**20CE503**

**Hall Ticket Number:**

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| **III/IV B.Tech** (**Regular**) **DEGREE EXAMINATION** | | | |
| **February,2023** | **Civil Engineering** | | |
| **Fifth Semester** | **Design of Concrete Structures** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| Use IS 456 2000 & SP:16 code books in the examination hall if needed. Assume M20 grade concrete and Fe415 steel, if not mentioned in the question. Assume relevant data if needed. | | | |
| *Answer* ***ONE*** *question from each Unit.* | | | (5X14=70 Marks) |

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|  |  | **Unit -I** |  |  |
| 1. |  | A concrete beam has 300 mm breadth and 500 mm effective depth; effective cover 50 mm, reinforced with 3 nos. 20 mm diameter steel bars at tension side. M20 concrete and Fe 415 grade steel are used. Determine the moment of resistance | CO1,L4 | 14M |
|  |  | **(OR)** |  |  |
| 2. |  | Design a simply supported rectangular beam of 6 m effective span and is supposed to carry an imposed uniform load of 30 kN/m. Use M25 concrete mix and Fe415 grade steel. Use Limit state method. | CO1,L3 | 14M |
|  |  | **Unit -II** |  |  |
| 3. |  | A RC rectangular beam of size 300 mm x 500 mm (effective) and reinforced with 4 number 20 mm diameter bars on tension side. Calculate the shear reinforcement required if the section is subjected to a factored shear force of 250 kN. Use M20 grade concrete and Fe415 steel. | CO2,L4 | 14M |
|  |  | **(OR)** |  |  |
| 4. |  | Analyze an isolated T-beam, having a span of 6.0 m and cross section having flange width of 750 mm, flange thickness of 125 mm, web width of 260 mm and an effective depth of 420 mm, is reinforced with 4 No’s of 20 mm dia bars on tension side. The materials used are concrete mix of grade M 20 and HYSD steel of grade Fe415. | CO2,L4 | 14M |
|  |  | **Unit -III** | |  |
| 5. |  | Design a two way simply supported slab of size 5 m x 3 m subjected to a live load of 5 kN/m2. Adopt M25 grade concrete and Fe500 grade steel. Assume wall thickness 300 mm. | CO3,L4 | 14M |
|  |  | **(OR)** |  |  |
| 6. |  | Design a simply supported R.C.C. slab for a room of a hall 4 m × 9 m with 230 mm wall all around. Assume the live load as 2 kN/m2, and load due to finishes as 2 kN/m2. Use M25 grade concrete and Fe415 steel. | CO3,L3 | 14M |
|  |  | **Unit -IV** |  |  |
| 7. |  | A short column 400mm X 400mm is reinforced with 4 numbers of 25mm dia. Find the axial factored load that the column can carry. The materials are M20 grade concrete and HYSD reinforcement Fe415. | CO4,L4 | 14M |
|  |  | **(OR)** |  |  |
| 8. |  | Design a short rectangular RCC column to take an axial load of 2500 kN and Mux= 50KN-m The size of the column is 300 x 450 m, with 8 mm HYSD ties. Use M20 and Fe 415 bars. Use limit state method. | CO4,L2 | 14M |
|  |  | **Unit -V** |  |  |
| 9. |  | What are the various types of footings? List and explain design steps for isolated square footing. | CO5,L4 | 14M |
|  |  | **(OR)** |  |  |
| 10. |  | Design a square footing for a Square column 300 mm× 300 mm, reinforced with 8-25 mm ø bars, and carrying a service load of 1250kN. Assume soil with an allowable pressure of 200 kN/m2 at a depth of 1.25 m below ground. Assume Fe 415 grade steel for column and footing, and M 20 grade concrete for the footing and M 25 grade concrete for column. | CO5,L4 | 14M |

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