Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1724303 **Date: 20-06-2014**

Subject Name: Geosynthetics and Reinforced Earth

Time: 02:30 pm - 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.**

Q.1	**(a)**	Name the various tests for which the gerosynthetics are examined. What are stiffness and creep tests?	**07**
	(b)	Explain in detail the role of soil reinforcement component in Rankin/Coulomb active wedge zone with modification of equations. Support your answer with neat sketch.	**07**
Q.2	**(a)**	Explain in detail stepwise procedure for design of RE wall with geotextile as reinforcement	**07**
	(b)	Explain tie back wedge method for determining internal stability of RE wall as per BS 8006	**07**
		OR	
	(b)	Stating functions of geosynthetics, explain with sketch the placement procedure of geotextile for reinforcement action in road subgrade.	**07**
Q.3	**(a)**	Design reinforced earth retaining wall using strip reinforcement. Use plus shape reinforcement panel, with thickness 200 mm and weight of 10kN each. A 150mm thick reinforced cap will be placed on top of the wall to maintain top alignment and appearance. Consider following data: Height of wall=10m ; Back fill material ū = 36°, ɔ= 17.5 kN/m^3; ɟ =62° and f= 0.4.The strip will be placed at s=1m and h=1m to center of the concrete wall facing units.	**07**
	(b)	Explain in detail geotechnical application of geomembrane.	**07**
		OR	
Q.3		A reinforced earth retaining wall is proposed to be 8 m high. The properties of the backfill material are as follows: $ɔ_1$= 16.6 kN/m^3 and ū 1= 30°. Galvanized steel ties are to be used for the construction of the wall. Design the reinforcements with FOS $_{(B)}$ = 3, FOS $_{(P)}$ = 3, f_y = 2.4 x 10^5 kN/m^2, and ū $_ε$= 20°. The properties of the in situ soil below the retaining wall are as follows: $ɔ_2$= 18 kN/m^3 and ū 2= 28° and c_2 =52 kN/m^2. Sketch tension line, failure plane and pressure distribution diagram.	**14**
Q.4	**(a)**	Design a 4.5 m geotextile rape round reinforced earth wall which is to carry load of 0.25 kg/ cm^2. The backfill of wall is sand of unit weight 1.7 t/m^3, angle of internal friction 30°. The woven slit fiber geotextile with grab strength 125 kg is to be used in the construction. Assume suitable data if necessary.	**07**
	(b)	Explain with the help of a neat sketch, various elements of reinforced earth wall, stating the specifications, requirement and function of each element.	**07**
		OR	

Q.4	**(a)**	Write advantages of using geosynthetics in pavement.	**07**
	(b)	What is reinforced earth wall? What is the difference between concrete retaining wall and reinforced earth wall? Give advantages and limitations of RE wall over concrete retaining wall.	**07**
Q.5		Write function of geosynthetics in water resources project in detail.	**14**
		OR	
Q.5		Explain various geotextile functions and mechanisms in detail	**14**

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