

Civil

B.E. / Civil / Sem-VII / C Scheme / Sub-DLOC / GEIT / Date: 20/11/25

S.H. 2025

QP. Code: 10095919

02

Time: 3Hours

Max Marks=80

Note 1. Question 1 is compulsory

2. Attempt any 3 out of five questions
3. Assume any suitable data wherever required

- Q1** Attempt any **FOUR** questions 20
- a What do you mean by compaction and consolidation?
  - b Mention the needs of reinforced earth anchors
  - c What is the need of ground improvement technique?
  - d What do you mean by stone column and what are the applications of it?
  - e Explain soil stabilization and purpose of it
- Q2a** Discuss chemical stabilization in detail with its types 10
- Q2b** What are the fundamental principles of grouting? Discuss the parameters on which grout ability depends and what are the desirable characteristic of grouts? 10
- Q3a** A 10m high wall is to be built using sand fill and polymer grid reinforcement. The sand has  $\phi=25^\circ$ , unit weight= $18\text{kN/m}^3$ . A surcharge load of 15kPa is to be allowed and a maximum safe bearing pressure for the foundation soil is 300kPa. Two grids of different design strength are available. Grid A at 20kN/m and grid B at 40kN/m. both have the bond coefficient  $F_b=0.9$ . The fill will be compacted in layers of 250mm thickness. Design the retaining wall. 10
- Q3b** Explain Mononobe and Okabe method to calculate capacity of strip anchors 10
- Q4a** To resist the earthquake, force an anchor of 6.5m is subjected in a sandy soil having a unit weight of  $19\text{kN/m}^3$ . The angle of internal friction of the sand particle is  $25^\circ$  and the anchor is embedded at 7m depth below the ground level. Take  $K_h=K_v=0$ . Calculate the pull-out capacity of vertical anchor. 10
- Q4b** What are the methods used for improving the effectiveness of stone column 10
- Q5a** Soft silt clay layer having a depth of 7.5m and  $C_u$  is 18kPa has the following property 10
- a. Weight density above the ground water table is  $18\text{ kN/m}^3$
  - b. Effective density (submerged) below the ground water table  $=8.5\text{kN/m}^3$
  - c. Ground water table is situated at 1m below the ground level. on the above of the stone column of water tank is to be supported on earthen pad foundation
  - d. Diameter of the tank= $79\text{m}$
  - e. Load intensity from the tank and the earthen pad is  $147\text{kPa}$
  - f. Diameter of the stone column is  $0.9\text{m}$
- Design a stone column foundation system
- Q5b** What are the factors considered for desired compaction on field 10
- Q6** All questions are compulsory 20
- a Explain equal strain condition.
  - b Show the schematic representation of grouting plant for permeation grouting.
  - c Short note on organic soil.
  - d What do you mean by replacement ratio as per IS 15284 for stone column?

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