**Seat No : _____** **Enrollment No: _____**

# GUJARAT TECHNOLOGICAL UNVERSITY

**PDDC. Semester- V Examination MAY 2012**

**Subject Code : X50603** **Subject Name : Foundation Engineering**

**Date: 16/05/2012** **Time: 10.30 am – 01.00 pm**

**Total Marks: 70**

**Instructions :**

(1) All questions are compulsory.
(2) Figures to the right indicates the marks.
(3) Use of Programmable calculator is strictly prohibited.
(4) Draw neat sketch wherever necessary.
(5) Write your seat no and enrollment no in space provided on the question paper.

**Q.1 (a)** What do you understand by site investigation? What are the different purposes for site investigation? **07**

**(b)** Enlist various type of soil samplers for obtaining undisturbed sample and explain any one in detail. **07**

**Q.2 (a)** Differentiate General shear failure and Local shear failure with neat sketch. **07**

**(b)** Determine the allowable gross load and the net allowable load for a square footing of 2 m side and depth of foundation is 1 m. Use Terzaghi's theory and assume local shear failure. Take factor of safety as 3. **07**
Take $\gamma$= 18 kN/m$^3$ , c=15 kN/m$^2$ and $\Phi'$=25° , $N_c'$=14.8 , $N_q'$=5.6 and $N_\gamma'$=3.2.

**OR**

**(b)** Describe contact pressure distribution on saturated clay and on sand. **07**

**Q.3 (a)** A 30 cm dia pile, 12 m long is driven into a sand deposit. The details of the hammer are as follows **07**
(1) total weight of hammer = 20 kN
(2) Length of stroke = 100 cm
(3) Average penetration per blow = 4mm
Estimate ultimate resistance of pile using Hiley's formula, assuming that driving is without dolly. Thickness of cushion is 2.5 cm. Assume other data if necessary.

**(b)** What are the conditions where a pile foundation is more suitable than a shallow foundation? **07**

**OR**

**Q.3 (a)** Explain negative skin friction and its effect on the pile. **07**

**(b)** Write a short note on classification of piles on different bases? **07**

**Q.4 (a)** Explain swell pressure and its significance. **07**

**(b)** Write a note on various methods of modification of an expansive soil for improving its characteristics. **07**

**OR**

**Q.4 (a)** How will you identify the expansive soil from its index properties? **07**

**(b)** Explain types and uses of geo synthetics. **07**

**Q.5 (a)** Enlist factor affecting the selection of foundation for any structure. **07**

**(b)** Following are the observation taken during the plate load test **07**

| Vertical stress kN/m$^2$ | 50 | 100 | 150 | 200 | 250 | 300 | 350 |
|---|---|---|---|---|---|---|---|
| Settlement (mm) | 8 | 15 | 23 | 30 | 36 | 60 | 90 |

Draw stress – settlement curve and find out safe bearing capacity of soil using FS=3.

**OR**

**(a)** How will you calculate sample disturbance? **07**

**(b)** Enlist and explain standards used in standard penetration test. **07**

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