CLASS: BE   SEMESTER : V
BRANCH: CIVIL   SESSION : MO/19

SUBJECT: CE5005 STRUCTURAL DESIGN - II

TIME: 3 HOURS   FULL MARKS: 60

INSTRUCTIONS:
1. **The question paper contains 7 questions each of 12 marks and total 84 marks.**
2. **Candidates may attempt any 5 questions maximum of 60 marks.**
3. **The missing data, if any, may be assumed suitably.**
4. **Before attempting the question paper, be sure that you have got the correct question paper.**
5. **Use of IS456:2000 is allowed in the examination,to be supplied to the candidates in the examination hall.**

Q.1   A rectangular beam of section 250 mm width by 500 mm effective depth is reinforced with 4 Nos. 25   [12]
       mm bars, out of which 2 bars are bent at the ends of the beam at 45°. Determine the additional shear
       requirement required if the factored shear force at the critical section is 350 kN. Consider concrete
       grade M 25 and steel of grade Fe 415. Sketch reinforcement details.

Q.2   What is meant by slenderness ratio of column? Design an axially loaded circular column with spiral   [12]
       transverse reinforcement subjected to a factored load of 1500kN. Sketch Reinforcement details.

Q.3   Design a rectangular beam for an effective span of 6m. The superimposed load is 50 kN/m and size of   [12]
       the beam is limited to 23 cm x 45 cm overall. Use Fe 415 grade steel. Consider the exposure condition
       as moderate. Sketch reinforcement details.

Q.4   Design a slab for a room 5.0m x 4.0m clear in size if the live load is 2kN/m^2 and the slab is continuous   [12]
       over two adjacent edges only. Sketch reinforcement details.

Q.5   Design a 'waist slab' type staircase comprising a straight flight of steps, supported between two   [12]
       stringer beams along the two sides. Assume an effective span of 1.5m, a riser of 150mm and tread of
       270mm. Consider live load on staircase 3kN/m^2. Use Fe250 steel and mild exposure condition.

Q.6   Design an isolated R.C.C. footing for a square column of section 450x450mm supporting an axial   [12]
       factored load of 2000kN. The safe bearing capacity of the soil at site is 250 kN/m2. Use M-25 concrete
       and Fe-415 steel. Sketch the reinforcement details.

Q.7(a)   What is meant by consistency of cement? How is it determined using IS code provisions?   [6]

Q.7(b)   What are the four major compounds used in cement? How do they affect the different properties of   [6]
          concrete?

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