Seat No.

T.E. (Civil Engineering) (Part-III) (Semester - VI) (New) Examination, May - 2018
GEOTECHNICAL ENGINEERING - II
Sub. Code : 66874

Day and Date : Saturday, 05 - 05 - 2018   **Total Marks : 100**
Time : 2.30 p.m. to 5.30 p.m.

Instructions :   1)   All questions are compulsory.
                  2)   Figures to the right indicate full marks.
                  3)   Use of non-programmable calculator.
                  4)   Assume suitable data wherever necessary and state it clearly.

SECTION-I

Q1) a)   Explain necessity of site exploration and give the criteria for deciding depth and number of bore holes.   [8]

   b)   Explain Wash boring with a neat sketch.   [8]

OR

   b)   Explain modes of failures of rock with examples.   [8]

Q2) a)   The following data was obtained from a plate load test carried out on a 60 cm square plate at a depth of 2 m below GL on a sandy soil which extands upto large depth. Determine the settlement of foundation 3.0m×3.0 m carrying a load of 110 t and located at a depth of 2 m from GL.   [9]

Load (t/m²)	5	10	15	20	25	30	35	40
Settlement (mm)	2.0	4.0	7.5	11.0	16.3	23.5	34.0	45.0

   b)   Explain standard penetration test.   [9]

OR

   b)   Write IS code method equation for calculating bearing capacity. Explain each term involved in it. Also explain how eccentricity of loading is considered.   [9]

P.T.O.

Q3) a) Write notes on (Any two): [8]

    i)   Calculation of consolidation settlement.

    ii)   Floating foundation.

    iii) Minimum depth of footing.

    iv) Tilt and angular distortion.

  b)   A combined trapezoidal footing has two columns 0.5×0.5 m each carrying loads of 2000 kN and 1500 kN. The c/c spacing of columns is of 6.0 m. Heavy column is on property line. Calculate dimensions of the combined trapezoidal footing by taking allowable soil pressure as 200 kN/m^2. **[8]**

SECTION-II

Q4) a) A group of 16 piles is arranged in square pattern with pile diameter as 45 cm and c/c distance of piles as 1.5 m. The soil has cohesion of 50 kN/m^2. Length of each pile is 10 m. Neglecting end bearing and taking adhesion factor as 0.7, [9]

    i)   Calculate group efficiency

    ii)   Mention whether the group would fail by individual or by block action

  b) Explain pile load test with sketch. [9]

OR

  b) Explain under reamed piles and it's construction. [9]

Q5) a) Explain with neat sketch, different shapes of well foundation and its suitability. [8]

  b) Write short note on: (Any two) [8]

    i)   Common types of cofferdams

    ii)   Pneumatic cassions

    iii) Remedial measures for tilt and shift

    iv) Soil pressure distribution for sheet pile wall

Q6) a) Discuss vibrofloation technique for ground improvement in detail. [8]

b) Data from method of slices for a slope of soil with $c = 4$ t/m², $\phi = 25°$ and $\gamma = 1.9$ t/m³ is given below. Determine factor of safety. Take angle subtended at centre of curvature by arc of failure as 104° and radius of curvature $R = 10$ m. [8]

Slice no.	1	2	3	4	5	6	7	8
Area (m²)	0.55	3.0	4.65	5.8	6.15	6.35	3.3	0.2
α (degree)	-24	-12	-1	11	23	36	52	68

OR

b) A 7 m deep slope of 1:1 is to be made in a cohesive soil. The soil has a cohesion of 25 kN/m², the angle is friction is 25° and bulk unit weight is 18 kN/m³. [8]

i) Find factor of safety w.r.t. cohesion

ii) What will be critical height of slope?

Take $S_n = 0.083$ for 1:1 slope and $\phi = 45°$.

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