**Code No.PC305CE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (CIVIL) IV-Semester (Supplementary) Examination, FEB-2024**

**Subject: DESIGN OF REINFORCED CONCRETE STRUCTURES**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer all the questions.(10X2M=20M)**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | List the different codes used in design of RC Structures | 2 | 1 | 1 |
| **b** | Discuss the suitability of steel as reinforcing material. | 2 | 1 | 2 |
| **c** | Under what circumstances doubly reinforced beams are used | 2 | 2 | 2 |
| **d** | What are the assumptions made in limit state of design? | 2 | 2 | 1 |
| **e** | Calculate the anchorage length in compression for Fe 415 steel of 20 mm dia. Use M20 concrete. | 2 | 3 | 2 |
| **f** | What are the types of reinforcements used to resist shear in beams? | 2 | 3 | 1 |
| **g** | What are the differences between one way slab and two way slab? | 2 | 4 | 2 |
| **h** | How do you check serviceability limit state? | 2 | 4 | 2 |
| **i** | Give IS specifications regarding reinforcement in a column. | 2 | 5 | 2 |
| **j** | What are different types of footings? | 2 | 5 | 1 |

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**PART-B**

**Answer Any Five questions**.**(5X8M=40M)**

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Describe under reinforced &over reinforced sections | 2 | 1 | 2 |
| **b** | Using working stress method, determine the moment of resistance of a beam 250 mm wide and 460 mm deep, reinforced with 4 bars of 20 mm diameter. Use M25 concrete and Fe 415 steel. | 6 | 1 | 3 |
| **3.** |  | A RCC beam is required to carry a uniformly distributed load of 20 kN/m inclusive of its self-weight. The effective span of the beam is 6 m. Design the beam for flexure. Use M25 concrete and Fe 415 steel. | 8 | 2 | 4 |
| **4.** |  | Design a rectangular beam section 300 mm width and 500mm effective depth subjected to ultimate moment of 175 KNm, ultimate shear force 25 KN and ultimate torsional force of 10 KNm. Use M20 concrete and Fe 415 steel.  | 8 | 3 | 4 |
| **5.** |  | Design a slab for a single room of internal dimensions 8 m x 3 m. The slab is supported on wall of 300 mm thick and subjected to a live load of 3 KN/m2. Draw neat sketches showing reinforcement details? Adopt M20 and Fe 500 grade steel. | 8 | 4 | 4 |
| **6.** | **a** | What is the importance of lateral ties in columns? | 2 | 5 | 2 |
| **b** | Design a circular column 400 mm diameter with lateral ties subjected to a working load of 1200 kN. Use M20 concrete and Fe 415 steel. The column is 3 m long and held in position and direction | 6 | 5 | 4 |
| **7.** |  | An isolated T-beam has a flange width of 2400 mm, Flange thickness of 120 mm and effective depth of 580 mm, the rib is 300 mm wide and reinforced with 12 bars of 22 mm dia. The effective span of the beam is 3.6 m. determine the M.R. of the section, if M20 concrete and Fe 415 steel are used. | 8 | 2 | 3 |
| **8.** |  | Design a dog legged stair case for a building in which the height of the floor is 3.3 m. Adopt rise & tread of each step as 150 mm and 225 mm respectively. The stair hall is 2.5 m x 4.5 m. Live load may be taken as 3 kN/m2. Use M20 concrete and Fe 415 steel. Assume the stairs are supported on 230 mm wall at the end of the outer edges. | 8 | 4 | 4 |
| **9.** |  | Design a square footing for column of 300 mm x 300mm carrying an axial load of 750 kN. The safe bearing capacity of soil is 200 kN/m2. Use M20 concrete and Fe 415 steel. Sketch the reinforcement details | 8 | 5 | 4 |

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