Chapter 9. Soil

Very Short Q&A:

Q1: Name an important natural resource that supports growth of plants.

Ans: Soil.

Q2: Name major soil pollutants.

Ans: Polythene bags, plastics, waste products, chemicals and pesticides.

Q3: Waste products and chemicals should be treated before they are released into the soil. True/False.

Ans: The rotting dead matter in soil is called humus

Q4: Define humus.

Ans: True

Q5: What do you mean by soil profile?

Ans: A vertical section through different layers of the soil is called the soil profile.

Q6: What is soil?

Ans: Soil is the crust part of the earth. It is mainly the mixture of rock particles and humus.

Q7: Name the process by which soil is formed.

Ans: Weathering

Q8: Each layer of soil differs in feel (texture), colour, depth and _____.

Ans: Chemical composition.

Q9: Loamy soil It is a mixture of

a. sand
b. soil

c. silt
d. All of the above

Ans: All of the above.

Q10: Loamy soil also contains humus, and is, therefore, considered the best for the growth of plants. True/ False

Ans: True

Q11: Name the soil with highest water absorption rate.

Ans: Sandy soil.

Q12: Name the soil having very less space between particles.

Ans: Clayey soil

Q13: Clay soils are heavy and hold more _____.

Ans: Water

Q14: Ram hast to grow wheat crop in his field, what kind of soil he will prefer?

Ans: Clayey soil

Q15: Deforestation causes

a. Rainfall
b. Water pollution
c. Soil erosion
d. None of these.

Ans: Soil erosion

Q16: Name some places with severe soil erosion.

Ans: Areas of little or no surface vegetation, such as deserts and barren lands.

Q17: Classify soil on the basis of appearance and properties of particles.

Ans: Sandy soil, Clay soil and Loamy soil

Q18: State on property of sandy soil.

Ans: Sandy soils are light, well aerated and dry.

Q19: State on property of loamy soil.

Ans: It is a mixture of sand, soil and silt. And also contain humus.

Q20: State on property of clayey soil.

Ans: It is made of a relatively high proportion of fine particles.

Q21: What is deforestation?

Ans: Clearing or Removal of forests or stands of trees.

Q22: In addition to rock particles, the soil contains

a. Air and water
b. Minerals
c. Minerals, organic matter air and water
d. Organic matter

Ans: Minerals, organic matter air and water

Q23: The water holding capacity is highest in

a. clayey soil
b. Loamy soil
c. Sandy soil
d. None of these

Ans: Clayey soil.

Q24: Name the soil horizon which contains humus.

Ans: A- Horizon

Q25: Upper layer of soil is _____ in colour.

Ans: Dark

Q26: Middle layer of soil contains less amount of _____.

Ans: Humus

Q27: Why is uppermost layer of soil, dark in colour?

Ans: Because it is rich in humus and minerals.

Q28: Suggest an alternative of chemical fertilizer.

Ans: Manures

Q29: Acid rain causes soil pollution or not?

Ans: Yes

Q30: We can prevent soil erosion by:

a. Using step farming in hill regions
b. Afforestation
c. Avoiding overgrazing of grass lands
d. All of these

Ans: All of these

Q31: Plastics and poly bags should get mixed in soil. True/False

Ans: False

Q32: Humus is important for soil fertility. True/False

Ans: True

Q33: If the amount of large and fine particles is about the same, then soil is called _____.

Ans: Loamy

Q34: What is bedrock?

Ans: After the C- horizon, there lies bedrock which is hard and difficult to dig with a spade.

Q35: Name the layer of soil having lesser amount of humus but more of minerals.

Ans: B- horizon.

Q36: What kind of soil is used for making matkas and toys?

Ans: Clay soil

Q37: Give the formulae for percolation rate.

Ans: Percolation rate= amount of water (mL)/ Percolation time (min)

Short Q&A:

Q1: Explain soil and factors affecting soil.

Ans: Soil is the crust part of the earth. It is mainly the mixture of rock particles and humus. Wind, rainfall, temperature, light and humidity are the factors which affect the soil profile and bring changes in the soil structure.

Q2: Define the following:

a. Soil profile
b. Horizon

Ans:

a. A vertical section through different layers of the soil is called the soil profile.
b. Each layer of soil differs in feel (texture), colour, depth and chemical composition. These layers are called horizons.

