

Total No. of Questions : 8]

SEAT No. :

PD4549

[Total No. of Pages : 2

[6404]-53

B.E. (Civil Engineering)
FOUNDATION ENGINEERING
(2019 Pattern) (Semester - VII) (401001)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of non-programmable calculator is allowed.
- 5) Assume suitable data if necessary.

- Q1) a)** Explain the laboratory consolidation (Oedometer) test and its applications. [6]
- b)** Explain the graphic procedure for determination of preconsolidation pressure. [5]
- c)** If the average effective stress on 3.1m thick clay layer ($e_0 = 0.95$, $W_L = 60\%$) sandwiched between top pervious and bottom impervious layer increases from 76.45 kN/m^2 to 115 kN/m^2 . Calculate total consolidation settlement. If coefficient of consolidation is $5.6 \text{ mm}^2/\text{min}$, how many days it will take to reach 50% consolidation settlement, assume time factor of 0.197. [6]

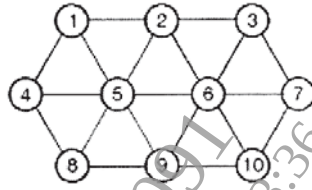
OR

- Q2) a)** State any six assumptions of Terzaghi's 1-dimensional consolidation Theory. [6]
- b)** Explain logarithm-of-time method for determination of coefficient of consolidation. [5]
- c)** For a normally consolidated clay, $\sigma_0 = 200 \text{ kN/m}^2$, $e = e_0 = 1.22$, $\sigma_0 + \Delta\sigma' = 400 \text{ kN/m}^2$, $e = 0.98$. The hydraulic conductivity, k , of the clay for the loading range is $0.61 \times 10^{-4} \text{ m/day}$. How long (in days) will it take for a 4-m-thick clay layer (drained on one side) in the field to reach 60% consolidation? Assume for $U = 60\%$, the value of $T_{60} = 0.286$. [6]

- Q3) a)** Explain with neat sketch the separation of pile load into skin friction and point resistance using cyclic pile load test. [6]
- b)** Explain the classification of piles based on mode of transfer of loads. [5]

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- c) Explain Feld's rule for calculation of efficiency of pile groups. Determine the group capacity, for group of 10 piles, arranged in 3 rows spaced at 1m c/c. if single pile capacity is 450 kN. [6]



OR

- Q4)** a) Explain the consolidation settlement of pile group using approximate method with neat sketch. [6]
 b) What are the Micropiles? Give the applications of Micropiles. [5]
 c) A square pile group (3×3 formation) consist of 9 piles of 30 cm diameter, center to center distance of 0.75 m and 10 m length driven in the clay $C_u = 100 \text{ kN/m}^2$, $\gamma = 20 \text{ kN/m}^3$, Determine the safe load for the group if $N_c = 9$, factor of safety $FS = 3$ and adhesion factor $\alpha = 0.6$. [6]

- Q5)** a) Explain the concept of floating raft with neat sketch. [6]
 b) List the forces considered in the design of Well Foundations and explain any two forces in detail. [6]
 c) Distinguish the assumptions involved in analysis of a raft foundation by Rigid Foundation (Conventional Method) and Simplified elastic (Flexible) Foundation Method. [6]

OR

- Q6)** a) Explain proportioning of combined trapezoidal footing with neat sketch. [6]
 b) Explain the depth selection and ultimate bearing capacity of well foundation. [6]
 c) Explain with neat sketch the remedial measures for rectification of Tilts during sinking of well. [6]

- Q7)** a) What are coffer dams? Explain any one Cellular coffer dams with neat sketch. [6]
 b) Explain with neat sketch the design principles to be followed for construction of foundations on black cotton soil. [6]
 c) Explain R C Diaphragm Wall-Construction stages with neat sketch. [6]

OR

- Q8)** a) Explain with neat sketch the load carrying capacity of under-reamed pile in clayey soils. [6]
 b) List the methods for evaluation of swelling potential. Explain any one method for measurement of swelling pressure. [6]
 c) Explain the soil improvement method by pre loading with prefabricated vertical drains. [6]

