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Question Paper Code : 21200

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Fourth Semester

Civil Engineering

CE 2251/CE 42/CE 1251/10111 CE 402/080100018 – SOIL MECHANICS

(Regulation 2008/2010)

(Common to PTCE 2251 – Soil Mechanics for B.E. (Part – Time) Third Semester –
Civil Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Assume suitable data if found necessary.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. If the liquidity index of a soil is zero. Find its consistency index.
2. The dry density of a soil and its specific gravity of solids are respectively 18 kN/m^3 and 2.7 find the moisture content required to have 100% saturation of the soil.
3. In a laboratory permeability test on a clayey soil, the diameter of the stand pipe is 2 cm and the diameter of the permeameter is 120 cm. the height of the mould is 130 cm. Determine the time taken for the head of water in the stand pipe to drop from 190 cm to 150 cm.
4. What are the different types of soil water?
5. What is mean by effective stress of a soil?
6. Define secondary consolidation.
7. Write down any four advantages of direct shear test.
8. Write down the expressions to determine the shear strength of soil by vane shear test.
9. What are the different types of slope failures?
10. Write about the Taylors stability Number.

PART B — (5 × 16 = 80 marks)

11. (a) Index properties tests on a 5kN soil sample resulted following values. Classify the soil based on IS classification system. Liquidity limit = 18% and plasticity index 4. (16)

Sieve size, mm	4.75	2.32	1.18	0.6	0.3	0.15	0.075	Pan
Weight retained, N	15	35	65	300	685	1700	2000	200

Or

- (b) A wet soil sample of mass 1.9 kg had a volume of 945 cm³ after oven drying its mass as reduced to 1.7 kg. The specific gravity of solids was found to be 2.7. determine
- (i) Moisture content
 - (ii) Bulk density
 - (iii) Dry density
 - (iv) Void ratio
 - (v) Porosity
 - (vi) Degree of saturation,
 - (vii) Saturated density and
 - (viii) Density at 30 % saturation. (16)
12. (a) Derive an equation for to determine the coefficient of permeability in an unconfined aquifer. (16)

Or

- (b) Derive an equation for flow through soil and hence derive the equation to determine the seepage discharge through a flow net. Also prove the discharge through different flow channel is constant and the head loss between two different potential drop lines is constant. (16)
13. (a) Derive Terzhaghi' s one dimensional consolidation equation. (16)

Or

- (b) With neat sketches explain the procedure of determination of effective stress by Newmark chart method. (16)
14. (a) Derive the equations for Skempton pore pressure parameters. (16)

Or

- (b) Write a detail note on triaxial shear test with neat sketches along with merits and demerits of this test. (16)
15. (a) Explain the Swedish circle method of analysis of slope stability with diagrams. (16)

Or

- (b) Explain with neat sketches about the different slope protection measures adopted along with the factors considered in selection of suitable method. (16)