

**R13**

Code No: 126DV

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech III Year II Semester Examinations, May - 2016****FOUNDATION ENGINEERING**

(Common to CE, CEE)

**Time: 3 hours****Max. Marks: 75**

**Note:** This question paper contains two parts A and B.  
 Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A****(25 Marks)**

1. a) What are the sampling methods. [2]
- b) Give the preparation of soil investigation report. [3]
- c) List out the types of slope failures. [2]
- d) Define the factor of safety for an infinite slope. [3]
- e) What are the assumptions of Coulombs theory? [2]
- f) Describe the MSE walls. [3]
- g) Differentiate between Shallow and deep foundations. [2]
- h) Explain settlement in pile foundation. [3]
- i) What do you mean by sinking of wells? [2]
- j) Discuss about tilt and shift. [3]

**PART - B****(50 Marks)**

2. a) Explain the need for soil exploration.
- b) Discuss the sub soil exploration methods.
- c) What is boring and sampling? [3+4+3]

**OR**

3. a) Discuss the boring methods
- b) Write the bore log report for soil investigation. [5+5]

4. A homogeneous dam section is 25m high with upstream slope of 2.5 to 1.0 and downstream slope of 2 to 1. There is a 12m long horizontal filter at the downstream end. Taking a free board of 3m determine a) Factor of safety of downstream slope under steady seepage conditions, b) factor of safety of upstream slope under sudden drawdown conditions. Using Bishops simplified method. [5+5]

**OR**

5. A vertical cut of 10m is made in a soil deposit,  $\gamma=19 \text{ kN/m}^3$ ,  $c=30 \text{ kN/m}^2$ ,  $\phi=0^\circ$ . There is a hard stratum below the original soil surface at a depth of 12m. Find the safe slope of cutting if the factor of safety is 1.50 for  $D_f=1.20 \text{ m}$ . Use Stability Charts. [10]

6. A retaining wall with a vertical back 6 m high supports a cohesionless backfill of unit weight  $19.6 \text{ kN/m}^3$ . The upper surface of the backfill rises at an angle of  $10^\circ$  with the horizontal, from the crest of the wall. The angle of internal friction for the soil is  $35^\circ$  and the angle of wall friction is  $20^\circ$ . Find the total active pressure per metre length of the wall and mark the direction of point of application of the resultant pressure. [10]

OR

7. A retaining wall has a smooth vertical back and is 8.5 m in height. It retains a horizontal backfill of sand with  $\phi=33^\circ$ . Find out the total active earth pressure per meter length of wall, if  $\gamma=18 \text{ kN/m}^3$  and  $\gamma_{\text{sat}}=20 \text{ kN/m}^3$ .

- a) The water table is far below the base of the wall  
b) The water table rises upto 4.0 m level above the base.

[5+5]

- 8.a) Describe the types of foundation and discuss the selection criteria of a foundation.  
b) For a continuous foundation of 0.9 m depth and 1.2 m width, using Terzaghi's bearing capacity factors determine the gross allowable load per unit area that the foundation can carry. Given  $\gamma=18 \text{ kN/m}^3$ ,  $c'=10 \text{ kN/m}^2$ ,  $\phi'=20^\circ$ , Factor of safety=3. Assume general shear failure.

[5+5]

OR

- 9.a) Discuss different methods for the installation of piles. How would you estimate the load carrying capacity of a pile in cohesionless soils?

- b) Design a friction pile group to carry a load of 3500 kN including the weight of pile cap, at a site where the soil is uniform clay to a depth of 10 m underlain by rock. The average compressive strength of clay is  $50 \text{ kN/m}^2$ . The clay may be assumed to be of normal sensitivity and normally loaded with a liquid limit of 70%. Adopt a factor of safety 2.5 against shear failure.

[5+5]

- 10.a) What are the forces acting on well foundation.  
b) What are the problems encountered in well sinking.  
c) Give the measures for rectifying tilts and shifts.

[3+3+4]

OR

- 11.a) With a neat sketch, state different components of a well foundation.  
b) What are types of well foundations? Discuss different shapes of well foundations. [5+5]

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