22. Which of the following is NOT a threat commonly faced by soils?
- Soil erosion
 - Percolation
 - Deforestation
 - Climate change
 - None of the above

Ans. B



Solution:

Percolation is the process of a liquid slowly passing through a filter. It's how coffee is usually made. **Percolation** comes from the Latin word percolare, which means "to strain through." **Percolation** happens when liquid is strained through a filter, like when someone makes coffee.

23. Which of the following is the part of Micro-Nutrient?

- A. Calcium
- B. Nitrogen
- C. Magnesium
- D. Zinc
- E. None of the above

Ans. D

Solution:

Zinc is the part of Micronutrients.

Major Nutrients

- pH (Soil Reaction; acidity / alkalinity of the soil)
- Total Dissolved salts
- Organic Carbon
- Phosphorous
- Potash

Minor Nutrients

- Sulphur
- Magnesium
- Calcium

Micro-nutrients

- Zinc
- Ferrous
- Manganese
- Copper

24. When you travel to Tamil Nadu, you will notice red soil. What is the main reason for this colour?

- A. Abundance of magnesium
- B. Accumulated humus
- C. Presence of ferric oxides
- D. Abundance of Phosphates
- E. None of these

Ans. C

Solution:

The red colour is mainly due to ferric oxides occurring as thin coatings on the soil particles while the iron oxide occurs as hematite or as hydrous ferric oxide, the colour is red and when it occurs in the hydrate form as limonite the soil gets a yellow colour.

25. Which of the following affects both the kind of soil and its rate of formation?

- A. climate (precipitation and temperature)
- B. slope angle and direction
- C. biota (plants and animals)
- D. parent material
- E. All of the above

Ans. E

Solution:

All soils initially come from rocks, this is termed the 'parent material'. The Parent Material may be directly below the soil, or great distances away if wind, water or glaciers have transported the soil. In addition to the soil parent material, soil formation is also dependent upon other prevailing processes affecting soil formation. The soil formation process is termed 'pedogenesis'. Climatic conditions are important factors affecting both the form and rate of physical and chemical weathering of the parent material. The formation of soils can be seen as a combination of the products of weathering, of structural development of the soil, of differentiation of that structure into horizons or layers, and lastly of its movement or translocation. In fact, there are many ways in which soil may be transported away from the location where it was first formed.

