Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

CE-504 (GS)

B.E. V Semester

Examination, December 2017

Grading System (GS)

Structural Design and Drawing-I (RCC)

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions. All questions carry equal marks.
ii) Use of IS: 456-2000 is permitted.
iii) Assume grade of concrete M-20 and grade of steel Fe-415 unless if not specified.
iv) Assume data suitably if any missing.

1. Design a cantilever beam over a span of 3m, carrying a superimposed load of 20,000N/m (2000kg/m). Use M20 concrete and HYSD bars of Fe415 as reinforcement. The width of the cross section of beam is given as 300mm. 14

2. Find the moment of resistance of a beam 300mm × 500mm deep (effective) if it is reinforced with 4-12 mm diameter bars in the compression zone and 6-20 mm diameter bars in the tension zone, each at an effective cover of 40mm. 14

3. Design a rectangular RCC beam simply supporting over a span of 5.25m the superimposed load is 40,000N/m the size of the beam is restricted to 300mm wide × 800mm deep (overall). Use M20 concrete and HYSD (Fe415) bars. 14

4. Design a continuous slab over a room 10m × 15m in plan. Four beams 300mm × 800mm are provided to cover 10m span. The slab is carries a superimposed live load of 2500N/m^2. Use M20 concrete and HYSD (Fe415) bars as reinforcement. 14

5. Design a two way slab for a room having clear dimension of 4m × 5m. Take live load as 2kN/m^2 and finishes as 0.5kN/m^2. Use M20 mix and HYSD (Fe415) bars as reinforcement. 14

6. A reinforced concrete wall 150mm thick is to carry a load of 400kN/m run of the wall. Design the footing if the bearing capacity of the soil is 200kN/m^2. Use M20 mix and HYSD (Fe500) bars as reinforcement. 14

7. Design a single flight stair case to cover a horizontal span of 4.5m if the total vertical rise is 3.6m there are total 18 steps to rise. The thread is 250mm. Take live load as 3000N/m^2. Use M-25 concrete and Fe415 steel. 14

8. Explain in detail (Any three): 14
   a) Distinguish between 'Factor of Safety' and 'Partial Safety Factor'.
   b) Explain the term 'balanced, over reinforced' section in bending. Explain which of these should be recommended in design.
   c) Distinguish between one way and two way slab. How are they analysed for determining BM and SF under UDL?
   d) Why is the span/effective depth ratio of slabs larger than that for beams?

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