

B.Tech III Year II Semester (R15) Regular Examinations May/June 2018  
**GEOTECHNICAL ENGINEERING – II**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**  
 (Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) What are the purposes of site investigations?
  - (b) What are the factors that affect the sample disturbance?
  - (c) What are different types of slope failures?
  - (d) What is a stability number?
  - (e) What are the factors affecting the magnitude of lateral earth pressure?
  - (f) What are the assumptions in Coulomb's theory?
  - (g) Define 'ultimate bearing capacity'.
  - (h) What is factor controlling the allowable soil pressure for foundation in cohesive soils?
  - (i) What are the conditions where a pile foundation is more suitable than a shallow foundation?
  - (j) What do you understand by grip length?

**PART – B**  
 (Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 Explain in detail about plate load test in detail.
- OR**
- 3 Describe various methods of drilling holes for sub-surface investigations.

**UNIT – II**

- 4 Describe Bishop's simplified method. What are the advantages over Swedish circle method.
- OR**

- 5 A dam of homogeneous section is 25 m high with upstream slope of 2.5 to 1.0 and downstream slope of 2 to 1. There is a 12 m long horizontal filter at the downstream end. Taking a free board of 3 m, determine: (i) Factor of safety of downstream slope under steady seepage condition. (ii) Factor of safety of upstream slope under sudden drawdown conditions.

**UNIT – III**

- 6 Discuss Culmann's method for the determination of active earth pressure.
- OR**

- 7 Determine the passive pressure by Rankine's theory per unit run for a retaining wall 4 m high, with  $i = 15^\circ$ ,  $\phi^l = 30^\circ$  and  $\gamma = 19 \text{ kN/m}^3$ . The backface of the wall is smooth and vertical.

**UNIT – IV**

- 8 How would you estimate the settlements of a foundation on cohesion less soils?
- OR**

- 9 A strip footing 2 m wide is to be laid at a depth of 4 m in a purely cohesive soil ( $C = 150 \text{ kN/m}^2$ ;  $\gamma = 19 \text{ kN/m}^3$ ). Determine the ultimate bearing capacity from: (i) Terzaghi's theory. (ii) Skempton's theory.

**UNIT – V**

- 10 A group of nine piles, 8 m long, is used for a column. The piles are 30 cm diameter with centre to centre spacing of 90 cm. The subsoil consists of clay with unconfined compression strength of  $180 \text{ kN/m}^2$ . Estimate the safe load. Take factor of safety as 3.0.
- OR**

- 11 Explain the various forces acting on a well foundation.

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