

# KATIHAR ENGINEERING COLLEGE, KATIHAR

## CIVIL ENGINEERING, 3<sup>rd</sup> Year (Semester-V)

**Subject: Soil Mechanics-I**

**Max. Marks: 05**

**Time Allotted: 40 Minutes**

**Instructor: Rashid Mustafa**

### Test-I

1. A soil has 28g of soil solids, 10 cm<sup>3</sup> of voids, 9g of water and specific gravity of soil is 2.7 consider the following statements in this regard

- A. The water content is  $\frac{9}{28} \times 100\%$
- B. The void ratio is  $10 \times 2.7 / 28$
- C. Degree of saturation is  $\frac{9}{10 \times 2.7} \times 100$
- D. The porosity is  $\frac{10 \times 2.7}{(28 + 10 \times 2.7)}$

Of these statements:

- ( $\alpha$ ) A, B and C are correct
- ( $\gamma$ ) A, C and D are correct

- ( $\beta$ ) B, C and D are correct
- ( $\delta$ ) A, B and D are correct

2. The relationship between water content (w %) and number of blows (N) in soils, as obtained from Casagrande's liquid limit device is given by

$$w = 30 - \log_{10} N$$

The liquid limit of soil is -----%

3. The atterberg limits of clay are 40%, 30% and 22%. Its natural water content is 26.5%. The clay is in ----- State.

4. For a sand of uniform spherical particles, the porosity in the natural state of soil is 20%. The relative density of soil in (%) is -----?

5. Laboratory sieve analysis was carried out on a soil sample using a complete set of standard IS sieves. Out of 500 g of soil used in the test, 200g was retained on IS 600 $\mu$  sieve, 250g was retained on IS 500 $\mu$  sieve and the remaining 50g was retained on IS 425 $\mu$  sieve. What will be the value of coefficient of uniformity ( $C_u$ ) -----?

6. The mass specific gravity of a fully saturated specimen of clay having a water content of 35% is 1.90. On oven drying the mass specific gravity drops to 1.75. The specific gravity of clay particles is

( $\alpha$ ) 2.65

( $\beta$ ) 2.77

( $\gamma$ ) 2.88

( $\delta$ ) 2.99

7. (a) Soil transported by wind and water

( $\alpha$ ) Lacustrine deposit ( $\beta$ ) Alluvial and Aeolian deposit ( $\gamma$ ) Aeolian and Alluvial deposit ( $\delta$ ) Talus soil

(b) A soil has liquid limit of 60%, plastic limit of 35% and shrinkage limit of 20% and it has a natural moisture content of 50%. The liquidity index of soil is -----

8. (a) If the degree of saturation of partially saturated soil is 60%, then air content of the soil is -----  
-----%

(b) A soil sample has a shrinkage limit of 10% and specific gravity of soil solids as 2.7. The porosity of the soil at shrinkage limit is -----%

9. The following index properties were determined for four soils A, B, C and D

Soil Property	A	B	C	D
Liquid Limit (%)	50	49	43	47
Plastic Limit (%)	23	17	21	26

Which of these soils contains more clay particles?

( $\alpha$ ) Soil A

( $\beta$ ) Soil B

( $\gamma$ ) Soil C

( $\delta$ ) Soil D

10. A sample of soil has the following properties:

Liquid limit = 45%, Plastic limit = 25%, Shrinkage limit = 17%, Natural moisture content = 30%

The consistency index of the soil is

( $\alpha$ ) 15/20

( $\beta$ ) 13/20

( $\gamma$ ) 8/20

( $\delta$ ) 5/20

**<END OF THE QUESTION PAPER>**

**NOTE:** Solution of class test-I will be uploaded on the college website [www.keck.ac.in](http://www.keck.ac.in)