DECEMBER 2019 / ENDSEM
F. Y. M. TECH. (STRUCTURE) (SEMESTER -I)
COURSE NAME: CRITICAL REVIEW OF DESIGN OF CONCRETE STRUCTURES
COURSE CODE: CVPB11182
(PATTERN 2018:R1)

Time: [3 Hour]   [Max. Marks: 50]

(*) Instructions to candidates:
1)   Answer Q.1, Q.2, Q.3, Q.4 OR Q.5, Q.6 OR Q.7, Q.8 OR Q.9
2)   Figures to the right indicate full marks.
3)   Use of scientific calculator is allowed
4)   Use suitable data where ever required
5)   Use of IS 456:2000 is permitted.

Q.1) a) What are the different loads considered in the design of R.C.C. structures?
[3 marks]

OR

b) Describe modulus of elasticity of concrete (Initial, secant and tangent).   **[3 marks]**

Q.2) a) Draw stress diagram for R.C. section for balanced, under-reinforced and over reinforced concrete (WSM).   **[3 marks]**

OR

b) Explained transformed section for singly reinforced section with neat sketch.
[3 marks]

Q.3) a) Derive expression for limiting depth of neutral axis (LSM).   **[2 marks]**

OR

b) Draw idealized stress-strain curve for HYSD steel.   **[2 marks]**

Q.4) Calculate short term deflection of a simply supported rectangular beam 300mm x 600mm, spanning over 5m span. It is reinforced with 4 bars of 20mm diameter on tensile side. It is subjected to an imposed service load of 20kn/m including self weight. The effective cover to tension steel is 40mm. Use M20 concrete and Fe 415 steel. **[14 marks]**

OR

Q.5) a) State any four reasons for appearance of cracks in reinforced concrete. What are the adverse effects of cracking of concrete. State any two recommendations given in IS 456-2000 to control cracks.   **[6 marks]**

b) A cantilever R.C.C. beam of span 3.5m, 300mm wide and 600mm deep is subjected to a maximum bending moment of 125 kNm due to uniformly distributed service loads out of which 50% moment is due to permanent loads. The beam is reinforced with 4 bars of 20mm diameter at tension zone. Effective cover to the reinforcement is 50 mm. Calculate short term elastic deflections.   **[8 marks]**

Q. 6) a) What are the reasons to provide minimum shear reinforcement? What is the minimum shear reinforcement recommended in IS 456-2000.　　　　　　　**[6 marks]**

　　　b) A R.C.C. beam 250mm wide and 500mm effective depth is reinforced with 4 bars of 25mm diameter as tension reinforcement. If the beam is subjected to a factored moment of 95 kN, design vertical shear reinforcement. Use M20 grade of concrete and Fe415 steel.　　　　　　　**[8 marks]**

<center>**OR**</center>

Q.7) a) Draw critical section for simply supported and cantilever beam?　　　**[4 marks]**

　　　b) A RC beam 200mm x 450mm effective depth is reinforced with 6-20mm Fe415 bars at midspan section and 3-20mm bars at support section. Design shear reinforcement using 8mm diameter Fe415 steel if the beam is to support a factored shear force of 150kN. Use M20 grad of concrete.　　　　　　　**[10 marks]**

Q.8) a) State any four functions of longitudinal and four functions of lateral ties in columns.　　　　　　　**[4 marks]**

　　　b) Design a short axially loaded square column of side 500mm for a service load of 2000kN. Use M20 concrete and Fe415 steel.　　　　　　　**[10 marks]**

<center>**OR**</center>

Q.9) Design a RC column to carry an axial load of 1600Kn. It is 4 m long, effectively held in position and restrained against rotation. Use M20 concrete and Fe 415 steel.

　　　　　　　[14 marks]

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