

Total No. of Questions : 8]

SEAT No. :

P-6523

[Total No. of Pages : 3

[6181]-72

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

Q1) a) Define Normal consolidation, over consolidation and Pre-consolidation Pressure. [6]

b) A normally consolidated clay stratum of 5m thickness has two permeable layers at its top and bottom. The liquid limit and the initial void ratio of clay are 40% and 0.85 respectively. While the initial overburden pressure at the middle of clay layers is 300kPa. Due to the construction of a new building, this pressure increases by 150 kPa. Compute the probable primary consolidation settlement (expressed in mm) of the building. [6]

c) What are the different types of foundation settlements? Explain in detail. [5]

OR

Q2) a) Discuss with sketch logarithmic of time fitting method for determination of coefficient of consolidation. [6]

b) An undisturbed sample of clay 24mm thick consolidated 50% in 20 minutes when tested in the laboratory, with drainage allowed at the top and bottom. The clay layer from which the sample was obtained is 4m thick in the field. How much time will it take place to consolidate 50% with a single drain? [6]

c) What is contact pressure? Draw contact pressure distribution of a rigid footing on sandy and clayey soil strata. [5]

P.T.O.

- Q3)** a) Enlist the classification of piles and explain with neat sketch pile classified with respect to function. [6]
- b) A circular pile section with 0.35 m diameter and length of 10m penetrates into the clay having $c = 50 \text{ kN/m}^2$ and mobilization factor = 0.8. Calculate the safe load with a factor of safety = 2.5. Neglect the bearing resistance. [6]
- c) Define Negative Skin Friction. How it is determined. Also explain how it is prevented. [5]

OR

- Q4)** a) What are the conditions where a pile foundation is more suitable than a shallow foundation? [6]
- b) Design square pile group to carry 500 kN load in clay with an unconfined compressive strength of 80 kN/m^2 . The pile is 30cm diameter and 8m long and adhesion factor 0.6. Use $FS = 3$. [6]
- c) Explain in brief efficiency of pile group. [5]
- Q5)** a) Sketch and describe the various components of the well foundation, indicating functions of each component. [6]
- b) Discuss the procedure for proportioning of footing for equal settlement. [6]
- c) What is Caisson? How Caissons are classified based on methods of construction? [6]

OR

- Q6)** a) Discuss tilts and shifts : precautionary and remedial measures of well Foundation. [6]
- b) Explain design steps of raft foundation by elastic (flexible) method. [6]
- c) What is meant by shallow foundations? What are the principles of the design of footing? [6]

- Q7)** a) Discuss preloading with prefabricated vertical drains/sand drains with a neat sketch. [6]
- b) Explain the effect of swelling and shrinkage of expansive soils on building constructed. Also, enlist the precautions to be taken. Illustrate with sketches. [6]
- c) Enlist types of cofferdams. Explain any one type with neat sketch. [6]

OR

- Q8)** a) Discuss design principle of undreamed pile. [6]
- b) Explain any four engineering problem associated with black cotton soil. [6]
- c) List out the various techniques of soil improvement. Explain any one. [6]

