SEAT No. :

P530

[6004]-452

[Total No. of Pages : 2]

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/m². 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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