

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER-V • EXAMINATION – SUMMER 2013**

**Subject Code: X50603****Date: 16-05-2013****Subject Name: Foundation Engineering****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a) Explain Plate load test by truss reaction method. 07  
 (b) Write purposes of site investigation.# 07
- Q.2 (a) A square footing is to be constructed on a deep deposit of sand at a depth of 1.0 m to carry a design load of 320 kN with a factor of safety of 2.5. The ground water table may rise to the ground level during rainy season. Design the plan dimension of footing given  $\gamma_{\text{sat}} = 20.8 \text{ kN/m}^3$ ,  $N_c = 25$ ,  $N_q = 34$  and  $N_\gamma = 32$ . 07  
 (b) Write assumptions made in Terzaghi's theory. 07
- OR**
- (b) What are the effects of swelling of soil on buildings? 07
- Q.3 (a) Explain shear failure criteria of soil used in calculation of safe bearing capacity of soil. 07  
 (b) Explain factors affecting bearing capacity in detail. 07
- OR**
- Q.3 (a) Briefly explain Settlement of single pile and settlement of group of pile. 07  
 (b) A strip footing 1 m wide and a square footing 1 m side are placed at a depth of 1 m below the ground surface. The foundation soil has cohesion of 10 kPa, angle of friction of  $26^\circ$  and unit weight of  $18 \text{ kN/m}^3$ . Calculate the safe bearing capacity using IS:6403. Use factor of safety of 3. 07
- Q.4 (a) Explain load transfer mechanism of pile. 07  
 (b) A precast concrete pile 40 cm X 40 cm is driven by a single acting steam hammer .Estimate the allowable load using (a)Engineering News Record Formula (F.S.=6).(b)Hiley Formula(F.S.= 4).Use the following data:  
 (i) Maximum rated energy = 4000 kN-cm  
 (ii) Weight of hammer = 40 kN  
 (iii) Length of pile = 15 m  
 (iv) Efficiency of hammer = 0.82  
 (v) Co-efficient of restitution = 0.5  
 (vi) Weight of pile cap = 3.2 kN  
 (vii) No. of blows for last 25 mm = 6  
 (viii) Modulus of elasticity of concrete =  $2 \times 10^7 \text{ kN/m}^2$   
 Assume the other data, if necessary.
- OR**
- Q.4 (a) Enlist types of pile according to driving method. 07  
 (b) A precast concrete pile of size 40 cm X 40 cm is to be driven into stiff clay. The unconfined compressive strength of the clay is  $150 \text{ kN/m}^2$ . Determine the length of pile required to carry a safe working load of 300 kN with factor of safety is 2.5. 07
- Q.5 (a) Enlist and explain types and uses of Geosynthetics. 07  
 (b) How will you identify the collapsible soil? 07
- OR**
- Q.5 (a) Explain different type of foundation. 07  
 (b) Enlist and discuss standards used in standard penetration test. 07

