



Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)**

Branch : Civil Engineering

08.807.10 Elective – V : REINFORCED EARTH (C)

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) Answer **all** questions from Part – A and **any one** question **each** from **each** Module from Part – B.
2) **All** questions in Part – A carry **equal** marks.

PART – A

1. Briefly explain the concept of reinforced soil. Sketch two reinforced soil structures.
2. What are the functions performed by geosynthetics ? List one situation each where these functions are applied.
3. What are the advantages of reinforced soil construction ?
4. Sketch the modes of failures observed in reinforced soil retaining walls.
5. List the base polymers used for the manufacture of geosynthetics.
6. Describe the manufacturing process of needle punched and thermally bonded non-woven geosynthetics.
7. List four different types of facing systems used in reinforced soil wall construction. Give sketches.
8. How are geogrids manufactured ?

(8x5 = 40 Marks)



P.T.O.



PART – B

Module – I

9. a) With sketches, explain :
- Equivalent confining stress concept
 - Pseudo cohesion concept and
 - Concept of expanding soil mass in relation to reinforced soil.
- b) A soil mass (silty sand with interfacial friction angle = 32°) has been reinforced with geotextile reinforcement (stiffness 15 kN/m). The vertical stress acting on a reinforcement layer is $\sigma_v = 30 \text{ kN/m}^2$. Vertical spacing = 0.3 m, length of reinforcement = 0.08 m. Calculate the equivalent confining stress. What will be the mode of failure ? 20

OR

10. a) What are the factors affecting the performance of reinforced soil structures ?
- b) What are the different types of reinforcements used in reinforced soil construction ? Mention the advantages and disadvantages of each of them.
- c) Differentiate between geonets and geogrids. 20

Module – II

11. Explain the Tie Back Wedge method of analysis of reinforced soil retaining wall bringing out the assumptions involved in the same. 20

OR

12. A reinforced soil retaining wall is to retain 6 m high soil ($\phi = 36^\circ$, $\gamma = 16 \text{ kN/m}^3$ for the foundation and the back fill). The allowable bearing pressure on the foundation is 200 kPa. Surface of the backfill is horizontal and is subjected to a uniform surcharge pressure of 26 kPa. Geogrid reinforcement with a tensile strength of 120 kN/m shall be used. Design the reinforced soil wall. Take an interaction factor of 0.6. Well graded river sand is proposed to be used as the reinforced soil fill material ($\phi = 40^\circ$ $\gamma = 18 \text{ kN/m}^3$). 20



Module – III

13. a) What are the advantages and disadvantages of natural geotextiles ? Explain the application of natural geotextiles in erosion protection.
- b) Compare and contrast jute and coir fibres with regard to their application in natural geotextiles.
- c) Explain the functions of geosynthetics. 20

OR

14. Explain :
- a) Concertina method
- b) Telescopic method and
- c) Sliding method of construction of reinforced soil retaining walls. 20
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