P530

[6004]-452

B.E.(Civil Engg)

FOUNDATION ENGINEERING

(2019 Pattern) (Semester - VII) (401001)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

  1)   Solve Q.1 or Q.2,Q.3 or Q.4,Q.5 or Q.6 and Q.7 or Q.8.

  2)   Figures to the right indicate full marks.

Q1) a)   Explain spring analogy with respect with respect to consolidation process. **[5]**

   b)   Explain with sketches how contact pressure changes according to type of soil and type of footing. **[6]**

   c)   A soil stratum is 10 m thick with pervious stratum on top and bottom. Determine the time required for 50% consolidation. Use following data (i) coefficient of permeability of soil = 10^{-9} m/s.(ii) Coefficient of compression = 0.003 m^2/kN, (iii) void ratio =2. =**[6]**

OR

Q2) a)   A rectangular footing 2 m × 3 m carries a column load of 600 kN at a depth of 1 m. The footing rests on c - φ soil strata, 6 m thick having Poisson's ratio of 0.25 and Young's modulus of elasticity as 20000 kN/m^2 . Calculate the immediate elastic settlement of the footing. Take influence factor = 1.06. **[5]**

   b)   Explain square root of time fitting method to determine coefficient of consolidation. **[6]**

   c)   Define (i) normally consolidated soil (ii) pre consolidated soil (iii) degree of consolidation. **[6]**

Q3) a)   Give classification of piles based on function. **[5]**

   b)   What is negative skin friction? How will you calculate the negative skin friction for a single pile? **[6]**

   c)   Calculate the efficiency of 15 piles arranged in three rows and 5 columns by Feld's rule. Take pile diameter = 300 mm and spacing of pile (both ways) = 0.8 m. **[6]**

OR

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Q4) a) What is the principle used in dynamic methods to calculate pile capacity? Write Engineering News Formula with meaning of each term. **[5]**

b) Explain the static pile load test in detail. **[6]**

c) A 3×3 pile group with pile diameter and pile length of 300 mm and 10 m respectively is embedded in soft clay with cohesion of 70 kN/m^2. The spacing between the piles (both ways) is 90 cm and adhesion factor is 0.6. Calculate the capacity of the pile group. Take factor of safety = 2.5. Neglect end bearing. **[6]**

Q5) a) Discuss the design principles involved in design of raft foundation by flexible (elastic) method. **[6]**

b) Write a note on (i) Floating raft (ii) types of shallow foundation. **[6]**

c) When following types of footings are used (i) Combined rectangular (in plan) footing (ii) Trapezoidal (in plan) footing (iii) Strap footing. **[6]**

OR

Q6) a) Enlist the uses of caissons and write a note on caisson disease. **[6]**

b) Explain the components of Pneumatic Caissons with a neat sketch. **[6]**

c) Draw a sketch of well foundation and give names to all parts. **[6]**

Q7) a) Explain any two types of cofferdams. **[6]**

b) Explain the procedure of swelling pressure test with a neat sketch. **[6]**

c) Discuss stone column technique with a neat sketch. **[6]**

OR

Q8) a) Write a note on 'construction of diaphragm wall'. **[6]**

b) Draw a vertical section of underreamed pile with two bulbs. Name various parts. **[6]**

c) Discuss vibro flotation technique with a neat sketch. **[6]**

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