Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160616 Date:19-12-2022

Subject Name:Foundation Engineering

Time:02:30 PM 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Explain about reconnaissance survey.	**03**
	(b)	Describe the split spoon sampler. What is its use?	**04**
	(c)	What are the methods available for sub-surface exploration? Explain any one in detail.	**07**
Q.2	**(a)**	Define the terms for sampler. (i) Inside clearance (ii) Outside Clearance (ii) (iii) Area Ratio	**03**
	(b)	Differentiate between general shear failure and local shear failure,	**04**
	(c)	Discuss the Dynamic cone penetration test. What are its limitations?	**07**
		OR	
	(c)	List various methods of flexible pavement design and explain CBR method.	**07**
Q.3	**(a)**	Explain: floating foundation	**03**
	(b)	Discuss the merits and demerits of plate load test.	**04**
	(c)	A strip footing 1.5m wide , rest on the surface of a dry cohesionless soil having $\phi = 25^0$ and γ =18 kN/m3. If the water table rises temporarily to the surface due to flooding , calculate the percentage reduction in the ultimate capacity of the soil. Assume $N\gamma = 9.0$.	**07**
		OR	
Q.3	**(a)**	Write short note on: Negative skin friction.	**03**
	(b)	Enlist the situations where pile foundations are preferred.	**04**
	(c)	Describe Terzaghi's theory of bearing capacity of foundation soil under strip footing What are the assumptions and its limitations?	**07**
Q.4	**(a)**	Explain with neat sketch the function of Better pile and Friction pile	**03**
	(b)	Explain about efficiency of pile group.	**04**
	(c)	A Group of friction pile in clay consists of 12 piles of 500 mm dia. grouped as 4 x 3 spaces at 1m apart. If the undrained shear strength of clay is 7 kN/m2 and pile s are 15m long, estimate the group capacity of pile. Take adhesion factor as 1.0	**07**
		OR	
Q.4	**(a)**	Describe behavior of collapsible soils.	**03**
	(b)	How do you estimate the group capacity of piles in sand and clay ?	**04**
	(c)	A RCC pile of 35 kN weight, was driven by a drop hammer weighing 40 kN with a effective free fall of 1.0 m. The average settlement per blows is 1.0 cm. the total elastic compression is 1.5 cm. Assuming Coefficient of Restitution as 0.25 and FOS = 2.5. Determine ultimate bearing capacity and allowable load on pile.	**07**

Q.5	**(a)**	Write short note on: CNS layer.	**03**
	(b)	Give applications of geosynthetics in roads.	**04**
	(c)	Draw a neat sketch of gravity retaining wall showing forces acting on it. Explain stability checks for gravity retaining wall.	**07**

OR

Q.5	**(a)**	Explain how free swell index can be measured.	**03**
	(b)	Explain anchors used in sheet pile walls.	**04**
	(c)	Why drainage of the backfill is necessary? Explain different methods of providing drainage of retaining wall?	**07**

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