Q3: Soil is one of the most important natural resources. Explain

Ans: Soil is one of the most important natural resources because

- It supports the growth of plants by holding the roots firmly and supplying water and nutrients.
- It is the home for many organisms.
- Soil is essential for agriculture. Agriculture provides food, clothing and shelter for all.
- Soil is thus an inseparable part of our life.

Q4: Describe the different layers in soil profile.

Ans: Different layers of the soil are referred to as horizons.

- The uppermost layer, the top soil, also known as A-horizon is generally dark in colour and fertile as it is rich in humus and minerals. This layer is generally soft, porous and can retain more water. This provides shelter for many living organisms such as

worms, rodents, moles and beetles. The roots of small plants are embedded entirely in the topsoil.

- The next layer, middle layer called B-horizon has a lesser amount of humus but more of minerals. This layer is generally harder and more compact.
- The third layer is the C-horizon which is made up of small lumps of rocks with cracks and crevices.
- Below this layer is the bedrock, which is hard and difficult to dig with a spade. Water can be held in the tiny gaps.

Q5: Explain humus and its importance.

Ans: A non-living organic matter formed from remains of dead and decay plants and animal by the activity of microorganism present in soil. Humus controls and regulates many soil functions, as well as plant growth. The better the humus content in the soil the healthier and more productive soil will be. Good humus count in soil will hold soil moisture longer, thus lesser water is required for crop production, also god humus count reduces wind erosion of soil.

Q6: How soil is formed?

Ans: The soil is formed by the breaking down of rocks by the action of wind, water and climate. This process is called weathering. There are two different types of weathering. Physical weathering and chemical weathering. Mechanical (physical) weathering is the breakdown of rock into smaller particles due to such factors as freezing and thawing, release of pressure, water absorption, salt crystal formation, land mass uplift, expansion and contraction from the sun or fire, plant root growth, actions of animals, abrasion, or other means that do not directly affect the rock's chemistry.Chemical weathering is the dissolution, carbonation, oxidation, or hydrolysis of rock and mineral by chemical means only, mostly from reactions with water or the acids contained in rainwater. Other materials are formed in the process. Warm, tropical climates are ideal environments for chemical weathering to take place as the chemical reactions are quickened by the bountiful rain and warm temperatures.

Q7: Why is top soil known as the habitat of many living organisms?

Ans: Soil is the habitat for many living organisms, like bacteria, fungi, protozoan and earthworms as it contains large amounts of nutrients. Therefore top soil is called the habitat of many living organisms.

Q8: Why Upper most layers in a soil profile are considered as most productive?

Ans: In the soil profile, Horizon – A, also known as Topsoil is best suited for the plant growth. As we know that availability of nutrients and water in soil helps to determine the

productivity of soil. Top soil is rich in humus minerals along with water. Thus, Top soil is considered as more productive.

Q9: What is physical weathering?

Ans: Physical weathering is the breakdown of rock into smaller particles due to factors such as freezing and thawing, release of pressure, water absorption, salt crystal formation, land mass uplift, expansion and contraction from the sun or fire, plant root growth, actions of animals, abrasion, or other means that do not directly affect the rock's chemistry. It is also called mechanical weathering.

Q10: What is chemical weathering?

Ans: Chemical weathering is the dissolution, carbonation, oxidation, or hydrolysis of rock and mineral by chemical means only, mostly from reactions with water or the acids contained in rainwater. Other materials are formed in the process. Warm, tropical climates are ideal environments for chemical weathering to take place as the chemical reactions are quickened by the bountiful rain and warm temperatures.

Q11: What is the similarity between physical and chemical weathering.

Ans: They both reduce the size of a rock body.

Q12: State the factors on which nature of soil depends?

Ans: The nature of any soil depends upon the rocks from which it has been formed and the type of vegetation that grows in it.

Q13: Classify soil on the basis of the proportion of particles of various sizes.

Ans:

- If soil contains greater proportion of big particles it is called sandy soil.
- If the proportion of fine particles is relatively higher, then it is called clayey soil.
- If the amount of large and fine particles is about the same, then the soil is called loamy.

Thus, the soil can be classified as sandy, clayey and loamy

Q14: Plants help the development of the soil. How?

Ans: The plants attract animals, and when the animals die, their bodies decay. Decaying matter makes the soil thick and rich. This continues until the soil is fully formed. The soil then supports many different plants.

Q15: Soil particles size is an important factor to determine the property of soil. Explain.

