ET-501(A)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

ꙨꙨꙨꙨꙨ   **June, 2015**

ET-501(A) : SOIL MECHANICS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions.*

1. (a) Explain how shrinkage limit of a fine grained soil is determined. What is volumetric shrinkage ?   7

   (b) The density of a partly saturated soil was found to be 18·8 kN/m³. If the water content and void ratio of the soil be 24·8% and 0·76 respectively, find the specific gravity and degree of saturation.   7

2. (a) Explain the characteristics of montmorillonite, kaolinite and illite minerals.   7

   (b) In a laboratory test, the liquid limit and plastic limit was 54·5% and 25·5% respectively. If the natural water content was 29·5% and % finer than 2μ was 18%, determine the liquidity index and classify the soil.   7

3. (a) Discuss the factors affecting permeability. 7

(b) What is quicksand ? Discuss its remedial measures. 7

4. (a) Discuss how Standard Proctor test is performed in the laboratory. Explain compaction curve. 7

(b) A homogeneous earth dam, 30 m high has a free board of 1·5 m. A flownet was constructed and the following results were obtained :

Number of potential drops = 12

Number of flow channels = 3

The dam has a 18 m long horizontal filter at its downstream end. Find the seepage loss per day, if the width of the dam is 200 m and K value is $3·55 \times 10^{-4}$ cm/sec. 7

5. (a) Explain Newmark's chart with a suitable example. 7

(b) Two long boundary walls of small width run parallel to each other at a distance 3 m apart. The self weight of the walls are 25 and 15 kN/m respectively. Plot the distribution of vertical stress intensity due to the walls on a horizontal plane 3 m below ground level. 7

6. (a) A soil sample is subjected to a major principal stress of 2 kg/cm^2 and minor principal stress of 1·1 kg/cm^2. Determine the normal and shear stresses acting on a plane 30° to major principal stress. 7

(b) Write the merits and demerits of direct shear test. 7

7. (a) Explain how coefficient of consolidation is determined. 7

(b) A 6 m thick clay layer is drained at both top and bottom. Find the time required for 50% consolidation of layer due to an external load. Take $C_v = 5 \times 10^{-4}$ cm^2/sec. 7

8. Write short notes on any *two* of the following : 2×7=14

(a) Swedish Circle Method

(b) Triaxial Shear Test

(c) Classification of Soils