

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° and unit weight of 18 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: 07

(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 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

