M.Tech. Regular-Semester 2012-Structural Engineering & Construction Sem II

STC203 - Design of Substructures

P. Pages : 1 **GUG/W/16/3971**

Time : Four Hours * 3 6 5 3 * Max. Marks : 70

Notes : 1. All questions are compulsory.
2. Assume suitable data wherever necessary.
3. I.S.I. Hand Book for structural steel section. I.S. Code 8000/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted.

1. Design a combined footing for column C1 & C2 having sizes 600 x 600 mm & 500 x 500m respectively. The column C1 carries 800 KN axial load, C2 carries 600 KN axial load and 100 KN bending moment in front plane of column. C/C distance between C1 & C2 is 2.5m SBC of soil is 180 KN/m^2. Use M25 grade concrete & Fe 500 grade steel. Sketch rein details. **35**

OR

2. Design a inverted T annular raft for four columns forming a rectangle in plan of size 3m x 6x c/c. The each column carries axial load of 1200KN & has a size 700 x 700mm SBC of soil is 120KN/m^2. Fck = 25 MPa, Fy = 415 MPa. **35**
Sketch rein. details

3. Design a pile & pile cap for a column 600 mm in dia. carrying 700 KN axial load & 150 KNm bending moment. The SBC of soil is 100 KN/m^2 & negative skin friction is 40 KN/m^2. Diameter of piles is limited to 300 mm. Fck = 25MPa, Fy = 500 MPa Sketch rein. details. **35**

OR

4. Design counterfort retaining wall to retain earth filling up to 5.5 m height. Density of filling soil is 17 KN/m^3 and angle of repose is 30^0. **35**
SBC of soil is 180 KN/m^2. Angle of repose of foundation soil is 31^0 Fck = 25MPa,
Fy = 500 MPa Sketch rein. details.

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