

Total No. of Questions : 10]

P2919

SEAT No. :

[Total No. of Pages : 3

[5669]-508

T.E. (Civil) (Semester - II)

FOUNDATION ENGINEERING

(2015 Pattern)

Time : 2.5 Hours]

Instructions to the candidates:

- 1) Answer Q.No. 1 or Q. No. 2, Q.No. 3 or Q.No. 4, Q.No. 5 or Q.No. 6, Q. No. 7 or Q.No. 8, Q.No. 9 or Q.No. 10.
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

[Max. Marks : 70

Q1) a) What is significant depth? How would you decide the depth of exploration. [5]

b) A footing 2m square rests on soft clay soil with its base at a depth 1.5m from ground surface. Using Skempton's equation determine net safe bearing capacity of footing for the soil properties  $C_u = 80 \text{ kN/m}^2$ ,  $\phi_u = 0$ , assume  $F.s = 3.0$ . [5]

OR

Q2) a) What is R.Q.D., How rating of rock quality is decided based on R.Q.D. [5]

b) Estimate average immediate settlement for the following data: [5]

- i) Footing =  $4\text{m} \times 2\text{m}$
- ii) Depth of foundation = 2 (m)
- iii)  $E = 48,000 \text{ kN/m}^2$ ,  $\mu = 0.5$
- iv) Contact pressure =  $200 \text{ kN/m}^2$ ,  $\mu_0 = 0.78$ ,  $\mu_1 = 0.84$

Q3) a) Explain terms with sketches [6]

- i) Inside clearance
- ii) Outside clearance
- iii) Area ratio

b) In what situations would you go for combined footing? Explain any one in detail. [4]

OR

Q4) a) Explain the effect of submergence on bearing capacity for different positions of ground water table. [6]

b) In a consolidation test void ratio decreased from 0.7 to 0.65, when the load was changed from  $50 \text{ kN/m}^2$  to  $100 \text{ kN/m}^2$ . Compute compression Index and coefficient of volume change. [4]

Q5) a) Explain how do you decide bearing capacity of single pile by pile load test method with suitable sketches. [6]

b) Draw a neat sketch of Pneumatic caisson and explain the functions of various component parts. [6]

c) A circular pile section with  $0.35\text{m}$  diameter and length  $10\text{m}$  penetrates a deposit of clay having  $C = 10 \text{ kN/m}^2$  and mobilizing factor  $m = 0.8$ . Calculate load carrying capacity by skin friction. [5]

OR

Q6) a) Explain the classification of piles with basis of classification. [5]

b) What is tilt and shift in case of well foundation. Explain remedial measures for rectification of tilt and shift. [6]

c) A pile  $300 \text{ mm}$  diameter  $8 \text{ m}$  deep is installed in a stratum having shearing resistance angle of  $30^\circ$ . A cohesion is  $10 \text{ kN/m}^2$ . Value of cohesion factor is  $0.8$  and density of stratum is  $17.66 \text{ kN/m}^3$ . Find Ultimate bearing capacity. [6]

Q7) a) Explain the effects of swelling and shrinkage of expansive soils on walls and flooring of buildings constructed on it. Also, enlist the precautions to be taken. Illustrate with sketches. [6]

b) Explain any one method of calculating load carrying capacity of double under reamed pile. [6]

c) Draw the neat sketches of structural arrangements involved in [5]

- i) Cantilever sheet pile
- ii) Anchored sheet pile

OR

Q8) a) Explain seven properties of clayey soils which would help in classifying their swelling potential. [6]

b) Explain with sketches [6]

- i) Rock fill cofferdam
- ii) Sand Bag cofferdam

c) What are the engineering problems associated with black cotton soils. Explain any four in brief. [5]

[5669]-508

2

P.T.O.

- Q9) a)** Explain use of geosynthetics in [5]
- i) Roads and pavements
  - ii) Load bearing improvement
- b)** Define terms [6]
- i) Epicenter
  - ii) Focus
  - iii) Magnitude and
  - iv) Intensity
- c)** Explain any four advantages of geosynthetics over the conventional materials. [5]

OR

- Q10) a)** What is liquefaction. Discuss effects of liquefaction and suggest suitable methods for prevention of liquefaction of soils. [6]
- b)** What is reinforced Earth wall. Draw a neat sketch of reinforced earth wall and explain functions of its various component parts. [6]
- c)** Differentiate between P-waves and S-waves. [4]

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