

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI.old. • EXAMINATION – WINTER 2017****Subject Code: 160606****Date: 13.11.2017****Subject Name: Geotechnical Engineering - II****Time: 02.30 to 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What soil exploration programme and explain electrical resistivity method. **07**
 (b) Describe standard penetration test. How the observed N – value is corrected? **07**
- Q.2** (a) What is coulomb's wedge theory? Compare Rankine's theory and coulomb's theory. **07**
 (b) A retaining wall 10 m high retains cohesionless soil with an angle of internal friction 35° . The surface is levelled with the top of wall. The unit weight of top 3 m of the wall is 16 kN/m^3 and that of the rest is 2 kN/m^3 . Find the magnitude and application of the resultant active pressure. **07**
- OR**
- (b) What are the different types of earth pressure? Give examples. **07**
- Q.3** (a) Describe Culmann's method for the stability analysis of homogeneous slopes. **07**
 (b) Calculate the factor of safety with respect to cohesion, of a clay slope laid at 1 in 2 to a height of 10 m, if the angle of internal friction $\phi = 10^\circ$; $c = 25 \text{ kN/m}^2$ and $\gamma = 19 \text{ kN/m}^3$. What will be the critical height of the slope in this soil? **07**
- OR**
- Q.3** (a) Differentiate between Finite and Infinite slope. Explain stability of a finite slope by Swedish method of Slices for a Cohesive soil. **07**
 (b) What is the effect of water table on bearing capacity of soil? **07**
- Q.4** (a) What is the basis on which the dynamic formulae are derived? Mention two well known dynamic formulae and explain the symbols involved. **07**
 (b) In a 16 pile group, the pile diameter is 45 cm and centre to centre spacing of the square group is 1.5 m. If $c = 15 \text{ kN/m}^2$, determine whether the failure would occur with the pile acting individually, or as a group? Neglect bearing at the tip of the pile. All piles are 10 m long. Take $m = 0.7$ for shear mobilisation around each pile. **07**
- OR**
- Q.4** (a) Explain various stages involved in the construction of under reamed pile foundation. **07**
 (b) Explain functions of different types of piles. **07**
- Q.5** (a) Explain the plate load test to determine ultimate bearing capacity of soil. **07**
 (b) A strip footing 1 m wide at its base is located at a depth of 0.8 m below the ground surface. the properties of foundation soil are: $\gamma = 18 \text{ kN/m}^3$, $c = 30 \text{ kN/m}^2$ and $\phi = 20^\circ$. Determine the safe bearing capacity, using factor of safety of 3. Use Tarzaghi's analysis. Assume soil fails by local shear. **07**
 $N_c = 11.8$; $N_q = 3.9$; $N_\gamma = 1.7$
- OR**
- Q.5** (a) Explain stress distribution in soils for concentrated loads by Boussinesq's equation. **07**
 (b) What are the factors affects the selection of type of foundations? Explain in detail. **07**
