Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VIII (NEW) EXAMINATION – WINTER 2020

Subject Code:2180609 **Date:25/01/2021**

Subject Name:Foundation Engineering

Time:02:00 PM TO 04:00 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Draw the sketch of sampler and show all the components of it.	**03**
	(b)	Differentiate between disturbed soil sample and undisturbed soil sample.	**04**
	(c)	Explain seismic refraction method in detail with figure.	**07**
Q.2	**(a)**	Enlist different applications of geosynthetics in the field of civil engineering.	**03**
	(b)	Differentiate between shallow foundation and deep foundation.	**04**
	(c)	Classify the methods of sub-soil exploration and explain in detail wash boring method.	**07**
Q.3	**(a)**	Define foundation, bearing capacity and allowable bearing pressure.	**03**
	(b)	Classify the methods to determine bearing capacity of soil.	**04**
	(c)	Discuss different modes of shear failure.	**07**
Q.4	**(a)**	Draw the neat and clean figure of plate load test set up and name all the components.	**03**
	(b)	Discuss limitations of plate load test.	**04**
	(c)	A strip footing of 2m width is placed at a depth of 4m below ground surface. Determine the net ultimate bearing capacity using Terzaghi's equation and IS code method. Consider unit weight of clay is 20kN/m^3 and cohesion as 10kN/m^2.	**07**
Q.5	**(a)**	Draw neat sketch of end bearing pile, friction pile and compaction pile.	**03**
	(b)	Classify the pile on the basis of method of installation.	**04**
	(c)	A drop hammer weighing 50kN and having an effective fall of 0.75m drives an RCC pile weighing 35kN. The average settlement per blow is 1.4cm. The total temporary elastic compression is 1.8cm. Determine ultimate bearing capacity and allowable load on pile assuming coefficient of restitution as 0.25 and factor of safety 2.5. Use Hiley's formula.	**07**
Q.6	**(a)**	Describe necessity of pile foundation.	**03**
	(b)	Explain negative skin friction.	**04**
	(c)	A square pile group of 9 piles through a recently filled up material of 4m depth. The diameter of the pile is 0.3m and pile spacing is 0.9m centre to centre. Compute the negative skin friction of the pile group if the unconfined compressive strength of the soil is 60kN/m^2 and unit weight is 15kN/m^3.	**07**
Q.7	**(a)**	Draw the typical sketch of retaining wall and show all the components of it.	**03**
	(b)	Describe the different forces acting on the retaining wall.	**04**

	(c)	A masonry retaining wall is 1.5m wide at top, 3.5m wide at the base and 6m high. It is trapezoidal in section with earth side face vertical. The backfill is level with top. The unit weight of backfill is 16kN/m^3 for the top 3m and 18kN/m^3 for the rest of the depth. The unit weight of masonry is 23kN/m^3. Determine the total lateral pressure on the wall per meter run and the maximum and minimum pressure intensities at the base. Consider $\phi = 30^o$.	**07**
Q.8	**(a)**	Define free swell index, swelling potential and swelling pressure.	**03**
	(b)	Discuss the general characteristics of expansive soil.	**04**
	(c)	Explain the functions of geosynthetics in detail with figures.	**07**

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