

IV B.Tech I Semester Supplementary Examinations, March/April - 2016**GEOTECHNICAL ENGINEERING – II****(Civil Engineering)****Time: 3 hours****Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain the significance of soil explorations and detail various boring techniques with their suitability [8]
b) Write a note on Pressure meter test and its suitability [7]
- 2 a) It is proposed to construct a highway embankment using C- Φ soil having $C = 30\text{kPa}$, $\Phi' = 10^\circ$ and $\gamma = 19\text{kN/cum}$. Determine the critical height up to which the embankment can be built with an inclination of 26° with a factor of safety of 1.5. Taylor's stability number for the condition is 0.07 [8]
b) What are the different modes of failure of earthen slopes? Illustrate with sketches [7]
- 3 a) A 9m high retaining wall with a vertical face is supporting a back fill with horizontal top consisting of two types of soils. The water table is located at a depth of 5m below the top. The properties of soil from 0 to 3m include $C = 0\text{kPa}$, $\Phi' = 36^\circ$ and $\gamma = 19\text{kN/cum}$ and those for soil from 3m to 9m include $C = 0\text{kPa}$, $\Phi' = 36^\circ$ and $\gamma = 18.5\text{kN/cum}$, $\gamma_{\text{sub}} = 20.50\text{kN/cum}$. Plot the distribution of active and passive earth pressure and determine the magnitude and point of application of total active and passive earth pressure acting on the retaining wall [8]
b) Derive an expression to evaluate coefficient of active earth pressure for cohesive soil deposit using Rankine's theory [7]
- 4 a) Explain the criteria for checking the stability of retaining walls [8]
b) What are the different types of retaining walls? Explain design criteria of anchored bulk heads [7]
- 5 a) Design a strip footing for a load bearing wall transmitting a force of 300kN/sqm , proposed to be laid at a depth of 2 m below the ground level on a C- Φ soil with $C = 40\text{kN/sqm}$, $\Phi' = 20^\circ$ and $\gamma = 18\text{kN/cum}$. Given $N_c' = 11.8$, $N_q' = 3.90$ and $N_r' = 1.7$ [8]
b) Explain advantages of IS code method over other methods of determining safe bearing capacity of soil [7]
- 6 a) Discuss estimation of settlement of a footing resting on cohesion less soil using a plate load test [8]
b) Estimate the immediate settlement of a concrete footing 2m X 2m in size founded on at a depth of 1.5 m in silty soil whose modulus of elasticity is 90kg/cm^2 . The footing is expected to transmit a unit pressure of 300kN/m^2 [7]
- 7 a) Discuss the conditions which force us to prefer pile foundations [8]
b) A pile is driven with a single acting hammer of weight 20 kN with a free fall of 800mm. the final set, average of three blows is 22.5mm. Find the safe load using the Engineering News Formula [7]
- 8 a) Discuss design aspects of well foundations [8]
b) Write a note on tilts and shifts in well foundations [7]