

Code No: 1263V

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.
- b) Define outside clearance.
- c) What are types of slope failures?
- d) Write the Taylors stability number.
- e) What is earth pressure at rest?
- f) What are the different types of retaining walls?
- g) Define the net and gross bearing capacity.
- h) Define dynamic formulae of Danish.
- i) List the different shapes of well foundations.
- j) What is the permissible flit of well foundations?

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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 $i=15^\circ$, $\Phi'=30^\circ$ and $\gamma=19 \text{ kN/m}^3$. 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° 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: $C=10 \text{ kN/m}^2$, $\Phi=22.5^\circ$ and density = 20 kN/m^3 . Taylor's stability numbers for mobilized friction angles of 22.5° and 15° 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° is subjected to sudden drawdown. $C=20 \text{ kN/m}^2$, $\Phi=30^\circ$, $\gamma_{sat}=18 \text{ kN/m}^3$ (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 $\phi=30^\circ$ and $\gamma=20 \text{ kN/m}^3$. The bottom layer is 5m having $\phi=35^\circ$ and $\gamma=22 \text{ kN/m}^3$. 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° . The Terzaghi's bearing capacity factors $N_c=30.14$, $N_q=18.4$ and $N_\gamma=15.1$. 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 $3\text{m} \times 2\text{m}$ exerts pressure of 100 kN/m^2 on cohesive soils ($E_s=5 \times 10^4 \text{ kN/m}^2$ 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]

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