

Total No. of Questions : 10]

SEAT No. :

**P3659**

**[4959]-1013**

[Total No. of Pages : 3

**B.E. (Civil)**

**e-ADVANCED GEOTECHNICAL ENGINEERING  
(2012 Pattern) (Semester - I) (Elective - II) (End-Semester)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, and Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Answer to the two sections should be written in separate books.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables, slide rule, Molliés charts, electronics pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data if necessary.*
- 6) *Neat diagrams must be drawn wherever necessary.*

**Q1) a)** Discuss different soil classification system. **[4]**

b) Explain the following: **[6]**

- i) PRA classification
- ii) USCS classification

OR

**Q2) a)** Determine the active earth pressure at a depth of 5.0 m in sand whose angle of friction is  $36^\circ$  and density of  $16.5 \text{ kN/m}^2$  in dry state. **[4]**

b) Explain the structure of montmorillonite and give role of montmorillonite in foundation engineering. **[6]**

**Q3) a)** Differentiate between Rankine's and Coulomb's earth pressure theories. **[4]**

b) Discuss the application of geosynthetics in geoenvironmental engineering. **[6]**

OR

**P.T.O.**

- Q4)** a) Discuss slope stabilization using soil nails. [4]
- b) What do you mean by “Reinforced Earth”? Give the advantages of reinforced earth structure. [6]

**Q5)** Explain the following:

- a) Soil as a mass spring system. [4]
- b) Barken’s method. [4]
- c) Pauw’s method. [4]
- d) Elastic half space method. [4]

OR

- Q6)** a) Resonance occurred at a frequency of 22 cycles/sec in a vertical vibration test of a block 1m \* 1m\* 1m. Determine the  $C_u$  of soil, if the weight of oscillator is 650N and the force produced by it at 12 cycles/sec is 1000N. [8]
- b) Discuss the design criteria for impact type machine as per IS-2974 (Pt II) -1966. [8]

- Q7)** a) Explain the steps for design of sand drains with the following cases:
- i) Isotropic case
- ii) Anisotropic case [8]
- b) Explain the stages for construction of bored compaction pile. [8]

OR

**Q8)** Explain the following:

- a) Vibroflotation. [4]
- b) Grouting. [4]
- c) Sand drains. [4]
- d) Freezing soil. [4]

**Q9)** a) Discuss the following in details. [3×4=12]

- i) Rheological Model and its utility
  - ii) Maxwell Model
  - iii) Creep
- b) Explain in detail “Saint Venant Model”. [6]

OR

**Q10)**a) Explain secondary consolidation in detail. [6]

- b) Reissner’s Model with spring and dashpot. [6]
- c) Explain basic and compound Rheological Models. [6]

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