Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:160606 **Date:11/12/ 2015**

Subject Name: Geotechnical Engineering - II

Time:2:30pm to 5:00pm **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)	A long natural slope in a c-φ soil is inclined at 12° to the horizontal. The water table is at the surface and the seepage is parallel to the slope. If a plane slip has developed at a depth of 4m, determine the factor of safety. Take c=8kN/m^2, φ= 22° and γ_{Sat}=19kN/m^3.	**07**
	(b)	Explain planar failure surface by Culmann's method in detail.	**07**
Q.2			
	(a)	Compute the intensities of active and passive earth pressure at depth of 8m in dry cohesionless sand with an angle of internal friction of 30° and unit weight of 18kN/m^3. What will be the intensities of active and passive earth pressure if the water level rises to the ground level? Take saturated unit weight of sand as 22kN/m^3.	**07**
	(b)	What are the graphical method available for the determination of active earth pressure? Explain any one in detail.	**07**
		OR	
	(b)	Elaborate the short comings of Rankine's active earth pressure theory and Coulomb's active earth pressure theory.	**07**
Q.3			
	(a)	Write about the piles according to method of installation and their load carrying capacity.	**07**
	(b)	In a 16 pile group, the pile diameter is 45cm and centre to centre spacing of square group is 1.5m. If c=50kN/m^2, determine whether the failure would occur with the pile acting individually of as a group? Neglect bearing at the tip of the pile. All piles are 10m long. Take m=0.7 for shear mobilization around each pile.	**07**
		OR	
Q.3	(a)	Explain in detail about the factors affecting the selection of types of foundation.	**07**
	(b)	Explain various stages involved in the construction of under reamed pile foundation.	**07**
Q.4			
	(a)	Enlist the methods of site investigation. Explain any one in detail with sketches.	**07**
	(b)	Write short notes on a) General shear failure b) Punching shear failure	**07**
		OR	
Q. 4	(a)	What are the assumptions made in the theory of Terzaghi's analysis?	**07**
	(b)	A strip footing 1m wide at its base is located at a depth of 0.8m below the ground surface. The properties of the foundation soil are	**07**

γ=18kN/m^3, c=30kN/m^2 and φ=20°. Determine the safe bearing capacity using a factor of safety of 3. Use Terzaghi's analysis. Assume that the soil fails by local shear.

Q.5

(a) Explain the plate load test for the determination of ultimate bearing capacity of soil. **07**

(b) Using Terzaghi's theory, determine the ultimate bearing capacity of a strip footing 1.5m wide resting on a saturated clay. (Cu=30kN/m^2, φ_u=0 and γ_{sat} = 20kN/m^3) at a depth of 2m below ground level. The water table is also at a depth of 2m from the ground level. If the water table rises by 1m, calculate the percentage reduction in the ultimate bearing capacity. **07**

OR

Q.5 (a) Write short notes on the following. **07**

a) Stress distribution diagrams.
b) Bore log and report writing.

(b) A retaining wall 4 m high supports a backfill (c=20 kN/m^2, φ=30°, γ=18kN/m^3) with horizontal top, the flush with the top of the wall. The backfill carries a surcharge of 20 kN/m^2 . if the wall is pushed towards the backfill. Compute the total passive pressure on the wall, and its point of application. **07**