



**POSTAL  
BOOK PACKAGE**

**2024**

**CONTENTS**

**CIVIL  
ENGINEERING**

**Objective Practice Sets**

## **Soil Mechanics and Foundation Engineering**

1.	Soil Types and Formations .....	2
2.	Properties of Soils .....	5
3.	Classification of Soils and Soil Structure .....	23
4.	Soil Compaction .....	29
5.	Principle of Effective Stress, Capillarity and Permeability .....	35
6.	Seepage Analysis .....	47
7.	Stress Distribution of Soil .....	53
8.	Compressibility and Consolidation .....	60
9.	Shear Strength .....	74
10.	Stability of Earth Slopes .....	89
11.	Lateral Earth Pressures and Retaining Walls .....	97
12.	Bearing Capacity and Shallow Foundations .....	108
13.	Pile Foundations .....	124
14.	Soil Stabilization and Exploration .....	134

## Soil Types and Formations

- Q.1** The soils which are formed by transportation of the weathered rock materials by the wind are called  
 (a) aeolian soils (b) marine soils  
 (c) lacustrine soils (d) alluvial soils
- Q.2** The most uniform soil deposit is  
 (a) wind-laid deposit  
 (b) delta deposit  
 (c) shore deposit  
 (d) glacial deposit
- Q.3** For engineering purposes, a soil is defined as  
 (a) a natural aggregate of mineral grains, loose or moderately cohesive, inorganic or organic in nature.  
 (b) loose mantle at the surface of the earth which favours the growth of plants.  
 (c) a disintegrated rock.  
 (d) None of the above
- Q.4** Consider the following statements:  
 1. Soils transported by gravitational forces are termed as colluvial soils  
 2. Cumulose soils are the result of the accumulation of decaying and chemically deposited vegetable matter under the conditions of excessive moisture  
 3. Loess is the wind blown silt or silty clay having little or no stratification  
 Which of these statement/s is/are correct?  
 (a) both 1 and 2 (b) only 3  
 (c) both 2 and 3 (d) 1, 2 and 3
- Q.5** Geologic cycle for the formation of soil, is:  
 (a) Upheaval → transportation → deposition → weathering  
 (b) Weathering → upheaval → transportation → deposition  
 (c) Transportation → upheaval → weathering → deposition  
 (d) Weathering → transportation → deposition → upheaval
- Q.6** The soil moisture driven off by heat, is called  
 (a) free water  
 (b) hygroscopic water  
 (c) gravity water  
 (d) none of these
- Q.7** Match **List-I** (type of soil) with **List-II** (mode of transportation and deposition) and select the correct answer using the codes given below the lists:  
**List-I**  
 A. Lacustrine soils  
 B. Alluvial soils  
 C. Aeolian soils  
 D. Marine soils  
**List-II**  
 1. Transportation by wind  
 2. Transportation by running water  
 3. Deposited at the bottom of lakes  
 4. Deposited in sea water  
**Codes:**  

	A	B	C	D
(a)	1	2	3	4
(b)	3	2	1	4
(c)	3	2	4	1
(d)	1	3	2	4
- Q.8** Consider the following statements in the context of aeolian soils:  
 1. The soil has low density and low compressibility.  
 2. The soil is deposited by wind.  
 3. The soil has large permeability.  
 Which of these statements are correct?  
 (a) 1, 2 and 3 (b) 2 and 3  
 (c) 1 and 3 (d) 1 and 2
- Q.9** Which of the following types of soil is not transported by gravitational forces?  
 1. Loess 2. Peat 3. Talus  
 (a) Only 3 (b) Both 1 and 3  
 (c) Both 1 and 2 (d) 1, 2 and 3

**Q.10** Bentonite is a material obtained due to the weathering of

- (a) limestone (b) quartzite  
(c) volcanic ash (d) shales

**Q.11** The term 'Loess' indicates those soils which are

1. uniformly graded
2. poorly graded
3. made up of 50% or more sand size particles
4. made up of more than 50% of silt particles

Which of the above statement are correct?

- (a) 1 and 3 (b) 1 and 4  
(c) 2 and 3 (d) 2 and 4

**Q.12** Lacustrine soils are soils

- (a) transported by rivers and streams  
(b) transported by glaciers  
(c) deposited in sea beds  
(d) deposited in lake beds

**Multiple Select Questions (MSQ)**

**Q.13** Consider the following statements in the context of Aeolian soils and choose the correct options.

- (a) It is formed due to transportation by wind.  
(b) It is a type of residual soil.  
(c) The soil has large permeability.  
(d) The soil has low density and low compressibility.

**Q.14** Transported soils are classified according to the transporting agency and method of deposition. Identify the true options:

- (a) Alluvial deposit: Soils that have been deposited from suspension in running water.  
(b) Lacustrine deposit: Soils that have been deposited from suspension in still, fresh water of lakes.  
(c) Marine deposit: Deposits that have been transported by ice.  
(d) Glacial deposit: Soils that have been deposited from suspension in running water.



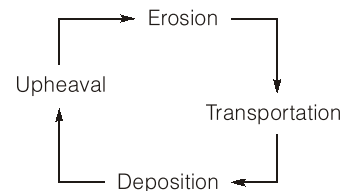
**Answers Soil Types and Formations**

1. (a) 2. (a) 3. (a) 4. (d) 5. (d) 6. (b) 7. (b) 8. (b) 9. (c) 10. (c)  
11. (b) 12. (d) 13. (a, c) 14. (a, b)

**Explanations Soil Types and Formations**

1. (a)  
**Alluvial Soil:** Soil that has been deposited by suspension in running water.  
**Lacustrine:** Soil that has been deposited from suspension in still fresh water of lakes.
2. (a)  
Wind laid deposit is the most uniform soil deposit.
3. (a)  
Soil can be defined as on natural aggregate of minerals grain, loose on moderately cohesive, inorganic or organic in nature.
5. (d)  
The process of soil formation is called pedogenesis. The process is cyclic known as geological cycle. The steps of geological cycle

are



6. (b)  
Water which is held tightly on the surface of soil colloidal particle in known as hygroscopic water.
8. (b)  
Aeolian soils have high compressibility and high permeability.
9. (c)  
Loess is a loose deposit of windblown silt that has been weakly cemented with calcium carbonate and montmorillonite.

10. (c)  
Bentonite is decomposed volcanic ash containing high percentage of clay mineral-montmorillonite.
11. (b)  
Loess are uniform grain size soil with particle size between about 0.01 to 0.05 mm. Thus they are uniformly graded soils made up of more than 50% of silt particles.
12. (d)  
Lacustrine soils are silt and clays which have been deposited in still, fresh water of lakes.
13. (a, c)  
Aeolian soil is deposited by wind. It consists of uniformly graded particles. They are in loose state so void ratio and permeability of soil is high. These soils have high compressibility and low density.
14. (a, b)  
**Marine deposit:** Soils that have been deposited from suspension in sea water.  
**Glacial deposit:** Deposits that have been transported by ice.

