

## Soil

### In text Questions

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**1. Why is it necessary to ban the use of polythene bags and plastics?**

**Ans.** Polythene bags and plastics pollute the soil as they kill the organisms living in the soil. That is why, it is necessary to ban the use of polythene bags and plastics.

**2. Can we make toys with the soil obtained from a field?**

**Ans.** No, soil from a field cannot be used to make toys. In order to make toys, the soil should be clayey.

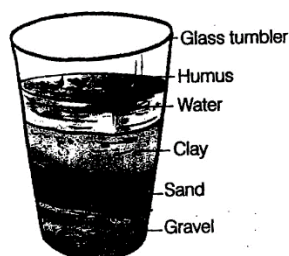
**3. Name the substances which pollute the soil.**

**Ans.** The substances which pollute the soil are polythene bags, plastics, waste products, chemicals, pesticides, etc.

**4. (a) Draw a diagram to show different layers of soil.**

**(b) Define the term humus.**

**Ans.** (a) A well labelled diagram of different layers of soil is given below:



(b) The rotting dead matter in the soil is called humus.

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**5. What kind of soil should be used for making matkas and surahis?**

**Ans.** Clayey soil is used to make matkas and surahis.

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**6. Do all the soils absorb water to the same extent?**

**Ans.** No, different types of soil has different absorbing capacity of water.

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**7. Which soil would have the highest and least percolation rate?**

**Ans.** Percolation rate of water is highest in the sandy soil. While the lowest in the clayey soil.

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**8. Which kind of soil would be most suitable for planting rice?**

**Ans.** For planting paddy (rice), clayey soil that is rich in organic matter and have a good water retaining capacity is ideal.

**9. What is the difference between rate of percolation and the amount of water retained?**

**Ans.** Percolation property of any material is linked to its porosity. Different soils have different porosity. Therefore, water percolates differently through different soil.

Percolation rate of water in the soil =  $\text{Volume of water percolated} / \text{Time taken for percolation}$

Whereas, water retaining capacity of a soil is described in terms of the amount of water absorbed by a particular type of soil. High water retaining capacity means higher water absorption.



# NCERT

## Exercises

(Questions-Solutions)

### Exercises

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1. In addition to the rock particles, the soil contains

- (a) air and water
- (b) water and plants
- (c) minerals, organic matter, air and water
- (d) water, air and plants

Ans. (c) In addition to the rock particles, the soil contains minerals, organic matter, air and water.

2. The water holding capacity is the highest in

- (a) sandy soil
- (b) clayey soil
- (c) loamy soil
- (d) mixture of sand and loam

Ans. (b) The water holding capacity is the highest in clayey soil.

3. Match the items in Column I with those in Column II.

	Column I		Column II
(a)	A home for living organisms	(i)	Large particles
(b)	Upper layer of the soil	(ii)	All kinds of soil
(c)	Sandy soil	(iii)	Dark in colour
(d)	Middle layer of the soil	(iv)	Small particles and packed tight
(e)	Clayey soil	(v)	Lesser amount of humus

Ans.

	Column I		Column II
(a)	A home for living organisms	(ii)	All kinds of soil
(b)	Upper layer of the soil	(iii)	Dark in colour
(c)	Sandy soil	(i)	Large particles
(d)	Middle layer of the soil	(v)	Lesser amount of humus
(e)	Clayey soil	(iv)	Small particles and packed tight

4. Explain how soil is formed.

Ans. Soil formation is a slow process which occurs in following two steps:

- (i) **Weathering of rocks** It is the breakdown of rocks into small particles by the action of air, wind and water.
- (ii) These small particles mix with humus (organic matter) and form soil.

5. How is clayey soil useful for crops?

**Ans.** Clayey soil has an important characteristic. It can retain water and moisture and are rich in humus. Therefore, it is suitable for growing cereals like wheat, gram and paddy.

