COURSE CODE(CREDITS): 18B11CE514 (3) MAX. MARKS: 25

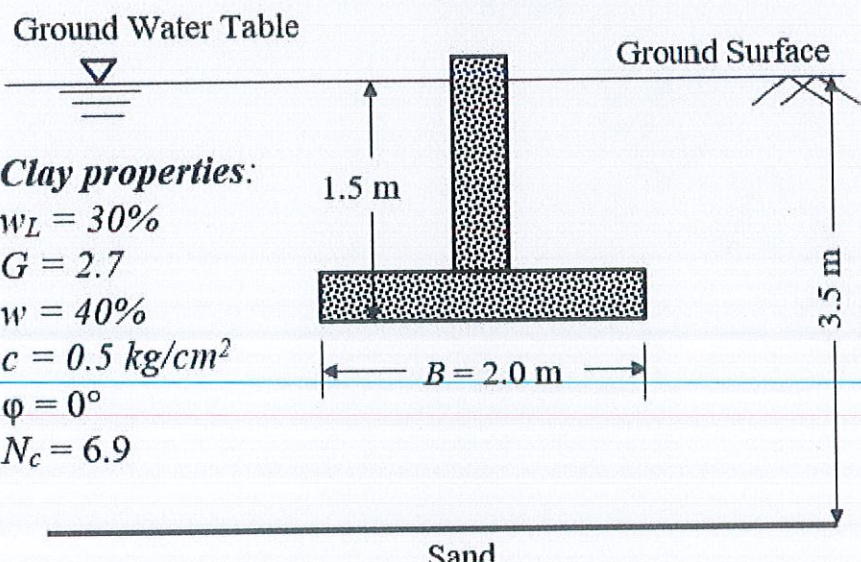COURSE NAME: FOUNDATION ENGINEERING

COURSE INSTRUCTORS: Saurabh Rawat MAX. TIME: 1 Hour 30 Minutes

Note: (a) *All questions are compulsory.*
  (b) *Marks are indicated against each question in square brackets.*
  (c) *The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems*

Q. No	Question	CO	Marks
Q1	Referring to **Fig. 1**, compute the settlement that would result if the load intensity is equal to safe bearing capacity of the soil allowed to act on the footing with a factor of safety of 3. The natural Ground Water Table is at the ground surface. Assume load spread of 2V:1H.	CO-1 CO-2 CO-3	[8]
	Ground Water Table Ground Surface 1.5 m **Clay properties:** $w_L = 30\%$ $G = 2.7$ $w = 40\%$ $c = 0.5\ kg/cm^2$ $\varphi = 0°$ $N_c = 6.9$ $B = 2.0\ m$ 3.5 m Sand **Fig. 1**		
Q2	With reference to the Standard Penetration Test (SPT): **a)** Enlist the soil parameters which can be determined using SPT.	CO-3	[2+1+3 = 6]

	b) Define the term 'set' and SPT N – value.			
	c) Explain the corrections applied for obtaining the correct SPT N – value.			
Q3	The soil at a building site consists of medium sand with $\gamma = 18$ kN/m³, $c' = 0$, φ' $= 32°$ and water table is at 3 m below the ground surface. A 2.5 m square footing is to be placed at 1.5 m below the ground surface. Compute the safe bearing capacity of the footing. [For $\varphi = 32°$, $N_q = 20.3$ and $N_y = 19.7$]	CO-2 CO-3	[6]	
Q4	A square footing located at a depth 1.5 m from the ground surface carries a column load of 150 kN. The soil is submerged having an effective unit weight of 1.1 kN/m³ and an angle of shearing resistance of 30°. Find the size of footing using Terzaghi's Theory for FoS = 3. For $\varphi = 30°$, $N_q = 10$ and $N_y = 6.0$	CO-2 CO-3	[5]	