**Code No.PC305CE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (CIVIL) IV-Semester (AICTE) Regular Examination, AUGUST-2023**

**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)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | Explain the different loads to be considered in design of RC structures | 2 | 1 | 1 |
| **b** | Explain concept of working stress method | 2 | 1 | 2 |
| **c** | What is the limiting value of depth Neutral Axis for different grade of steel? | 2 | 2 | 2 |
| **d** | Explain stress block parameters. | 2 | 2 | 1 |
| **e** | Explain anchorage and development length. | 2 | 3 | 2 |
| **f** | Define diagonal tension and how to prevent it? | 2 | 3 | 2 |
| **g** | What is the importance of distribution steel in slabs? | 2 | 4 | 2 |
| **h** | Calculate the bending moment coefficients for two way slab simply supported on all four edges with corners held down for room of size 5 m X 4 m | 2 | 4 | 3 |
| **i** | Differentiate long and short columns. | 2 | 5 | 1 |
| **j** | Describe the location of critical section for one way shear and two way shear in design of footing. | 2 | 5 | 2 |

**P.T.O**

**PART-B**

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q.No.** |  | **Questions** | | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Calculate minimum reinforcement required for a RC section 230mm x 500mm. assume Fe500 steel. | | 2 | 1 | 2 |
| **b** | A RCC beam 400 X 600 mm effective size is reinforced with 4 bars of 25 mm diameter. The beam is subjected to a bending moment of 150 kNm. Find the stresses developed in steel and concrete, if m= 13.33. | | 6 | 1 | 3 |
| **3.** |  | | Determine the ultimate moment of resistance of a beam 300 mm X 500 mm effective size is reinforced with 7 bars of 20 mm dia in tension zone and 2 bars of 20 mm dia in compression zone. Use M20 grade concrete and Fe 415 grade steel. Take d’= 50 mm. Use limit state method | 8 | 2 | 3 |
| **4.** |  | A simply supported beam 300 mm x 600 mm effective is reinforced with 5 bars of 25 mm diameter. It carries a uniformly distributed load of 80 kN/m including self-weight over an effective span of 6 m. Out of 5 main bars 2 bars are bent up bars. Design the shear reinforcement for the beam. Use M20 concrete and Fe 415 steel. | | 8 | 3 | 4 |
| **5.** |  | Design RCC slab for a room measuring 4 m x 5 m clear in size. The slab is simply supported on all four edges with corners not held down, carries super imposed load of 3.5 KN/m2 inclusive of floor finish. Use M20 grade concrete and Fe 415 steel | | 8 | 4 | 4 |
| **6.** |  | Design an isolated R.C.C footing for a rectangular column 230mm x 380mm carrying a working load of 500KN. The safe bearing capacity of the soil is 175KN/m2. Adopt suitable grades of concrete and steel and draw neat sketches. | | 8 | 5 | 4 |
| **7.** |  | A floor consists of 150mm, thick R.C. slab monolithic constructed with 300 mm wide beam. The beams are spaced at 3.6 m c/c and their effective span is 5 m. If the super imposed load on the slab is 5kN/m2. Design an intermediate Tee beam. Use M20 concrete and Fe 415 steel. | | 8 | 2 | 4 |
| **8.** |  | Design a section of ring beam section 500 mm width and 700 mm deep subjected to bending moment of 130 kNm, shear force 120 KN and twisting moment of 10 kNm at ultimate. Use M20 concrete and Fe 415 steel. | | 8 | 3 | 4 |
| **9.** | **a** | Distinguish between Uniaxial and Biaxial Bending. | | 2 | 5 | 2 |
| **b** | Design a square column to carry an axial load of 1500 kN. It is 4 m long effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe 415 steel. | | 6 | 5 | 4 |

**\*\*\*\*\***