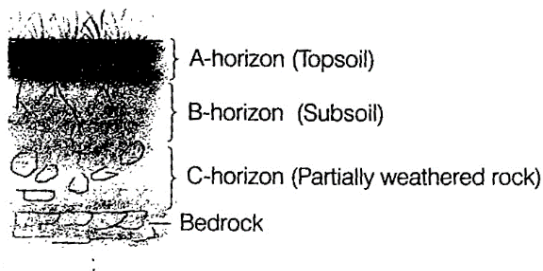
**6. List the differences between clayey soil and sandy soil.**

**Ans.** Differences between clayey and sandy soil are

Clayey soil	Sandy soil
Particles are of very small size.	Particles are of quite large size.
Particles are tightly packed together.	Particles are not closely packed.
No air is present between particles	Well aerated
It can retain water for long time	It cannot hold water
Water does not drain easily	Water drains easily
It is fertile	It is not fertile

**7. Sketch the cross-section of soil and label the various layers.**

**Ans.**



**8. Razia conducted an experiment in the field related to the rate of percolation. She observed that it took 40 min for 200 mL of water to percolate through the soil sample. Calculate the rate of percolation.**

**Ans.** Given,

Time = 40 min

Volume of water = 200 mL

Amount of water (mL)

$$\text{So, rate of percolation} = \frac{\text{Amount of water (mL)}}{\text{Percolation time (min)}}$$

$$= \frac{200}{40} = 5 \text{ mL / min}$$

Therefore, percolation rate of water

= 5 mL/min.

**9. Explain how soil pollution and soil erosion could be prevented.**

**Ans.** Prevention of soil pollution can be done by

- (i) use of manures instead of synthetic fertilisers.
- (ii) use of natural pesticides.
- (iii) avoid dumping of polythene and plastics in soil.
- (iv) industrial waste should be treated before release in soil.

Prevention of soil erosion can be done by

- (i) afforestation that is large scale planting in place of cut down forests.

- (ii) avoiding overgrazing of grasslands.
- (iii) terrace farming and other better farming methods in hilly areas.

**10. Solve the following crossword puzzle with the clues given:**

1														
		2												
													3	
		4		5										
							6							
				7										

**Across**

- 2. Plantation prevents it.
- 5. Use should be banned to avoid soil pollution.
- 6. Type of soil used for making pottery.
- 7. Living organism in the soil.

**Down**

- 1. In desert, soil erosion occurs through.
- 3. Clay and loam are suitable for cereals like.
- 4. This type of soil can hold very little water.
- 5. Collective name for layers of soil.

**Ans.**

1														
W														
I		2	R	O	S	I	O	N						
		E												
N													3	
D													W	
		4		5P	O	L	Y	T	H	E	N	E	H	
		S												
		A											A	
		N											T	
		D					6	L	A	Y				
							C							
		Y												
				7E	A	R	T	H	W	O	R	M		

**Across**

- 2. Plantation prevents it (—) Erosion
- 5. Use should be banned to avoid soil pollution (—) Polythene
- 6. Type of soil used for making pottery (—) Clay
- 7. Living organism in the soil (—) Earthworm

**Down**

1. In desert, soil erosion occurs through (—) Wind
3. Clay and loam are suitable for cereals like (—) Wheat
4. This type of soil can hold very little water (—) Sandy
5. Collective name for layers of soil (—) Profile



# NCERT

## Exemplar

(Problems-Solutions)

### Multiple Choice Questions

1. The microorganisms present in the soil require moisture (water) and nutrients for growth and survival. Choose from the options below, the habitat (place) where the soil has plenty of water and nutrients.

(a) Desert (b) Forest  
(c) Open field (d) Cricket ground

**Ans.** (b) The microorganisms present in the soil having plenty of water and nutrients are present in the habitat of forest.

2. Availability of water and minerals in the soil for maximum absorption by roots is in the

(a) B-horizon (b) C-horizon  
(c) A-horizon (d) surface of soil

**Ans.** (c) Availability of water and minerals in the soil for maximum absorption by roots is in A-horizon.

3. Soil conservation measures are mainly aimed at protecting which of the following?

(a) Plants (b) Topsoil  
(c) Subsoil (d) Soil organisms

**Ans.** (b) Soil conservation measures mainly aim at protecting topsoil which is rich in humus and nutrients making it fertile to grow plants.

