

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-II Remedial Examination December 2010****Subject code: 721503****Subject Name: Advanced Foundation Engineering****Date: 21 /12 /2010****Time: 02.30 pm – 05.00 pm****Total Marks: 60****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Draw neat and clean sketches wherever necessary.
5. Relevant IS code 6403 is permitted.

Q.1 (a) Define the following terms: Ultimate bearing capacity, Gross safe bearing capacity and Net allowable bearing pressure. **03**

(b) A square column foundation is to be designed for a gross allowable total load of 250 kN. If the load is inclined at an angle of 15° to the vertical. Using IS code method, determine the width of foundation. Adopt factor of safety = 3. $\gamma = 19 \text{ kN/m}^3$, $\phi = 35^\circ$, $c = 5 \text{ kN/m}^2$. The depth of foundation is 1.0 m. **09**

Q.2 (a) Differentiate between the general shear failure and local shear failure. How the ultimate bearing capacity in local shear is determined? **06**

(b) Explain in detail geotextiles & geogrids with their uses. **06**

OR

(b) A strip footing of 2 m width is founded at a depth of 4 m below the ground surface. Determine the net ultimate bearing capacity; using (1) Skempton's equation and (2) IS code. The soil is clay having $c = 10 \text{ kN/m}^2$. The unit weight of soil is 20 kN/m^3 . **06**

Q.3 (a) What is negative skin friction? What is its effect on the pile? **06**

(b) Explain well foundation with typical sketch. Also explain different shapes of wells with neat sketch. **06**

OR

Q.3 (a) Explain in detail pile load test. **06**

(b) Discuss in detail various forces acting on a well foundation. **06**

Q.4 (a) Describe the methods for determination of the mass, spring constant, damping factor and the mass of participating soil. **06**

(b) Discuss the procedure for the design of a raft foundation. **06**

OR

Q.4 (a) Discuss the use of single degree of freedom system in the analysis of machine foundation. What are its limitations? **06**

(b) Define the coefficient of sub grade reaction. How is it found? Discuss the various factors affecting its value. **06**

Q.5 (a) Elaborate the use of finite element method for the analysis of raft foundation. **05**

(b) Explain Meyerhof's bearing capacity theory. **07**

OR

Q.5 (a) Explain in detail 'The causes of settlement of foundations'. **04**

(b) A foundation block of weight 30 kN rests on a soil for which the stiffness may be assumed as 25000 kN/m. The machine is vibrated vertically by an exciting force of $3.0 \sin (30 \pi t) \text{ kN}$. Find the natural frequency, natural period, natural circular frequency and the amplitude of vertical displacement. The damping factor is 0.50. **08**
