

COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CE-403) Structural Design-III (Th)

Course: B.Tech

Branch: Civil Engineering

Semester: Sem VII

Year: 2014-2015

Max. Marks: 60

Duration: 4 Hours Time: -

2 to 5 p.m

Date: 1.12.14

Instructions:

MIS No.

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1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper
7. IS456-2000 and IS 3370 are allowed.

Q.1 What are advantages of pre-stressing? What are methods of pre-stressing? Explain any one. (7)

Q.2 A rectangular beam of cross section 300 mm x 500 mm with span of 6.0 m is subjected to a uniformly distributed load. Find the uniformly distributed load the beam can carry in the following situations. Materials used M40 and High tension steel with $f_y = 900$ MPa

- a) when pre-stressing force is applied at centroid of cross-section (8)
- b) when same force is applied with eccentricity of 80 mm.

Q.3 Design a cantilever type RCC retaining wall to support soil in hilly area using the following data.

Depth of backfill to be retained = 4.0 m. The backfill is carrying an additional surcharge with an angle of 20° . Unit weight of soil = 16 kN/m^3 . Angle of friction of backfill soil = 30° .
Depth of foundation = 1.0 m. Coefficient of friction between base and soil = 0.4.
Safe bearing capacity of soil = 180 kN/m^2 . Use M20 Grade concrete and steel Fe 415. (15)

Q.4 Design a circular water tank with a flexible base for a capacity of 250000 litres. The external diameter of the water tank is restricted to 10 m. Take free board as 0.3 m. Use M25 Grade concrete and Fe415 steel. Show all details. (10)

Q.5 Design a combined rectangular footing for two columns P and Q, carrying loads of 300 kN and 500 kN respectively. The column P is 300 mm x 300 mm in size and column Q is 450 mm x 450 mm in size. The centre to centre spacing of columns is 2.5 m. The safe bearing capacity of soil is 170 kN/m^2 . Use M20 concrete and Fe415 steel. (20)

OR

Q.5 Design the counter-fort retaining wall using data as given in Q. No. 3 above.