GE-I : V SEM CIVIL : OLD

10/06/15

(OLD COURSE) **QP Code : 3710**

(3 Hours) **[Total Marks : 100**

N. B.:
(1) Question No. 1 is compulsory.
(2) Attempt any four from remaining six questions.
(3) Figures to the right indicate the full marks.
(4) Assume any suitable data if not given and justify the same.

Q.1 (A) What is the use of classification of soils? [05]
(B) Write a note on characteristics of flow net. [05]
(C) Explain factors affecting the permeability of soil. [05]
(D) Explain factors affecting the shear strength of soil. [05]

Q.2 (A) From first principles establish the relationship between following parameters. [10]
(I) e, S_r, w and G (II) $e, S_r, G, \gamma,$ and γ_w.
(B) Name the method of determining in-situ permeability of coarse grained soil. Derive the expression to find out coefficient of permeability for the same case from two observation wells. [10]

Q.3 (A) In an unsaturated specimen of clay has a volume of 18.9 cc and mass of 30.2 gm. On oven drying the mass reduces to 18 gm. The volume of dry specimen as determined by displacement of mercury is 9.9 cc. Determine shrinkage limit, specific gravity, shrinkage ratio and volumetric shrinkage. [10]
(B) Explain the Coulomb theory for shear strength of soil. [05]
(C) Explain merit and demerit of direct shear test. [05]

Q.4 (A) A saturated soil sample has a volume of 23 cm³ at liquid limit. The shrinkage limit and liquid limits are 18% and 45% respectively. The specific gravity of solids is 2.73. Determine the minimum volume which can be attained by soil. [10]
(B) Discuss with sketch any one boring method used in soil exploration program. [10]

Q.5 (A) Draw the total, effective and neutral stress diagrams for a sand deposit 12 m thick underlain by a soft clay layer. The water table level is at a depth of 4 m from the surface. The soil above GWT has 40% saturation and specific gravity may be taken as 2.65. Take $e = 0.57$. [10]
(B) Explain field compaction and its control. [10]

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Q.6   (A) Given standard soil compaction test results as follows: G = 2.70

Trial No.	1	2	3	4	5	6
Water content (%)	0.12	0.14	0.16	0.18	0.20	0.22
Mass of wet soil (Kg)	1.68	1.85	1.91	1.87	1.87	1.85

The volume of mould used was 950 ml. Plot the compaction curve and obtain the maximum dry density and optimum water content. Also draw 90% saturation line.   [10]

(B) Explain how would you classify the fine grained soil using a plasticity chart?   [05]

(C) In shear strength test if α = 60⁰, σ = 20 kN/m² and c = 10 kN/m². Determine the Φ and shear strength.   [05]

Q.7   (A) A sample of dry clay is subjected to a tri axial test. The confining pressure is 250 kN/m² and angle of internal friction is 36⁰. Calculate the principal stresses of failure.   [05]

(B) Draw the various graphs you come across in a consolidation test, name the parameter on axis and use of each graph.   [05]

(C) A clay layer, whose settlement under a given loading is expected to be 10 cm, settles by 2.5 cm at the end of one month after the application of load increment. How many months will be required to reach a settlement of 5 cm? How much settlement will occur in one year? T_v for 60, 70, 80 and 90 percent degree of consolidation are 0.287, 0.403, 0.567 and 0.848 respectively.   [10]

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