



SF - 8325

B. E. III (Sem. VI) (Civil) Examination

May / June - 2011

Geotechnical Engineering - II

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लभवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. 3 (SEM. 6) (CIVIL)

Name of the Subject :
GEOTECHNICAL ENGINEERING - 2

Subject Code No. : 8 3 2 5 Section No. (1, 2,.....): Nil

Seat No. :

Student's Signature

- (2) Assume suitable data if necessary.
(3) Figures to the right indicate full marks.
(4) Attempt all the questions.

1 (a) Taylor's stability number and discuss factor of safety with respect to height. 5

OR

(a) Explain stability analysis of infinite slope for cohesionless soil. 5

(b) Write short note on : (any one) 5

(a) Swedish slip circle analysis for $C - \phi_u$ soil.

(b) Friction circle method for analysis of slope.

(c) Calculate the factor of safety with respect to cohesion of a clay slope laid at 1 in 1.5 to a height of 6 m, if the angle of internal friction $\phi = 10^\circ$; $c = 22kN/m^2$ and $\gamma = 20kN/m^3$. What will be the critical height of the slope in this soil ? 6

2 (a) Derive Boussineq's expression for a vertical stress developed at a point on the central axis of circular footing loaded by uniform intensity. 6

(b) Discuss vertical pressure distribution on vertical plane at depth Z. 5

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[Contd...

- (c) Find the intensity of vertical pressure and horizontal shear stress at a point 6 m directly below a 30 kN point load acting at a horizontal ground surface. What will be the vertical pressure and shear stress at a point 2 m horizontally away from the axis of loading but at the same depth of 4 m ? 7
- 3 (a) Derive the equation of active earth pressure behind the retaining wall for cohesionless soil mass subjected to uniform surcharge intensity throughout the depth H. Also draw pressure distribution diagram behind the retaining wall. 5
- OR**
- (a) What is the difference between Rankine theory and Coulomb theory of earth pressure ? 5
- (b) A 8 m high vertical wall supports a saturated, cohesive backfill ($\phi_u = 0$) with horizontal surface. The top 3 m of backfill weighs 18 kN/m³ and has an apparent cohesion of 18 kN/m². The bulk unit weight and apparent cohesion of the bottom 5m of the backfill are respectively 20 kN/m² and 24 kN/m². What is the likely depth of tension cracks behind the wall ? If tension cracks develop, What will be the total active pressure ? Draw the pressure distribution diagram and determine the point of application of the resultant pressure. 7
- (c) Explain active pressure, passive pressure and pressure at rest behind the retaining wall. 4
- 4 (a) All question are compulsory : 5
- (1) Define penetration resistance N for SPT test.
 - (2) When the load on two adjacent column is approximately same than _____ footing is provided.
 - (a) Rectangular
 - (b) trapezoidal
 - (3) Net safe bearing capacity is ratio of _____ and _____ .
 - (4) The grouping of pile will not reduce the bearing capacity of pile in case of :
 - (a) Friction piles
 - (b) end bearing piles
 - (c) both (a) and (b)
 - (d) None of above
 - (5) Skempton's bearing capacity equation is used for _____ soil.
 - (a) cohesive
 - (b) non cohesive
 - (c) cohesive and non cohesive

- (b) Discuss seismic refraction method in brief. 6

OR

- (b) Describe standard penetration test with the corrections to be applied and interpretations. 6
- (c) Draw neat sketch of soil samples and define. 5
- (a) Area ratio
 - (b) Inside clearance
 - (c) Outside clearance
- 5 (a) State various assumptions made by Terzaghi for evaluation of bearing capacity of soil. 6
- (b) Describe plate load test with neat sketches. 6
- (c) Define following : (any **three**) 6
- (a) Ultimate bearing capacity
 - (b) Net ultimate bearing capacity
 - (c) Safe bearing capacity
 - (d) Allowable bearing capacity

OR

- (c) A rectangular footing of size 5mt. x 3mt is founded at a depth of 2.1 mt below ground surface on purely cohesive soil ($\phi_u=0$) having cohesion of 75 kN/M² the unit weight of soil is 18 kN/M³. Determine ultimate bearing capacity of soil by 6
- (a) Terzaghi
 - (b) Skempton
- 6 (a) Discuss efficiency of pile groups. 6
- (b) Discuss negative skin friction. 4
- (c) A group of 9 piles with 3 pile in each row were driven in clay. The diameter of pile is 30 cm and length of pile is 8 mt. The unconfined compressive strength of pile is 70 kN/M² if centre to centerspacing of pile is 0.9 mt. find allowable load on pile group. Take factor of safety = 2.5. 6