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[5668]-104

S.E. (Civil) (I Sem.) EXAMINATION, 2019

GEOTECHNICAL ENGINEERING

(2015 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 and Q. No. 7 or Q. No. 8.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if necessary.

(iv) Use of calculator is allowed in the examination.

(v) Neat diagrams must be drawn wherever necessary.

1. (a) Explain any *one* method to determine the field density of soil with neat sketch. [6]

(b) A sample of coarse sand is 150 mm high and 55 mm in diameter. It was tested in a constant head permeameter. Water permeated through the soil under a hydrostatic head of 500 mm for 6 seconds. The water was collected and it was found to be 500 ml. Find the permeability in cm/sec. [6]

Or

2. (a) The initial void ratio of inorganic clay is found to be 0.65, while the specific gravity of solids is 2.68. Determine the dry density of soil. Also determine the bulk density and moisture content if soil is 50% saturated. [6]

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- (b) Explain the procedure for flownet construction for seepage for an earthen dam and write the expression for determination of seepage. [6]
3. (a) Write a note on pressure bulb and its significance. [6]
- (b) A cylindrical specimen of saturated clay, 40 mm in diameter and 90 mm in overall length is tested in an unconfined compression tester. The specimen has cone end and its length between the apices of cones is 80 mm. Find the unconfined compressive strength of clay, if the specimen fails under an axial load of 46.5 N. The change in the length of specimen at failure is 10 mm. [6]
- Or
4. (a) A point load of 500 kN is applied at the ground surface. Calculate vertical stress at point which is 7.5 m away horizontal and 5 m below ground. [6]
- (b) Describe the procedure of direct shear test with sketch. Also state the merits and demerits of test. [6]
5. (a) Explain Rankine's lateral stress distribution theory for active, passive and at rest state with the assumptions involved. [6]
- (b) Determine the active resultant thrust at a depth of 7 m in sand whose angle of friction is 25° and density of 17 kN/m^3 in dry state. [7]

Or

6. (a) Compute the intensities of active and passive earth pressure at depth of 8 m in dry cohesion less sand with an angle of internal friction of 30° and unit weight of 18 kN/m^3 . What will be the intensities of active and passive earth pressure if the water level rises to the ground level ? Take saturated unit weight of sand as 22 kN/m^3 . [6]
- (b) Explain Rebhans graphical method for determination of earth pressure on retaining wall. [7]
7. (a) Write down the effects of subsurface contamination. [6]
- (b) What is finite and infinite slope ? Give example. Explain how stability charts are used in the design of slopes. [7]
- Or
8. (a) Discuss sources and types of ground contamination. [6]
- (b) Derive the expression for factor of safety for dry infinite slope and submerged infinite slope in sandy soils. [7]