Printed Pages: 4 NCE-022

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 100667 Roll No. | | | | | | | | | | |

B.TECH.

Theory Examination (Semester-VI) 2015-16

EARTH & EARTH RETAINING STRUCTURES

Time : 3 Hours *Max. Marks : 100*

Note: Attempt all the Sections. If any missing data; then choose suitably.

Section-A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) Write about the requirement of safety of dam.

(b) List the basic components of mechanically stabilized earth retaining wall.

(c) Write the various types of reinforcing elements installed in soil.

(d) Name any four applications of soil reinforcement for ground improvement.

(e) What are the differences between reinforced soil walls and nailed soil walls?

(f) What are the principle requirements of a reinforcing material?

(g) What are the four failure mechanisms to check for external stability of a reinforced earth wall?

(h) List the various steps for the construction of reinforced soil wall.

(i) Define the term Pressure Ratio in details?

(j) Write the advantages of fibre - reinforced soil.

Section-B

2. Attempt any five questions from this section.

(10×5=50)

(a) For an earth dam; derive the Laplace equation for seepage through the homogeneous media. Also discuss its method of solution?

(b) What is rock fill dam? What are their advantages? Draw a neat sketch showing the cross section of a rock fill dam.

(c) Discuss various design steps of mechanically stabilized earth retaining wall along with their neat sketches.

(d) Write various types of the soil nails along with their relative advantages and disadvantages. Also discuss the failure modes of soil nailing.

(e) Give the basic concepts in increasing the strength of cohesionless soil by reinforcing it. Considering rupture failure.

(f) How would you check the internal stability of a reinforced soil structure with vertical faces?

(g) Explain the method of obtaining ultimate bearing capacity of footing resting on reinforced sand.

(h) Show and discuss any three applications of reinforced earth technique to foundation problems. Also discuss the failure mechanism for the isolated strip footings resting on reinforced earth slab.

Section-C

Attempt any two questions from this section.

(15×2=30)

3. What are the various applications of soil nailing? Explain stepwise, the procedure of doing soil nailing work for stabilizing the open excavations. Also give any five practical applications of this technique.

4. Compute the pullout capacity of the following reinforcing elements buried in a horizontal position at a depth of **8 m** in sand having unit weight **18 kN/m^3**, **c = 0** and ϕ = **30°**. For soil - metal take $\tan\delta = 0.7 \tan\phi$ whereas for soil - grout and soil - geotextile take $\tan\delta = \tan\phi$.

a) A steel strip of width **100 mm**

b) A driven soil nail of diameter **50 mm**

c) A drilled and grouted soil nail in a hole of diameter **150 mm**, and

d) Unit width of a geotextile sheet of length **5 m**.

5. How will you calculate the ultimate bearing capacity of footing on reinforced earth slab? Discuss in detail. Also discuss all the failure zones for the reinforced soil bed.