Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2164003 **Date:16/05/2019**

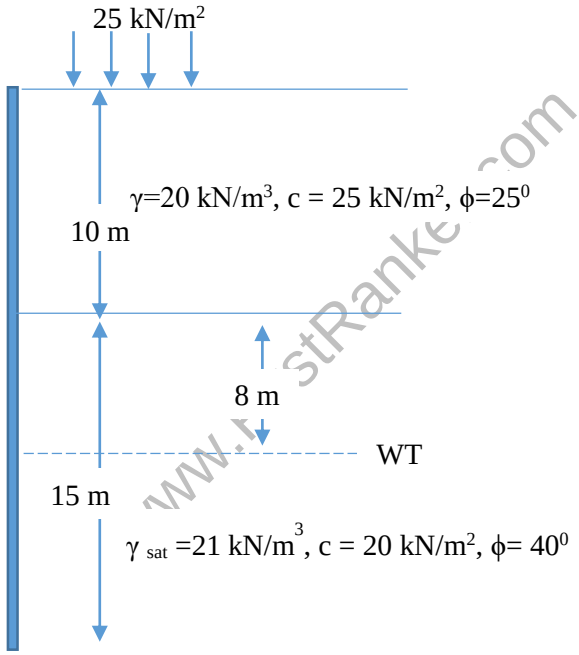
Subject Name:Geotechnical Engineering - II

Time:10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

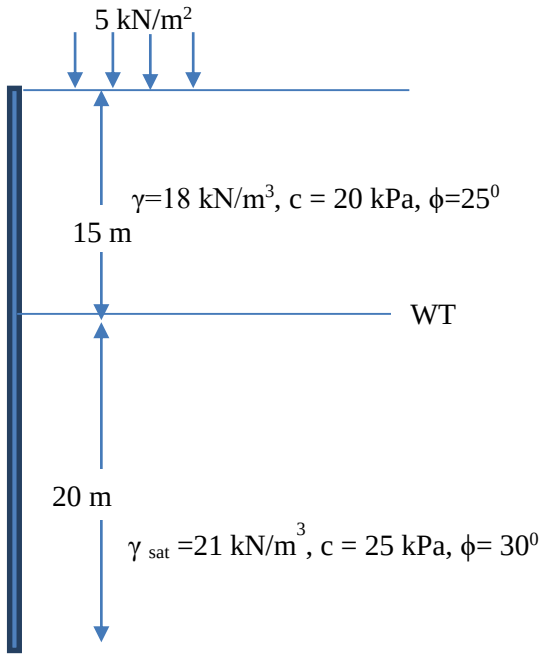
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Support your answer with neat sketches wherever possible.**

			MARKS
Q.1	**(a)**	Explain the active and passive Rankine states with the help of Mohr's circle diagram in a cohesion less soil.	**03**
	(b)	Illustrate different shear failure modes of a shallow foundation, with the help of neat sketches.	**04**
	(c)	Illustarte load transfer mechanism of shallow foundation and pile foundation.	**07**
Q.2	**(a)**	Critically differentiate between Rankine and Coulomb theories of earth pressure.	**03**
	(b)	Enlist various geosynthetic materials and their suitability in geotechnical engineering work.	**04**
	(c)	Draw active earth pressure diagram acting on retaining wall.	**07**



OR

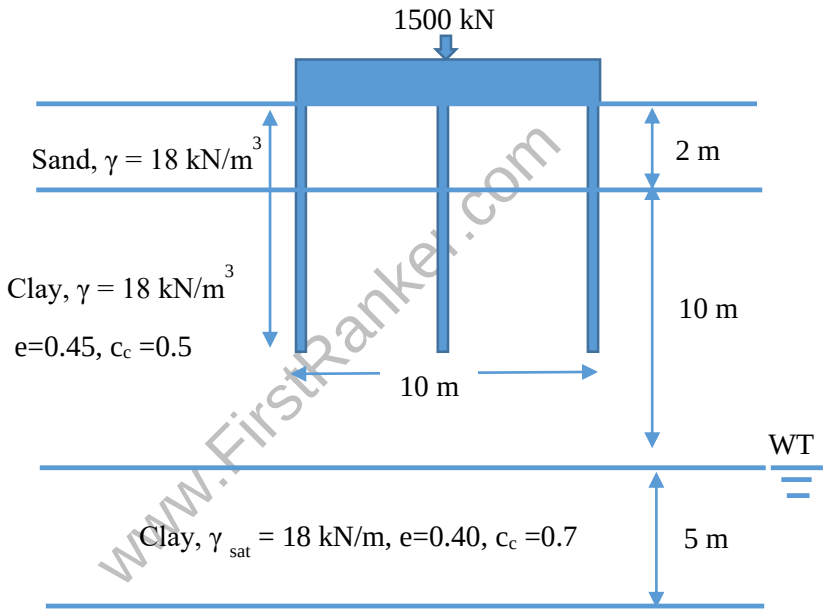
(c) Draw passive earth pressure diagram acting on retaining wall. **07**



Q.3 **(a)** What are various components of foundation settlement? **03**

(b) Describe the concept of earth reinforcement. **04**

(c) Determine settlement of pile group of 3x3 and length of 8 m. **07**



OR

Q.3 **(a)** What are criteria's to differentiate between shallow and deep foundations other than foundation depth. **03**

(b) Explain variation of contact pressure under rigid and flexible footings resting on cohesive and cohesionless soils using neat sketches. **04**

(c) Nine piles of 300 mm diameter and 8 m length are arranged in a square pattern in cohesive soil with unconfined compressive strength of 50 kN/m^2. Center to center spacing is 900 mm. Assume adhesion factor to be 0.9. Evaluate the allowable bearing capacity of pile group assuming factor of safety of 2.5. **07**

Q.4	**(a)**	What do mean by disturbed and undisturbed soil sample?	**03**
	(b)	Enlist various field tests to determine the shear strength of soil?	**04**
	(c)	A strip footing with 3 m width is founded at a depth of 2 m below the ground surface in a (c-ϕ) soil having a cohesion c = 30 kN/m^2 and angle of shearing resistance = 35°. The moist weight of soil above the water table is 17.25 kN/m^3. Initially, water table is observed to be 1.25 m below ground level, but after some time the water table lowered down to 1.25 m below the foundation base. Determine the change in bearing capacity due to change in water table. ϕ=35, N_c=57.8, N_q=41.4 and N_y= 41.1.	**07**

OR

Q.4	**(a)**	State the objectives of soil exploration.	**03**
	(b)	Explain Terzaghi's method to determine bearing capacity.	**04**
	(c)	A square footing fails by general shear in a cohesionless soil under an ultimate stress of 1687.5 kPa. The footing is placed at the ground level. Given ϕ = 35°, and γ =20 kN/m^3, determine the size of the footing if the water table is at the base of footing. For, ϕ=35, Nc=57.8, Nq=41.4 and Ny= 41.1.	**07**
Q.5	**(a)**	Explain friction circle and Swedish circle methods to determine stability of slope.	**03**
	(b)	Derive an equation to determine the stability of circular slope of purely cohesive soil under seismic loading.	**04**
	(c)	Describe the following: (a) Fender pile; (b) SPT; (c) Pile group efficiency (d) Grouting	**07**

OR

Q.5	**(a)**	Discuss various steps involved in soil exploration?	**03**
	(b)	Derive an equation for unsupported height in cohesionless soil.	**04**
	(c)	Describe the following: (a) Negative skin friction; (b) Significant depth; (c) Geonet; (d) Plate load test,	**07**

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