4. Read the following statements with reference to soil.

(i) Weathering is a very fast process of soil formation.  
(ii) Percolation of water is faster in sandy soils.  
(iii) Loamy soil contains only sand and clay  
(iv) Topsoil contains the maximum amount of humus.

Choose the correct statements from the above.

(a) (ii) and (iv) (b) (i) and (iii)  
(c) (ii) and (iii) (d) (i) and (ii)

**Ans.** (a) Statements (ii) and (iv) are correct with reference to soil while (i) weathering is a slow process of soil formation and (iii) loamy soil consists of sand, clay and silt along with humus.

### Very Short Answer Type Questions

5. Soil has particles of different sizes. Arrange the words given below in decreasing order of their particle size.  
Rock, clay, sand, gravel, silt

**Ans.** The soil particles with the decreasing order of their particle sizes can be shown as :  
Rock > gravel > sand > silt > clay

6. The components of loamy soil are ..... and

**Ans.** The components of loamy soil are sand, silt and clay.

7. Read the following statements and give the appropriate terms for each of them.
- (a) The process of breakdown of rocks by the action of wind, water, sunlight.
  - (b) Removal of topsoil during heavy rains or strong winds.
  - (c) Accumulation of wastes in the soil generated by human activity which alter the features of soil.
  - (d) The process of movement of water into deeper layers of soil.

**Ans.** The terms for the above described statements are as follows:

- (a) Weathering
- (b) Soil erosion
- (c) Soil pollution
- (d) Percolation

8. Unscramble the following jumbled words related to soil.

- (a) S U H U M
- (b) I L O S F I P R O L E
- (c) Z O I N O R H
- (d) M O A L
- (e) G I N R H E T W E A
- (f) A T O N I E R P C L O

**Ans.** The words unscrambled to form the following words related to soil.

- (a) HUMUS,
- (b) SOIL PROFILE
- (c) HORIZON
- (d) LOAM
- (e) WEATHERING
- (f) PERCOLATION

### Short Answer Type Questions

9. How can a farmer convert acidic soil into neutral soil?

**Ans.** The farmer can convert acidic soil into neutral soil by adding a small quantity of quicklime or slaked lime solution to the soil.

10. Is it a good practice to remove grass and small plants that are growing in an open, unused field? Give reason to support your answer.

**Ans.** No, it is not a good practice to remove grass and small plants growing in an open, unused field because the plants cover the soil surface. Their roots bind the soil particles, holding and adhering them in place. It helps in preventing the topsoil from being washed off during heavy rain, floods and winds. This way, soil erosion is prevented and topsoil layer is preserved for growing more plants.

11. A man digging a pit found that he could dig with ease initially but digging became difficult as he went deeper. He could not dig beyond a depth of 5 feet. Provide a suitable scientific explanation.

**Ans.** The man digging a pit could dig with ease initially because of the presence of topsoil and subsoil (mainly comprising of humus and nutrients). But as he digs deeper, he finds it difficult to dig beyond a depth of 5 feet as lower layers is made up of small partially weathered rocks with cracks and crevices and with bedrock which makes it hard to dig.

12. Rajasthan is a desert state in India. Once while travelling to Rajasthan by train, Boojho observed several streams and rivulets of rainwater during the journey but to his surprise, he did not see streams of water in the desert region even during rains. Help Boojho find a suitable explanation for this.

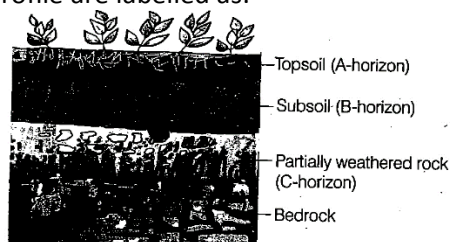
**Ans.** Deserts are made up of sand, thus when the rainwater falls on land, it percolates immediately downwards in the spaces between sand particles. So, the streams of water in desert region are not visible even during rainy season.

