Code No: 126DV **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, May - 2017
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) Define area ratio. [2]
b) Define outside clearance. [3]
c) What are types of slope failures? [2]
d) Write the Taylors stability number. [3]
e) What is earth pressure at rest? [2]
f) What are the different types of retaining walls? [3]
g) Define the net and gross bearing capacity. [2]
h) Define dynamic formulae of Danish. [3]
i) List the different shapes of well foundations. [2]
j) What is the permissible flit of well foundations? [3]

PART - B

(50 Marks)

2.a) Explain briefly Standard penetration test.
b) Determine the passive pressure by Rankine's theory per unit run for a retaining wall 4m high, with $i=15^0$, $\Phi'=30^0$ and γ= 19 kN/m^3. The back face of the wall is smooth and vertical. [5+5]

OR

3.a) Explain the need for soil exploration and Illustrate methods of it.
b) The field 'N' value in a deposit of fully submerged fine sand was 50 at a depth of 8 m. The average saturated unit weight of soil is 19 kN/m^3. Calculate the corrected 'N' value. [5+5]

4.a) Explain Bishop's simplified method. Derive an expression for the factor of safety.
b) Determine the safe height of a slope which is to be constructed at an angle of 30^0 with the horizontal. The required factor of safety with respect to both cohesion and angle of internal friction is 1.5, and the soil has the following properties: C= 10 kN/m^2, $\Phi=22.5^0$ and density = 20 kN/m^3. Taylor's stability numbers for mobilized friction angles of 22.5^0 and 15^0 are, respectively, 0.016 and 0.046. [5+5]

OR

5.a) How a slope is analysed using Swedish circle method? Derive an expression for the factor of safety.
b) Determine the factor of safety with respect to cohesion, if an embankment of 20 m height and having a slope of 45^0 is subjected to sudden drawdown. C=20 kN/m^2, $\Phi=30^0$, γ_{sat}=18 kN/m^3 (Take Taylor's stability number = 0.08). [5+5]

6.a) Describe the Culmann's graphical method of determining the active earth pressure in cohesion less soils.

b) A retaining wall with smooth vertical back is 8m high and retains a two layer sand back fill. The top layer is 3m high having $\emptyset=30^0$ and $\Upsilon=20$ kN/m^3. The bottom layer is 5m having $\emptyset=35^0$ and $\Upsilon=22$ kN/m^3. Determine the total active earth pressure and point of its application. [5+5]

OR

7.a) State the assumptions in Rankine's theory. Derive an expression for Active and Passive pressure.

b) Discuss the principles of the design of retaining walls. [5+5]

8.a) Differentiate between general shear failure and local shear Failure.

b) A square footing of 1.8 m size is placed over a sand of bulk density 20 kN/m^3 and saturated density 22 kN/m^3 at a depth of 1.0 m below ground. The angle of internal friction of sand is 30^0. The Terzaghi's bearing capacity factors $N_c=30.14$, $N_q=18.4$ and $N_\Upsilon=15.1$. Determine the ultimate bearing capacity of the soil when there is no effect of water table and when the water table is at base. [5+5]

OR

9.a) Discuss the uses of penetration tests for estimation of load-carrying capacity of piles.

b) A rectangular footing 3m × 2m exerts pressure of 100 kN/m^2 on cohesive soils ($Es=5\times10^4$ kN/m^2 and $\mu=0.50$). Determine the immediate settlement at the centre; assuring (i) the footing is flexible I=1.36 (ii) the footing is rigid. I=1.06? [4+6]

10.a) Discuss the construction aspects of well foundations.

b) Discuss the various methods for the design of well foundations. [5+5]

OR

11.a) Explain briefly sinking of wells.

b) Discuss the causes and remedies for tilts and shifts. [5+5]

---ooOoo---