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RN-6747

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

May / June – 2010

Geotechnical Engg. - II

Time : Hours] [Total Marks : **100**

Instruction :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 3 (Sem. 5) (Civil)**

Name of the Subject :

☛ **Geotechnical Engg. - 2**

☛ Subject Code No. : **6 7 4 7** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Use **separate** answer book for each section.
(3) Assume suitable data if **necessary**.
(4) Figure to the **right** indicate full marks.
(5) Explain with neat sketches if needed.

SECTION - I

1 (a) Answer the following : 8

(i) The seismic refraction method is _____ method for site investigation.
  (a) Direct
  (b) Indirect
  (c) Name of above

(ii) If the water table is at base of footing the value of Rw_1 = _____
  (a) 0.5
  (b) 1
  (c) 0

(iii) In Rankine's theory of earth pressure assumes that backfill of wall is _____.
  (a) Plane and smooth
  (b) Vertical and smooth
  (c) Vertical and rough

(iv) In plate load test, the thickness of steel plate should not be less than _____ mm.
  (a) 30
  (b) 25
  (c) 20

(v) The area ratio of soil sampler should not be greater than _____ per cent.
(a) 10
(b) 25
(c) 20

(vi) For purely cohesive soil, the value of N_c is _____ for strip footing as per skempton's analysis.
(a) 9
(b) 7.5
(c) 6.2

(vii) A tension crack is usually developed in the soil near the _____ of the wall because of negative pressure.
(a) Top
(b) Bottom
(c) Center

(viii) In fairly soft and compressible soil, large deformation occur, below footing before failure zone are fully developed such a failure is called _____.
(a) General shear failure
(b) Local shear failure
(c) Punching failure

(b) Explain electric resistivity method with neat sketch. **6**

OR

(b) Define sampler. Explain design criteria of soil sampler with sketch. **6**

(c) Bore log presentation describe the stratification and programming of exploration. **5**

2 (a) Define following term : **6**
(i) Ultimate bearing capacity
(ii) State Bearing capacity
(iii) Allowable bearing capacity.

OR

(a) Explain Skempton's and Brinch Hansen's bearing capacity equation. **6**

(b) Explain effect of water table in bearing capacity of soil using reference of depth of foundation. **5**

(c) The plaste load tests are conducted in a c-ϕ soil, on plates of two different sizes and following result were obtained : **7**

	Load	*Size of Plate*	*Settlement*
(i)	50 kN	0.3 m × 0.3 m	25 mm
(ii)	110 kN	0.6 m × 0.6 m	25 mm

Find the size of square footing to carry a load of 800 kN at the same specified settlement of 25 mm.

3 (a) Derive the expression for submerged backfill and backfill with surcharge using Rankin's theory. **6**

OR

(a) Explain concept of active pressure, passive pressure and pressure at rest. **6**

(b) A retaining wall of 12 m high retains cohesionless soil with angle of internal friction 35'. The surface is level with the top of the wall. The unit weight of the top 3m of fill is 1.8 t/m^3 and that of the rest is 2.1 t/m^3. Find the magnitude and application of resultant active thrust. **7**

SECTION - II

4 (a) Attempt all the questions. **10**

(i) Failure of soil generally occurs along _____ surface.

(ii) The stability number S_N is given by _____.

(iii) The grouping of pile will not reduce the bearing capacity of pile in case of _____ piles.

(iv) In case of cohesionless soil the contact pressure is _____ at the end of the footing.

(v) The intensity of vertical pressure at a depth Z directly below the point load Q on the axis of loading is _____.

(vi) List five different piles with functions.

(b) Explain Swedish circle method for C-ϕ Soil. **6**

OR

(b) Discuss depth factor for finite slope. **6**

(c) An embankment 6m high is made in a cohesive soil with slope 2H:1V. The embankment soil has unconfined compressive strength of 150 kN/m^2 and unit weight of 18 kN/m^3. Taking any one slip circle passing through toe, determine factor of safety against sliding. **6**

5 (a) Describe pile load test with neat sketches. **6**

OR

(a) Write brief note on efficiency of pile in groups. **6**

(b) The group of n-pile has to be proportioned in a uniform pattern in soft clay with equal spacing in all directions. Take C = 25 kN/m^2. Determine the optimum value of spacing of piles in group. Take n = 25 and m = 0.7. Neglect the end bearing effect and assume that each pile is circular in section. **6**

6 (a) Discuss vertical pressure distribution on a horizontal plane at depth Z below ground surface due to concentrated load. **6**

OR

(a) Explain New mark's influence chart to determine vertical stress at any point in loaded area. **6**

(b) Explain contact pressure in sandy and clayey soil. **4**

(c) A circular area of 20 m radius transmits uniform load of 150 kN/m^2. Obtain the intensity of vertical stress at a point 15 m below the centre of the area. **6**