

# PNS SCHOOL OF ENGG. AND TECHNOLOGY

INTERNAL QUESTIONS WITH ANSWER

DIPLOMA 3<sup>RD</sup> SEMESTER(TH-2)

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## SHORT QUESTIONS

1. WHAT IS SOIL?

ANS. A soil mass is a three phase system consisting of solid particle, water and air. The void space between the soil grains is filled partly with water and partly with air.

2. what is water content?

Ans. The water content also called moisture content is defined as the ratio of weight of water to the weight of solids in a given mass of soil.

$$W = \frac{W_w}{W_d} * 100$$

3. What is density of soil?

Ans. The density of soil is defined as the mass of soil per unit volume

4. what is specific gravity?

Ans. specific gravity is defined as the ratio of the weight of given volume of soil solids at a given temperature to weight of an equal volume of distilled water at that temperature both weights are taken in air.

5. What is the relation between void ratio and porosity?

$$\text{Ans. } e = \frac{n}{1-n} \text{ or } n = \frac{e}{1+e}$$

6. what is relative density?

Ans. The relative density is defined as the ratio of difference between the void ratio of soil in loosest state and its natural void ratio to the difference between the void ratios in the loosest and densest state

$$I_d = \frac{e_{\max} - e}{e_{\max} - e_{\min}}$$

7. what is liquid limit?

Ans. liquid limit is the water content corresponding to the arbitrary limit between liquid and plastic state of consistency of soil. it is defined as the minimum water content at which the soil is still in the liquid state.

8. what is shrinkage limit?

Ans. shrinkage limit is defined as the maximum water content at which a reduction in water content will not cause a decrease in volume of soil mass. it is the lowest water content at which a soil can still be completely saturated.

9. what is plasticity index?

Ans. the range of consistency within which a soil exhibits plastic properties is called plastic range and is indicated by plasticity index. the plasticity index is defined as the numerical difference between the liquid limit and plastic limit of soil.

$$I_p = W_L - W_p$$

10. what is sensitivity of clays?

Ans. it is defined as the ratio of its unconfined compression strength in undisturbed state to that in the remoulded state with in change in water content.

## LONG QUESTIONS

1. RELATION BETWEEN  $e, G, w$  and  $S$

$e_w$  represents volume of water

$e$  represent volume of voids

and volume of solids equal to unity

$$S = V_w / V_v = e_w / e$$

$$e_w = eS$$

the term  $e_w$  is known as the water void ratio. for fully saturated sample

$$e_w = e$$

$$w = W_w / W_d = e_w \cdot Y_w / Y_s \cdot 1$$

$$\text{but } G = Y_s / Y_w$$

$$w = \frac{eW_g}{G} \quad w = \frac{eW}{G}$$

$$eW = Wg$$

$$eW = wG$$

$$e = \frac{Wg}{S}$$

For fully saturated sample  $s=1$  and  $w = w_s$

b) what is void ratio, porosity and degree of saturation discuss briefly?

**ANS. The void ratio may be defined as the ratio of the volume of voids to the volume of the solid.**

It is generally denoted by **e**.

**Mathematically,**

$$e = \frac{V_v}{V_s}$$

where,

$V_v$  = Volume of voids

$V_s$  = Volume of the solid

## **POROSITY**

The percentage of space inside a **material**, a substance or mixture such as rocks or soil, is called **porosity**. The empty spaces inside a material are called **voids** and can come in a variety of sizes. The remainder of a material is called a **solid**.

A basic example is a piece of scoria rock. The scoria itself is the material, but there may be empty space within the rock itself. These empty spaces, of varying sizes, are called voids. Porosity is the calculation of the total amount of empty space within the scoria rock. Furthermore, there can also be an effective porosity of the rock. The effective porosity is the amount of empty space that gases or liquids can move through continuously.

## **DEGREE OF SATURATION**

**The ratio of the total volume of voids to the volume of free water in a sample, stated as a percentage**, is known as the degree of saturation of soil and is calculated using the formula  $S = \frac{(w \cdot G_s)}{e}$  or Degree of saturation =  $\frac{(\text{Water content} \cdot \text{Specific gravity of the soil})}{\text{Void ratio}}$

