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[5152]-103

S.E. (Civil) (First Sem.) EXAMINATION, 2017

GEOTECHNICAL ENGINEERING

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,
Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Neat diagrams must be drawn wherever necessary

(iii) Figures to the right indicate full marks.

(iv) Use of calculator is allowed

(v) Assume suitable data, if necessary.

1. (a) Write short note on transported soils with examples. [6]

(b) In falling head test a sample of soil having 75 mm diameter and 55 mm length was tested. At start, initial head was 80 cm and after one hour, the head was 40 cm. Find the coefficient of permeability if the diameter of stand pipe is 1 cm. [6]

Or

2. (a) Explain the procedure of flow net construction for seepage below a sheet pile and write the expression for determination of seepage. [6]

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- (b) A partially saturated soil from an earth fill has a natural water content of 19% and bulk unit weight of 19.33 kN/m^3 . Assuming, $G = 2.6$, determine the degree of saturation, void ratio and porosity. [6]
3. (a) What is significant depth and pressure bulb ? Explain with neat sketch. [6]
- (b) A cohesive soil has an angle of shearing resistance of 15° and cohesion of 35 kN/m^2 . If a specimen of this soil is subjected to a triaxial compression test, find the value of lateral pressure in the cell for failure to occur at a total axial stress of 300 kN/m^2 . [6]
- Or
4. (a) An embankment was constructed by compacting a soil at a moisture content of 18% and a dry density of 16.27 kN/m^3 . If $G = 2.7$, determine the void ratio and degree of saturation of the embankment soil. [6]
- (b) Draw Mohr circle for direct shear test and show principal plane, principal stress, failure plane, strength envelope and C, ϕ on the sketch. [6]
5. (a) Determine the active thrust on retaining wall when uniform surcharge acts on the ground. [7]
- (b) Explain the Culmann's graphical method for determination of active earth pressure. [6]

Or

6. (a) What is critical height ? State the expression. Determine the critical height of vertical excavation that can be made without any lateral support in a cohesive soil having the following properties :

$$\gamma = 18 \text{ kN/m}^3, C = 14 \text{ kN/m}^2, \phi = 12^\circ \quad [7]$$

- (b) State assumptions in Rankine's theory of earth pressure and explain the concept of plastic equilibrium. [6]

7. (a) Explain how the soil acts as a geochemical trap. [6]

- (b) What are the different forms of instability for clayey soil ? Explain with sketches. [7]

Or

8. (a) How is decontamination using chemicals carried out ? [6]

- (b) Discuss the causes and remedies of Landslides. [7]