Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC– SEMESTER IV– • EXAMINATION – SUMMER - 2016

Subject Code:X40603 **Date:21/11/2016**

Subject Name: Soil Engineering

Time:02:30 PM to 5:00 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) Explain the factor affecting compaction. [7]

(b) A sample of soil was prepared by mixing a quantity of dry soil with 18% by mass of water. Find the mass of this wet mixture required to produce cylindrical, compacted specimen of 16 cm diameter and 13 cm deep and having water content 10% water content. Also find the void ratio and dry density of the specimen if G=2.65. [7]

Q-2(a) Explain the Newmark's influence chart . [7]

(b) A water tank supported by a ring foundation having outer diameter of 12 m and inner diameter of 10 m. The ring foundation transmits uniform load intensity of 160 kN/m^2. Compute the vertical stress induced at a depth of 4 m, below the centre of ring foundation, using (a) Boussinesq Equation and (b) Westergaard's Equation, taking μ = 0. [7]

OR

(b) Write merits of triaxial test. [7]

Q-3(a) What is active and passive earth pressure? Derive the Rankin's theory of passive earth pressure for cohesionless and cohesive backfill. [7]

(b) A retaining wall 4 m high, has a smooth vertical back. The backfill has a horizontal surface in level with the top of the wall. There is uniformly distributed surcharge load of 36kN/m2 intensity over the backfill. The unit weight of the backfill is 18kN/m^3 ; Its angle of internal friction is 30° and cohesion is zero. Determine the magnitude and point of application of active pressure per meter length of the wall. [7]

OR

Q-3(a) Differentiate standard proctor test and modified proctor test. [7]

(b) Explain modified Mohr-Coulomb theory. [7]

Q-4(a) Explain the Swedish slip circle method for slope stability. [7]

(b) A standard specimen of cohesionless sand was tested in triaxial compression and the Sample failed at deviator stress of 250kN/m^2, when the cell pressure was 120kN/m^2, under drained conditions. What would be the deviator stress and the major principle stress at failure for another identical specimen of sand if it is tested under a cell pressure of 200kN/m^2 ? Assume c= 0 and Ψ=30°. [7]

OR

Q-4(a) Draw stress distribution curve for various depth for the soil subjected by a point load. Also draw the curve for r=0. [7]

(b) The laboratory consolidation data for undisturbed clay soil sample are as follows e_1=1.00, σ=80 kN/m^2 and e_2=1.50, σ=285 kN/m^2. Determine the void ratio fora pressure σ=450 kN/m^2. [7]

Q-5(a) Explain the Friction circle method for slope stability. [7]

(b) Following are the results of undrained triaxial compression test on identical soil specimens, at failure: [7]

Lateral pressure σ_3 (kN/m^2)	100	300

Total vertical pressure σ_1 (kN/m^2)	440	760
Pore pressure u (kN/m^2)	-20	60

OR

Q-5(a) Determine the lateral earth pressure at rest per unit length of the wall shown in figure. Also determine the location of the resultant earth pressure. For the 1st 2m depth Φ=30 , γ=17.85kN/m^3 And for the 2nd 4m depth Φ=30 , γ_{sat}=18.5kN/m^3 Take [7]

$K_0 = 1 - \sin\Phi$ and

$\gamma_w = 10$ kN/m^3

(b) Explain the types of slope failure. [7]

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