5E3152

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B.Tech. (Sem.V) (Main) Examination- Dec. 2012
Civil Engineering
5CE2 Concrete Structures-I

Time : 3 Hours] [Total Marks : 80

[Min. Passing Marks : 24

Instructions to Candidates :
Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT-I

1. (a) Discuss the major features of working stress method and limit state method. **(5)**
   (b) What do you understand by a Balanced section, over reinforced and under reinforced section. **(5)**
   (c) A rectangular singly R. C. beam with cross- section 300mm × 600mm is simply supported over the clear span of 4.25m with support of 300mm each. Calculate ultimate moment of resistance of the beam. Use M 20 and Fe 415 steel grade. **(6)**

OR

1. (a) What do you understand by a singly reinforced beam and doubly reinforced beam. State the condition where a doubly reinforced beam is prefered. **(6)**
   (b) Determine the ultimate moment of resistance capacity of a doubly reinforced beam with width of beam as 300mm and effective depth 600mm and cover as 40mm both in tension and compression. Reinforcement in compression as 2 nos @ 25mm ϕ and in tension as 5 nos @ 25 mm ϕ. Use M 20 concrete and Fe 415 steel grade. **(10)**

UNIT-II

2. Design a singly reinforced concrete beam supported on two walls of thickness 500mm spaced at a clear distance of 6m. The beam carries a superimposed load of 10 kN/m. Use M 20 concrete and Fe 415. Apply all checks. **(16)**

OR

Design a doubly reinforced beam which rests over a clear span of 5m. The superimposed dead load is 18 kN/m and live load is 12kN/m. Bearing at each end is 50mm. The beam has cross-section of 300 × 550mm. Use M 15 and Fe 415 grade. Apply all the checks. **(16)**

UNIT-III

3. Design a simply supported R.C. slab for a room having inside dimensions as 3m × 8m. The slab carries a lime concrete of 75 mm thickness at its top. The live load on the slab is 2 kN/m^2. Take unit weight of lime concrete as 20 kN/m^3 . Use M 20 grade of concrete and steel of Fe 415 grade **(16)**

OR

3. Design a R.C. slab for a room measuring 5m × 6m from inside. The slab carries a live load of 2 kN/m^2 and 25 mm thick lime concrete having unit weight as 20 kN/m^3. The slab is simply supported at the four edges, with corners free to lift. Take the width of supporting wall as 350 mm. **(16)**

UNIT-IV

4. Design a circular column to carry an axial load of 1000 kN. Use M 20 and Fe 415 grade of steel. Also provide helical reinforcement for the above column. **(16)**

OR

4. (a) A concrete column of 450mm × 450mm is reinforcened with 4 bars of 20mm dia. Determine the ultimate load capacity of column, using M 20 concrete and steel Fe 415 grade. **(10)**
   (b) Give typical sketch of the following :
   (i) Isolated square footing. (ii) Strap footing. (iii) Raft foundation. **(6)**

UNIT-V

5. (a) A footing supports a square column of size400mm × 400mm with a service load of 900 kN. Find out the size of footing, depth of the footing and reinforcement required in it, if the safe bearing capacity of soil is 200kN/m^2. Use M 20 and Fe 415. Also draw Neat Sketch. **(16)**

OR

5. (a) Describe one way shear and two way shear in a square footing. **(4)**
   (b) Determine the thickness and size of R.C footing of a column of size 300mm ×500mm. The column carries a load of 1500kN and safe bearing capacity of soil at the site 175 kN/m^2. **(12)**