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EI-195

B.E. (Vth Sem.) (CGPA) Civil Engg. Exam.-2015

STRUCTURAL DESIGN & DRAWING - I (R.C.C.)

Paper - CE-503

Time Allowed : Three Hours

Maximum Marks : 60

Note : Use of IS 456 : 2000 is permitted. Assume suitable data, if required.

- Q.I (a) Differentiate between working stress and limit state method. 4
- (b) A rectangular R.C. beam of width 250 mm and depth 380 mm, effective cover = 25mm. Tension reinforcement was provided with four bars of 12 mm diameter. Calculate ultimate moment of resistance and maximum super imposed load beam can carry if it is simply supported over a span of 3.5m. Use M20 and Fe 415. 8

Or

Calculate moment of resistance of a doubly reinforced RC beam of section with size 300×450 mm reinforced with 6 Nos bars of 20 mm diameter on tension side & 4 nos. bars of 20 mm diameter on compression side. Effective cover on both sides is 35mm. Use M 20 & Fe 415. 12

~~Q.II~~

A beam simply supported over a span of 5m and carries a U.D.L. of 20 KN/m including self weight. If the size of beam is restricted to 300×500 mm, design the beam for bending and shear. Take M 20 grade of concrete and Fe 415 steel. 12

Or

A beam supported over a span of 6 m carries a superimposed load of 40 KN/m. Centre to centre spacing of beams is 3m. Design the midspan section of an intermediate beam as a T-section with following data :

Thickness of slab = 120mm

Width of Web = 200 mm

Total depth of beam = 600 mm

Load factor = 1.5

Use M 20 grade of concrete and Fe 415 grade of steel apply are necessary checks. 12

(3)

Q.III Design a root slab for an assembly hall having inside dimensions $15m \times 10m$, width of beam = 250 mm, beams are placed at 3.75 centre to centre.

Lire load = $1.5 \text{ KN}/m^2$, Floor finish = $1.6 \text{ KN}/m^2$

Use M 20 grade for concrete and Fe 415 steel. 12

Or

Design a two-way slab with corners held down for a room with dimensions $5m \times 8m$. Take M 20 grade of concrete and Fe 415 steel. The load bearing walls are 300mm thick. Draw full details of the slab showing reinforcement. 12

Q.IV Design a circular column of diameter 400mm with helical reinforcement subjected to a working load of 1200KN. Use M-25 concrete and Fe 415 steel. The column has unsupposed length of 3m and is effectively held in position at both ends, but not restrained against rotation. 12

Or

Design a RCC column footing for the following Data :

Size of column = $400 \times 400\text{mm}$

Safe bearing capacity of soil = $200 \text{ KN}/m^2$

load on column = 1500KN

Use M 20 and Fe 415 grade. 12

Q.V Design a dog legged stair for building in which vertical distance between the floors is 3.0m. Size of stair room is 3×4.5 m. The live load on stairway is $8\text{KN}/\text{m}^2$. Use M 20 and Fe 415 grade. 12

Or

(a) Describe various types of stair case and their suitabilities. 4

(b) A stair case in a residential building is supported on walls at both the ends of its flight centre to centre span between two support walls is 4.50m. The height of ceiling to floor is 3.50m. Design the stairs with M 20 concrete grade Fe 415 steel. 8