13. Locate the following zones given as boxed items in figure which shows a diagram of soil profile. Topsoil, subsoil, C-horizon, bedrock





**Ans.** The different layers/zones in the soil profile are labelled as:



**14.** Match the animals in Column I with their natural place of dwelling (habitat) in Column II.

	Column I		Column II
(a)	Earthworm	(i)	Sand and beaches
(b)	Garden lizard	(ii)	Burrows in soil
(c)	Crab	(iii)	Deep, narrow holes in dry soils
(d)	Rodents	(iv)	Surface of soil
(e)	Scorpion	(v)	Surface of shaded moist soils
(f)	Snails and slugs	(vi)	A-horizon of moist soils

**Ans.** The animals with their natural place of habitat are

	Column I		Column II
(a)	Earthworm	(vi)	A-horizon of moist soils
(b)	Garden lizard	(iv)	Surface of soil
(c)	Crab	(i)	Sand and beaches
(d)	Rodents	(ii)	Burrows in soil
(e)	Scorpion	(iii)	Deep, narrow holes in dry soils
(f)	Snails and slugs	(v)	Surface of shaded moist soils

### Long Answer Type Questions

**15.** Continuously water-logged soils are disadvantageous for plant growth. Why?

**Ans.** Roots, although underground, possesses living cells that require oxygen for respiration and production of energy. They absorb oxygen that is present in the spaces between soil particles. But in water-logged soils, water occupies spaces between soil particles and pushes the oxygen out into the atmosphere. Thus, roots are deprived of oxygen and this affects the plant growth.

**16. Why is soil erosion relatively less in dense forests as compared to barren, open fields?**

**Ans.** In dense forests, the tree cover (canopy) prevents rainwater from directly falling on the ground/soil. Also roots of the vegetation bind the soil particles and hold them together. As a result, soil erosion is minimized. But in barren, open fields, the soil is exposed to the falling rain. The soil particles become loose due to the impact of rain drops and the flow of water carries them away. The flowing water further erodes the soil surface aggravating erosion.

**17. Gardeners gently dig up the soil around the roots of garden herbs (plants) frequently. Give reasons.**

**Ans.** A gardener often gently digs up the soil around the roots of garden plants or herbs for following reasons:  
 (i) It enables easy root growth.  
 (ii) For easier percolation of water.  
 (iii) For aerating the soil enabling air to get into deeper layers of soil.  
 (iv) For removing the weeds.

**18. In towns and cities, generally, the borewells have to be dug very deep to get water as compared to borewells dug in villages. Give suitable reasons.**

**Ans.** The borewells have to be dug very deep to get water as compared to those in villages because  
 (i) excessive use of water depletes the groundwater.  
 (ii) towns and cities have asphalted roads and vast areas of soil are concreted. As a result, rainwater cannot percolate to recharge groundwater and the groundwater level further decrease.  
 Villages have larger areas of open soil surface and fewer asphalted roads and concrete surfaces. Thus, larger soil surface area is available for rainwater to percolate into the soil easily and recharge the groundwater. As a result, even shallow borewells yield water.

**19. Several terms related to soil are hidden in the squares given as figure, spot them and make a list. Two examples are given for you.**

G	R	P	E	L	I	F	O	R	P
W	H	U	M	U	S	S	G	M	E
E	A	B	S	R	G	A	I	G	R
A	E	T	C	G	V	N	K	N	C
T	R	H	E	G	E	D	Z	C	O
H	O	E	D	R	O	C	K	S	L
E	S	P	A	A	A	K	P	C	A
R	I	L	D	V	R	S	I	L	T
I	O	A	K	E	G	Q	M	A	I
N	N	N	T	L	S	G	H	Y	O
G	K	T	H	O	R	I	Z	O	N

**Ans.** Humus, sand, water, clay, gravel, weathering, horizon, percolation, mineral, plant, erosion, profile, silt.

G	R	P	E	L	I	F	O	R	P
W	H	U	M	U	S	S	G	M	E
E	A	B	S	R	G	A	I	G	R
A	E	T	C	G	V	N	K	N	C
T	R	H	E	G	E	D	Z	C	O
H	O	E	D	R	O	C	K	S	L
E	S	P	A	A	A	K	P	C	A
R	I	L	D	V	R	S	I	L	T
I	O	A	K	E	G	Q	M	A	I
N	N	N	T	L	S	G	H	Y	O
G	K	T	H	O	R	I	Z	O	N