

Code No: D2006

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II - SEMESTER EXAMINATIONS, APRIL/MAY 2012
ADVANCED FOUNDATION ENGINEERING
(STRUCTURAL ENGINEERING)

Time: 3 hours

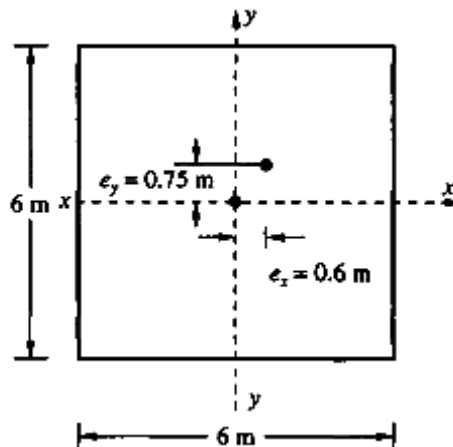
Max. Marks: 60

Answer any five questions
 All questions carry equal marks

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Note: Bearing capacity charts may be allowed

- It is proposed to construct an overhead tank at a site on a raft foundation of size 8 x 12 m with the footing at a depth of 2 m below ground level. The soil investigation conducted at the site indicates that the soil to a depth of 20 m is normally consolidated insensitive inorganic clay with the water table 2 m below ground level. Static cone penetration tests were conducted at the site using a mechanical cone penetrometer. The average value of cone penetration resistance q_c was found to be 1540 kN/m^2 and the average saturated unit weight of the soil = 18 kN/m^3 . Determine the immediate settlement of the foundation. The contact pressure $q_n = 100 \text{ kN/m}^2$. Assume that the stratum below 20 m is incompressible.
- Figure gives the plan of a footing subjected to eccentric load with two way eccentricity. The footing is founded at a depth 3 m below the ground surface. Given $e_x = 0.60 \text{ m}$ and $e_y = 0.75 \text{ m}$, determine Q_{ult} . The soil properties are: $c = 0$, $N_{cor} = 20$, $\gamma = 18.5 \text{ kN/m}^3$. The soil is medium dense sand. Use Hansen's theory.



- Discuss the estimation of group capacity of piles.
- Explain how the settlement of group of piles is estimated in clayey soil.
- What are the under-reamed piles? Discuss the advantages and load transfer mechanism of under-reamed bulbs.
- Discuss in detail the load carrying capacity of under-reamed piles in sandy soil.

5. What do you understand about sinking of wells? Discuss the lateral stability of wells by Terzaghi's analysis.
6. Discuss the formulations for depth of embedment of sheet pile wall embedded in clay with sand backfill.
- 7.a) What are the problems associated with expansive soils? Discuss how swell potential and swell pressure of expansive soils is estimated.
b) Discuss in detail the specifications and mechanisms of granular pile anchor technique in controlling the adverse effects posed by expansive soil.
8. Write short notes on the following:
 - a) Allowable settlements as per the IS code.
 - b) Negative skin friction and its controlling techniques
 - c) Different shapes of wells
 - d) Differential free swell index and Swell potential
