PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020   **Date :** 6-JAN-2023
Course Code : CIV3003   **Time :** 9.30AM - 12.30PM
Course Name : Sem V - CIV3003 - Design of RCC Structural Elements   **Max Marks :** 100
Program : B.Tech. Civil Engineering   **Weightage :** 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS   **10 X 2 = 20M**

1. What does R.C.C. stand for?
   a) Reinforced Cement Concrete   (CO1) [Knowledge]
   b) Reinforced Concrete Cement
   c) Reinforced Combined Cement
   d) Reinforced Constituent Cement

2. The partial safety factor to be used in limit state of deflection of concrete is_____
   a) 1.0   (CO1) [Knowledge]
   b) 1.5
   c) 1.15
   d) 2.0

3. In the Ultimate Limit State Analysis of Reinforced Concrete Beam Section, if the neutral axis depth X_u is equal to the X_{umax}, then the section is said to be
   a) Under reinforced sections   (CO1) [Knowledge]
   b) Over reinforced sections
   c) Balanced reinforced sections
   d) All of the above

4. The stress strain curve of concrete as per IS-456 is
   a) Perfect straight line up to failure   (CO1) [Knowledge]
   b) Straight line up to 0.002 strain value and then parabolic up to failure
   c) Parabolic up to 0.002 strain value and then uniform up to failure
   d) Linear up to 0.002 strain value and then uniform up to failure

5. The _____ is the distance between the exposed concrete surface (without plaster and other finishes) to the nearest surface of the reinforcing bar
   a) Efffective cover   (CO2) [Knowledge]
   b) Clear cover
   c) Effective depth
   d) None of the above

6. The intensity of shear stresses near the support in a beam section is _____
   a) maximum   (CO2) [Knowledge]
   b) minimum
   c) zero
   d) none of the above

7. When the beam is subjected to very high shear stresses and relatively low flexural stresses, i.e. near the support, the type of cracks occured is termed as _____
   a) diagonal tension cracks   (CO2) [Knowledge]
   b) flexural cracks
   c) flexure-shear cracks
   d) None of the above

8. In one way slab, main reinforcement is provided in _____ direction
   a) shorter   (CO3) [Knowledge]
   b) longer
   c) Both the directions
   d) all of the above

9. The minimum number of bars required in rectangular and circular columns are_____ respectively
   a) 6 and 6
   b) 4 and 6   (CO3) [Knowledge]
   c) 8 and 8
   d) 4 and 8

10. Short columns have slenderness ratio less than
    a) 20   (CO3) [Knowledge]
    b) 30
    c) 25
    d) 12

PART B

ANSWER ALL THE FOUR QUESTIONS   **4 X 10 = 40M**

11. A reinforced concrete beam of rectangular section 350mm wide is reinforced with four bars of 20mm diameter at an effective depth of 550mm out of which 2 bars are bent-up near the support. The beam has to resist a factored shear force of 400kN at support section. Assuming M20 concrete and Fe415 HYSD bars, design vertical stirrups for the section.

(CO2) [Comprehension]

12. A simply supported beam of 7m span carries a factored UDL of 95kN/m. The beam has a width of 200mm and effective depth of 450mm. 3 bars of 20mm diameter are provided as main steel. Using M25 steel and Fe500 HYSD bars, design vertical stirrups to resist shear stresses near the support section.

(CO2) [Comprehension]

13. Design a simply supported RCC slab, for a room having inside dimensions 3mx 7m.The thickness of supporting wall is 300mm. The live load on the slab is taken as $2kN/m^2$. Adopt M20 grade concrete and Fe415 HYSD bars. Take floor finish = $1.5kN/m^2$

(CO3) [Comprehension]

14. Design the reinforcement in a column of size 400 mm x 600 mm subjected to an axial load of 2000 kN under service dead load and live load. The column has an effective length of 2.6m. Use M 20 concrete and Fe 415 steel.

(CO3) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   **2 X 20 = 40M**

15. Design a simply supported rectangular RC beam, having effective span of 6 m, subjected to a uniformly distributed load of 34 kN/m. Compute the required reinforcement, assuming the breadth of beam as 230 mm and the effective cover for compression and tension reinforcement as 50 mm. Use M20 concrete and Fe 415 grade steel.

(CO2) [Application]

16. Design a simply supported RCC slab, for a room having clear dimensions, 4m by 5m with corners free to lift up. Adopt M20 grade concrete and Fe415 HYSD bars. Take floor finish = $0.6kN/m^2$ and live load = $4kN/m^2$

(CO3) [Application]

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