

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 geosynthetics 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 $\gamma = 36^\circ$, $\gamma = 17.5 \text{ kN/m}^3$; $\phi = 62^\circ$ and $f = 0.4$. The strip will be placed at $s=1\text{m}$ and $h=1\text{m}$ 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: $\gamma = 16.6 \text{ kN/m}^3$ and $\phi = 30^\circ$. Galvanized steel ties are to be used for the construction of the wall. Design the reinforcements with $\text{FOS}_{(B)} = 3$, $\text{FOS}_{(P)} = 3$, $f_y = 2.4 \times 10^5 \text{ kN/m}^2$, and $\delta = 20^\circ$. The properties of the in situ soil below the retaining wall are as follows: $\gamma = 18 \text{ kN/m}^3$ and $\phi = 28^\circ$ and $c_2 = 52 \text{ kN/m}^2$. Sketch tension line, failure plane and pressure distribution diagram. **14**

- Q.4** (a) Design a 4.5 m geotextilerape 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**