Ans: Different particles of soil have different sizes which affect its properties like:

- Sand particles are quite large and having large spaces between them. These spaces are filled with air. Water can drain quickly through these spaces. So, sandy soils tend to be light, well aerated and rather dry.
- Clay particles, being much smaller, pack tightly together, leaving little space for air. So, clay soils have little air. But they are heavy as they hold more water than the sandy soils.
- Loamy soil is a mixture of sand, clay and another type of soil particle known as silt. The size of the silt particles is between those of sand and clay. The loamy soil also has humus in it. It has the good water holding capacity for the growth of plants.

Q16: Define a. loamy soil b. sandy soil

Ans:

a. Loamy soil is a mixture of sand, clay and another type of soil particle known as silt. The size of the silt particles is between those of sand and clay. The loamy soil also has humus in it. It has the good water holding capacity for the growth of plants
b. If soil contains greater proportion of big particles it is called sandy soil.in sandy soil Sand particles are quite large and having large spaces between them. These spaces are filled with air. Water can drain quickly through these spaces. So, sandy soils tend to be light, well aerated and rather dry.

Q17: Why loamy soil is known as best for growing plants?

Ans: The loamy soil has large amount of humus mixed in it. It has the right water holding capacity for the growth of plants. So loamy soil is known as best for growing plants.

Q18: What is percolation of water? How it is different for different types of soil?

Ans: The gravity flow of groundwater through the pore spaces in rock or soil is called percolation of water. The rate of absorption is different for different types of soils. This phenomenon of absorption of water by soil is termed as percolation.Percolation rate of water is different in different types of soil. It is highest in the sandy soil and least in the clayey soil. The rate of absorption of a soil depends on its composition. Percolation rate= amount of water (mL)/ Percolation time (min)

Q19: Explain silt

Ans: Silt is the soil present as deposits in riverbeds. It is formed by the weathering of rocks in the mountains and flows into the rivers. It is a component of loamy soil which is considered most suitable for growth of plants.

Q20: Explain the factors that help us to determine the various types of vegetation and crops that might grow in any region.

Ans: The factors that help us to determine the various types of vegetation and crops that might grow in any region are type of climate and component of soil.

Q21: State the main agents of weathering.

Ans: The main agents of weathering are:-

1. Temperature: Temperature changes that cause the rock surface to break apart
2. Frost: Ice expands and produces pressure, causing the crevices in rock to open
3. Air: Wind blow across rock surface and carry minute particle and form layer
4. Water: - Continuous movement of rain water causes braking down of rock particles into fine particles
5. Living organism: - Lichen grow on the surface of rocks and produce acid which corrode the rocky surface .Weathering by living organism is called biological weathering.

Q22: What are the causes of soil erosion?

Ans: Soil erosion is mainly caused by rain, wind, flooding, overgrazing, and deforestation. Erosion of soil is more severe in areas of little or no surface vegetation, such as desert or bare lands

Q23: State some ways to prevent soil erosion.

Ans: There are many ways to prevent soil erosion

1. By planting more trees and increasing the vegetation cover.
2. By prevented Cutting of trees and deforestation and taking efforts to increase the green areas.
3. By maintaining soil in its natural condition by using less manure or by crop rotation
4. By arranging proper irrigation

Q24: Explain red and yellow soil.

Ans: Red and yellow soils are found in areas, which receive low rainfall. They contain huge concentration of iron oxides that are responsible for giving the reddish or yellow colour.

Q25: Differentiate between alluvial soil and mountain soil.

Ans: Alluvial Soils are mainly found in the plains of northern India. These soils have low phosphorous and nitrogen content and found in the north western regions of the country but Mountain soils are considered as a significant variety of soil in the Himalayan region of the country. They are mainly found in dry and cold district in the northern region of India.

Q26: Differentiate between clayey soil and sandy soil.

Ans: Laterite soil is found in those regions which receive heavy rainfall. This soil is poor in lime content and hence it is more acidic. This soil contains least moisture content. It is basically red in colour because of the presence of iron oxides. It is more popular in the coastal regions of Ratnagiri District and Malabar. But Black Soil is black in colour due to presence of salt and large amount of humus. This soil becomes sticky when is wet. It does not contain adequate nitrogen but it contains sufficient phosphorous required for the growth of the plants. It is generally found in hilly areas.

