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10CV842

Eighth Semester B.E. Degree Examination, June/July 2017

Reinforced Earth Structures

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Define the term 'reinforced earth'. Explain the basic components of RE with appropriate sketches. (10 Marks)
- b. Explain the 'principle of RE' using:
 - i) Pseudo cohesion concept (10 Marks)
 - ii) Effective confining stress concept (10 Marks)
- 2 a. What are geosynthetics? Discuss the classification of geosynthetics. (10 Marks)
- b. Write a note on raw materials used for the manufacture of geosynthetics. (10 Marks)
- 3 a. What are geogrids? How they are manufactured? List their physical properties that envisages its use in increasing load carrying capacity of soil. (10 Marks)
- b. Explain the following tests with reference to geotextiles:
 - i) Uniaxial tensile test (10 Marks)
 - ii) Puncture resistance test (10 Marks)
- 4 a. With neat sketches, discuss external and internal stability of a reinforced soil wall. (10 Marks)
- b. The following Fig.Q4(b) shows a retaining wall with steel ties. The properties of soil are shown in figure. Check the external stability of the wall given the soil-tie friction angle = 20° . The total height of the wall is 8 m and allowable bearing pressure of soil is 250 kPa. A surcharge of 30 kPa acts in top of the backfill. The yield strength of reinforcement is 2.5×10^5 kN/m².

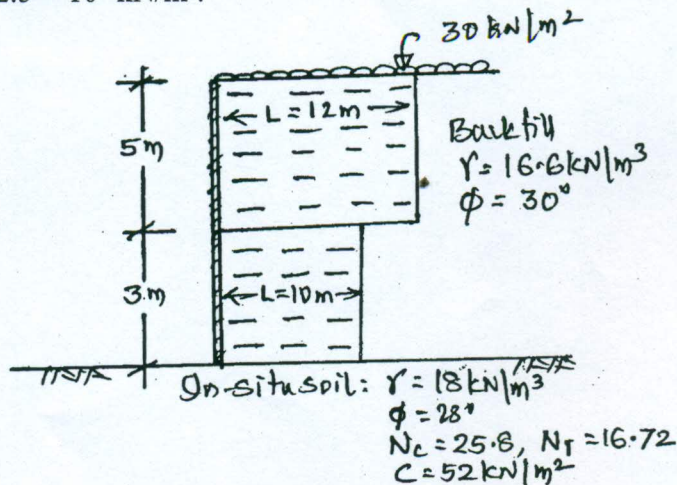


Fig.Q4(b)

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**PART – B**

- 5 a. Explain the modes of bearing capacity failure of a reinforced earth foundation. (08 Marks)
b. Explain the method of improving bearing capacity of a strip foundation using geotextiles. (08 Marks)
c. In a reinforced soil slope, reinforcement design strength 35 kN/m is used. The friction coefficient from a sliding shear test is 0.5. The embankment has $C = 5 \text{ kN/m}^2$, $\phi = 26^\circ$, and $\gamma = 20 \text{ kN/m}^3$. The vertical height between the top level of reinforcement and crest of embankment is 4 m. calculate pull-out length. Use $FS = 3.0$. (04 Marks)
- 6 a. What is soil nailing? Explain its relative merits and demerits. (10 Marks)
b. What are the main components of soil nailing? Compare and contrast its salient features with regard to RE. (10 Marks)
- 7 a. What are landfills? Briefly explain the typical design for land fill lines and covers using RE. (10 Marks)
b. With appropriate sketches, describe any five major functions of geosynthetics. Hence list the requirement of geosynthetic has to satisfy to be used on filters and drainage requirements in soil. (10 Marks)
- 8 a. With the help of neat sketches, explain the reinforcement functions of geosynthetics in roadways. (08 Marks)
b. What are the causes of slope failure? Hence explain the advantages of using reinforcement in slopes in increasing their stability. (08 Marks)
c. A road embankment on a soft soil has the following details:
 $S_{ud} = 16 \text{ kN/m}^2$, $\gamma = 20 \text{ kN/m}^3$, height of embankment = 5 m, depth of soft soil = 4 m, full inward shear stress mobilize with $\alpha = 1$, $FS = 1.3$.
Estimate the side slope (1 : n). (04 Marks)

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