

**R18**

Code No: 156BA

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech III Year II Semester Examinations, August/September - 2021**

**FOUNDATION ENGINEERING**

(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

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1. What is meant by N value? Why should we apply correction for the N value obtained from the field? Briefly explain the corrections. [15]

2.a) What is the significance of soil exploration? Explain.

b) Discuss the following:

- i) Undisturbed soil
- ii) Disturbed soil.

[9+6]

3.a) Why earth slopes fail? Discuss.

b) An infinitely long slope is made up of a  $c-\phi$  soil having the properties cohesion ( $c$ ) = 20 kPa and dry unit weight of soil ( $\gamma_d$ ) = 16 kN/m<sup>3</sup>. The angle of internal friction and critical height of slope are 40° and 5 m respectively. What is the angle of internal friction of the soil to maintain the limiting equilibrium. [6+9]

4.a) What is Taylor's stability number? Discuss its use.

b) A cutting of depth 10 m is to be made in soil which has  $c = 30$  kN/m<sup>2</sup>,  $\gamma = 19$  kN/m<sup>3</sup> and  $\phi = 0$ . There is a hard stratum below the original soil surface at a depth of 12 m. Find the safe slope of cutting if the factor of safety is 1.5. For  $D_f = 1.20$ ;  $S_n = 0.143$  for  $i = 30^\circ$ ;  $S_n = 0.101$  for  $i = 15^\circ$ . [8+7]

5.a) Write the assumptions of Rankine's theory.

b) A retaining wall of height 5 m retains a sand fill, whose angle of internal friction,  $\phi = 30^\circ$  and unit weight,  $\gamma = 118$  kN/m<sup>3</sup>. Estimate the active earth pressure force and its position from bottom of wall. [6+9]

6.a) List the various types of retaining walls and discuss the gravity retaining wall and cantilever retaining wall.

b) Discuss how factor of safety against sliding is estimated for a gravity retaining wall.

[8+7]

7. A square footing rests on a uniform thick deposit of stiff clay with an unconfined compressive strength of 120 kPa. The footing is located at 1.2 m below the ground surface and is to carry a total load of 1000 kN. The unit weight of clay soil 20 kN/m<sup>3</sup> and ground water level is at a great depth and its effect can be ignored. Determine the dimension of square footing required for the loading and soil conditions given with a factor of safety of 3. [15]

8. A bored concrete pile 30 cm diameter and 6.50 m length passes through stiff clay. The average undrained shear strength of clay is 50 kPa upto pile tip and 100 kPa below the pile tip. Find the ultimate load carrying capacity assuming adhesion factor of 0.3. [15]

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