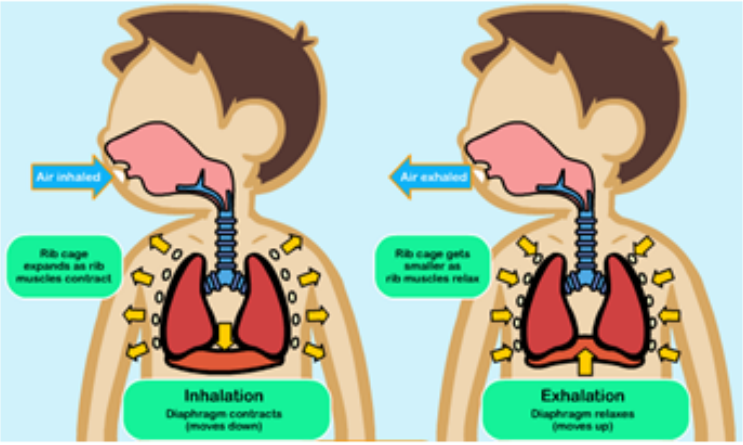
Q27: Differentiate between laterite soil and black soil.

Ans:

Clayey soil	Sandy soil
1. Higher ratio of fine particles 2. Soil retains water and becomes sticky and wet 3. Difficult to plough when wet 4. Suitable for crops like paddy, wheat and gram	1. Higher ratio of large particles 2. Loose particles, air permeate through the soil 3. It dries up easily as it cannot retain water 4. Suitable for vegetables, peanut and cotton cultivation

Q28: Sketch the cross section of soil and label the various layers.

Ans:



Q29: What is soil pollution and factors responsible for the same?

Ans:

The contamination of soil due to excess use of chemicals and harmful waste products like fertilizers, insecticides, industry waste is called soil pollution. The causes of soil pollution are as follow: Excessive use of chemicals fertilizers and pesticides Acid rain
Dumping of waste materials
Leakage of radio hazard materials
Polythene and plastics pollute soil as well as kill the organisms living in soil.

Q30: List some measure to prevent soil pollution.

Ans: Minimise use of chemical fertilizers, use manures in place of that Industrial waste should be treated before release Avoid use polythene and plastics.

Long Q&A:

Q1: Explain different types of soil found in India

Ans:

Following are the different types of soil found in India

a. Late rite Soils: This typical soil is found in those regions which receive heavy rainfall. This soil is poor in lime content and hence it is more acidic. This soil contains least moisture content.It is basically red in colour because of the presence of iron oxides. It is more popular in the coastal regions of Ratnagiri District and Malabar.

b. Black Soil: It is black in colour due to presence of salt and large amount of humus. This soil becomes sticky when is wet. It does not contain adequate nitrogen but it contains sufficient phosphorous required for the growth of the plants.It is generally found in hilly areas.
c. Red and Yellow Soils: Red and yellow soils are found in areas, which receive low rainfall. They contain huge concentration of iron oxides that are responsible for giving the reddish or yellow colour.
d. Alluvial Soils: Alluvial Soils are mainly found in the plains of northern India. These soils have low phosphorous and nitrogen content and found in the north western regions of the country
e. Mountain Soils: Mountain soils are considered as a significant variety of soil in the Himalayan region of the country. They are mainly found in dry and cold district in the northern region of India.

Q2: 2. Sonia conducted an experiment in the field related to the rate of percolation. She observed that it took 60 minutes for 360 ml of water to percolate through the soil sample, calculate the rate of percolation.

Ans:

2. Percolation rate= amount of water (mL)/ Percolation time (min)
So, Percolation rate= 360 mL / 60 min= 6 mL /min

Q3: Explain the process of weathering, its type and importance in forming soil

Ans:

The soil is formed by the breaking down of rocks by the action of wind, water and climate. This process is called weathering, it broke down soil into small pieces that get mixed with humus and form soil. There are two different types of weathering. Physical weathering and chemical weathering.Mechanical (physical) weathering is the breakdown of rock into smaller particles due to such factors as freezing and thawing, release of pressure, water absorption, salt crystal formation, land mass uplift, expansion and contraction from the sun or fire, plant root growth, actions of animals, abrasion, or other means that do not directly affect the rock's chemistry. Chemical weathering is the dissolution, carbonation, oxidation, or hydrolysis of rock and mineral by chemical means only, mostly from reactions with water or the acids contained in rainwater. Other materials are formed in the process. Warm, tropical climates are ideal environments for chemical weathering to take place as the chemical reactions are quickened by the bountiful rain and warm temperatures.