

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC- SEMESTER-IV - EXAMINATION – SUMMER 2017****Subject Code: X40603****Date: 31/05/2017****Subject Name: Soil Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks: 70**

- Q.1 (a) Explain the principle of the direct shear test. What are the advantages of this test? 07
- (b) Enlist assumption made in Boussinesq's theory of stress distribution 07
- Q.2 (a) A concentrated load of 30 kN acts on a surface of a homogeneous soil mass of large extent. Find stress intensity at a depth of 18 m (i) directly under the load and (ii) at a horizontal distance of 6.0 m. Use Boussinesq's equation. 07
- (b) What is the effect of compaction on the engineering properties of the soil? 07
- OR**
- (b) A retaining wall, 7 m high, retains dry sand with an angle of friction of 30° and unit weight of 17 kN/m^3 . Determine the earth pressure at rest. If the water table rises to the top of the wall, determine the increase in the thrust on the wall. Assume the submerged unit weight of sand as 10 kN/m^3 07
- Q.3 (a) Write a short note on stability analysis of Infinite slopes for $c-\Phi$ soils. 07
- (b) An embankment is inclined at angle 35° and its height is 12 m. The angle of Shearing resistance is 15° and cohesion intercept is 180 kN/m^2 . The unit weight of soil is 17 kN/m^3 . If the Taylor's stability number is 0.06, find the factor of safety with respect to cohesion. 07
- OR**
- Q.3 (a) Explain Modified Mohr-coulomb theory. 07
- (b) Write short note on Compaction needle 07
- Q.4 (a) In an unconfined compression test a sample of clay 100mm long and 50mm in diameter fails under a load of 150N at 10% strain. Calculate the shearing resistance taking into account the effect of change in cross-section of the sample. 07
- (b) Explain spring analogy theory for primary consolidation of any soil sample 07
- OR**
- Q.4 (a) What do you understand by "Pressure bulb"? Illustrate with sketches. 07
- (b) Explain Standard Proctor Test. 07
- Q.5 (a) Enlist the method determination of coefficient of consolidation and explain any one in detail. 07
- (b) The laboratory consolidation data for an undisturbed clay sample are as follows $e_1 = 1.00$, $\sigma = 75 \text{ kN/m}^2$ and $e_2 = 0.80$, $\sigma = 440 \text{ kN/m}^2$ determine the void ratio for a pressure $\sigma = 550 \text{ kN/m}^2$. 07
- OR**
- Q.5 (a) Compare the Coulomb's theory with Rankine theory for lateral earth pressure. 07
- (b) How many days would be required by a clay stratum 6.5 m thick, draining at both ends with an average value of coefficient of consolidation $= 47 \times 10^{-4} \text{ cm}^2/\text{sec}$, to attain 50% of its ultimate settlement. 07
