P3972

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[4860] - 40

M.E. (Civil) (Structure) (Semester - I)
DESIGN OF FOUNDATION
(2008 Pattern) (Elective - I (d))

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

1) Answer any two questions from each section.
2) Answers to the two sections should be written in separate books.
3) Neat diagrams must be drawn wherever necessary.
4) Your answers will be valued as a whole.
5) Use of electronic pocket calculator & IS codes are not allowed.
6) Assume suitable data, if necessary.

SECTION - I

Q1) a) Explain the following: [15]
   i) Proportioning of Footing.
   ii) IS - 1892-1979, provisions for soil exploration.
   iii) USCS.
   iv) Soil Structure Interaction.
   v) Teng's correlations.

   b) For a framed structure, a column footing of size 2.5 m x 3m, transmits a pressure increment of 150 kN/m², at its base embedded in sand 1.8 m below GL. Total depth of sand below GL is 3.8m & below it 2m deep clay was found. Assuming 2 V : 1H, pressure distribution, compute the consolidation settlement at the middle of clay layer. Using following data,
   i) For sand, $\gamma = 19$ kN/m³ & $\gamma_{sat} = 23$ kN/m³.
   ii) For clay, $\gamma_{sat} = 20$ kN/m³, Cc = 0.26, w = 40%, G = 2.7, GWT @ 2.8m below GL.
   [10]

Q2) a) Explain the design steps, with sample calculations, for [16]
   i) Flat slab raft.
   ii) Beam & Raft (slab) foundation.

   b) Discuss the conditions favouring the design of different types of raft foundations. [9]

Q3) a) Discuss the design of foundations for **[15]**

       i) Rotary machines.

      ii) Impact machines, as per IS-2974 (pt-II) - 1966.

   b) For a block vibration test, resonance occurred at a frequency of 30 cycles/sec, with test block size 1m x 1m x 1m. Determine Cu if the wt. of oscillator is 900 N & the force produced by it after 15 cycles is 1800 N. Compute the max. Amplitude in the vert. direction at 15 cycles/sec if the wt. of block is 24 kN/m³. **[10]**

SECTION - II

Q4) a) Compute the settlement of pilegroup in a uniform clay upto a depth of 20m, using following data, **[15]**

      i) Total load = 3000 kN.

      ii) 'B' of pile cap = 5m,

      iii) L = 10 m, ϕ = 0.5 m & qu = 70 kN/m²,

      iv) LL = 60%, FOS = 03 for shear.

   b) Explain the following:

      i) Design steps for precast & in-situ piles. **[6]**

      ii) NSF. **[4]**

Q5) a) Explain the steps for design of RCC precast pile with sample calculations & check for handling stresses. **[17]**

   b) Explain the steps for 'Rees & Mat lock Method. **[8]**

Q6) a) Explain the steps for design of pile cap, with sample calculations. **[9]**

   b) Explain different types of 'Shell foundations', stating their suitability & IS code recommendations. **[8]**

   c) Compare Hyperbolic & conical RC shell foundations, with & without edge beams. **[8]**

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