| ET-501(B) |

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

Term-End Examination

June, 2014

00535

ET-501(B) : FOUNDATION ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt **all** questions. Use of calculator is permitted. Assume reasonable values for missing data, if any. Illustrate your answers with neat sketches.*

1. Answer any *four* of the following :   *4×10=40*

    (a) (i)   Discuss in detail "Standard Penetration Test".

         (ii) How do you determine the bearing capacity using field data ?

    (b) Define shallow foundation. Derive an expression for calculating Bearing Capacity of Shallow foundation for general shear failure, using Terzaghi's Theory.

(c) Determine the safe Load on a rectangular footing $3 \cdot 0$ m $\times$ $2 \cdot 0$ m to be founded at a depth of $1 \cdot 5$ m below ground surface if a factor of safety of $3 \cdot 0$, with respect to shear failure is specified. The unit weight of the soil is 18 kN/m^2 and the relevant shear strength parameters are $c' = 25$ kN/m^2 and $\phi = 22°$. The ground water table is at a depth of 2 m below ground surface. Use IS : 6401-1981 recommendations.

(d) Explain the types of footings with neat sketches. Also explain the situation where each of the footings are preferred.

(e) Discuss in detail about theory of determining consolidation settlement in clay.

(f) The loading period for a new building continued from July 1975 to July 1977. Estimate the settlement in July 1985, if it was found that the average settlement in July 1980 was 8 cm, and ultimate settlement is 18 cm.

Given for $U = 40\% \rightarrow T_v = 0 \cdot 208$

$U = 50\% \rightarrow T_v = 0 \cdot 282$

$U = 75\% \rightarrow T_v = 0 \cdot 55$

2. Answer any *three* of the following : $3×10=30$

(a) Explain in detail Rankine's Active and Passive states of earth pressure theory for cohesionless soils and derive expressions for K_a and K_p.

(b) Explain different types of shallow foundations with neat sketches.

(c) (i) How is the load carrying capacity of bored pile foundations determined ?

(ii) An under reamed bore pile with a shaft diameter of 1·0 m and bell diameter of 2·5 m is installed in a deep deposit of clay as shown in figure 1. The length of pile is 12 m. The unconfined compressive strength of clay is 120 kN/m^2. Calculate the design capacity.
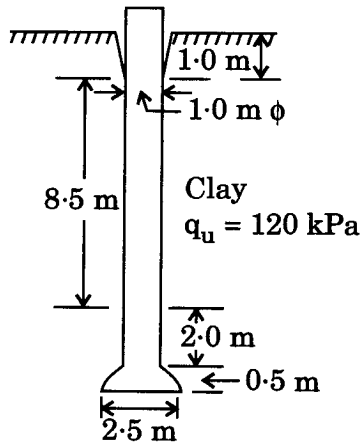

Figure 1

(d) Derive an expression for amplitude due to vertical vibration.

(e) Explain in detail constructional aspects of well foundations.