

**BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY**  
**Question Bank (K-Scheme)**

**Name of Subject:** Geotechnical Engineering

**Unit Test :** I

**Subject code:** 314315

**Course :** CE

**Semester:** IV

**CHAPTER 1 (Overview of Geology and geotechnical engineering )**

**2 Marks**

- a. Define Geology and state its branches.
- b. Define soil as per IS: 2809-1972.
- c. State the objectives of Geotechnical engineering.
- d. State the importance of geology in civil engineering.
- e. State important uses of igneous, sedimentary and metamorphic rocks. .

**4 Marks**

- a. State classification of rocks based on their origin.
- b. State field applications of geotechnical engineering.
- c. Explain the use of soil as a foundation material.
- d. State any four applications of soil as construction material and foundation material.
- e. State applications of soil as foundation bed.

**CHAPTER 2 (Physical and Index Properties of soil )**

**2 Marks**

- a. Define void ratio and Porosity.
- b. Define degree of saturation and water content.
- c. Define dry unit weight and saturated unit weight.
- d. Define specific gravity and plasticity index.
- e. Define liquid limit and plastic limit.

**4 Marks**

- a. Explain three phase system of soil.
- b. Explain the Atterberg's limits.
- c. Explain measuring of field density and moisture content by core cutter method
- d. Explain the laboratory procedure of determining plastic limit of soil.

- e. Explain step by step procedure to determine specific gravity of soil by pycnometer method.
- f. Explain laboratory procedure for mechanical sieve analysis of soil.
- g. Explain the procedure of determine of liquid limit of soil.
- h. Draw particle size distribution curve. Explain grading of soil with sketch.
- i. Explain practical procedure for determining water content by oven drying method.
- j. Draw neat labeled sketch to explain stepwise procedure to determine bulk density by sand replacement method
- k. calculate void ratio, porosity, and degree of saturation of soil mass of bulk density 1.76 specific gravity of soil grains 2.7 and water content as 30%.
- l. State field identification tests on soil and explain any one
- m. Define plasticity index , liquidity index , shrinkage index , flow index, Toughness index.
- n. Calculate coefficient of uniformity and coefficient of curvature for a soil sample for which  $D_{10}=0.430\text{mm}$ ,  $D_{30}= 0.790\text{mm}$ ,  $D_{60}= 1.300\text{mm}$ .

### **CHAPTER 3 (Permeability and shear strength of soil )**

#### **2 Marks**

- a. Define Permeability.
- b. Define flow net. State its two characteristics.

#### **4 Marks**

- a. State Darcy's law of permeability.
- b. Enlist factors affecting permeability.
- c. Describe step by step procedure to determine coefficient of permeability of fine grained soil by falling head method in laboratory.
- d. Explain step by step procedure to determine coefficient of permeability of fine grained soil by constant head method in laboratory.
- e. Explain phreatic line in earthen dam with sketch.
- f. State Factors affecting shear strength of soil.
- g. State Factors affecting permeability of Soil.

