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INTERNATIONAL CENTRE FOR APPLIED SCIENCES (Manipal University) IV SEMESTER B.S. DEGREE EXAMINATION – APRIL / MAY 2017 SUBJECT: BASIC CONCRETE DESIGN (CE 243) (BRANCH: CIVIL) Saturday, 29 April 2017

Time: 3 Hours

- ✓ Answer ANY FIVE full Questions.
- ✓ Missing data, if any, may be suitably assumed
- ✓ Use of IS456 and sp16 is permitted
- 1A. Explain the stress-strain curve of concrete and its significance in design of RC structure **1B.** What is neutral axis. Derive an expression for limiting depth of neutral axis, moment of resistance and percentage of steel. **1C.** Explain various loads to be considered while designing RC structures. (4+12+4)**2A.** Explain limit state method. Elaborate various limit states. 2B. Determine the service loads that the simply supported beam of size 300mmx600mm, with effective length 8m and reinforced with 4 bars of 20 diameter in the tension zone, with effective cover of 50mm. M20 and Fe415. (5+15)3. A doubly reinforced beam is reinforced with 4-16# on the compressive side and 6-20#+2-12# on the tension side with overall depth of 575mm and effective cover of 75mm. beam is simply supported on wall of width 250mm. determine the moment of resistance of the beam. M30 and Fe500. (20)**4.** Determine the moment of resistance and design the shear reinforcement for a tee beam with effective width of flange as 1500mm, depth of flange 100mm, overall depth of beam is 610mm. beam is reinforced with 4-12# on the compressive side and 6-25#on the tension side. M25 and Fe415 (20)**5A.** Determine the anchorage length of 4-20# supporting a simply supported, singly reinforced beam of 300mm width and 500mm effective depth. Beam is subjected to factored shear force of 275kN. Use M25 and Fe 500. **5B.** Explain the conditions when beam is subjected to torsion. (12+8)
 - **6A.** Explain the short term and long term deflection in beams
 - 6B. Design a one way continuous slab subjected to imposed loads of 6kN/m including floor finish. Take effective span as 3.5m and support width of 300mm. use M30 and Fe500. (3+17)
 - 7. A short rectangular column is subjected of M30 and Fe415 of size 300X450mm is reinforced with 20 bars of 16# lateral ties of 8mm at 250 centre to centre. Clear cover of 40mm is provided for the reinforcement. Can it support a load of 1600 and moment of 175mm safely? (20)
 - 8. Design an isolated footing of depth 0.8m for a square column of side 400mm. The column is reinforced with 12-20#. Load on column is 1000kN. Safe bearing capacity of soil at depth of 0.8m is 240kN/m². Use M25 and Fe415 (20)

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Max. Marks: 100