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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 17-01-2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOE | **Program:** B. Tech CIV/CII | |
| **Course Code :** CIV3003 | **Course Name :** Design of RCC Structural Elements | |
| **Semester**: V | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **26** | **26** | **48** | **-** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

*(iii) Use of IS456 code book is permitted*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20Marks** | | | | |
| **1** | Write a short notes on (i) Characteristics strength of materials (ii) Characteristics of loads. | **2 Marks** | **L1** | **CO1** |
| **2** | Write any two assumptions made in limit state of collapse in flexure? | **2 Marks** | **L1** | **CO1** |
| **3** | Write the codal specification for limiting depth of neutral axis in limit state method. | **2 Marks** | **L1** | **CO1** |
| **4** | Write short note on under reinforced and over reinforced sections. | **2 Marks** | **L1** | **CO2** |
| **5** | What do you understand by doubly reinforced beam section? | **2 Marks** | **L1** | **CO2** |
| **6** | Name the different types of shear reinforcement provided to resist shear forces developed in RC beam sections | **2 Marks** | **L1** | **CO2** |
| **7** | Write any two differences between one way slab and two way slab | **2 Marks** | **L1** | **CO3** |
| **8** | Write the span/depth ratio for two way slab system as per IS456 | **2 Marks** | **L1** | **CO3** |
| **9** | Write IS specifications for minimum eccentricity of an axially loaded short column. | **2 Marks** | **L1** | **CO3** |
| **10** | Classify the columns based on type of loading. | **2 Marks** | **L1** | **CO3** |

**Part B**

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| **Answer ALL the Questions Total 80 Marks.** | | | | | | |
| **11.** | **a.** | Determine whether the section is under or over-reinforced with fck = 30 N/mm2, fy = 415 N/mm2 for the following values of Ast: (a) 1610 mm2 (b) 4190 mm2. | | **10 Marks** | **L1** | **CO1** |
|  | **b.** | Find the moment of resistance of the beam section with 200mm width and effective depth 400mm, reinforced with 3-16mm diameter of Fe415 steel bars. Take M20 concrete. | | **10 Marks** | **L2** | **CO1** |
| **or** | | | | | | |
| **12.** | Design a singly reinforced concrete beam to support a working live load of 6 kN/m over a clear span of 3m. Use M20 grade concrete Fe415 HYSD bars. Adopt width of supports as 200mm. | | | **20 Marks** | **L3** | **CO1** |
|  |  | |  |  |  |  |
| **13.** | **a.** | | Explain the different types of shear failures observed in reinforced concrete members. | **08 Marks** | **L1** | **CO2** |
|  | **b.** | | A reinforced concrete beam of rectangular section has a width of 300mm and effective depth of 550mm. The beam is reinforced with 4 bars of 20mm diameter on the tension side. Two of the tension bars are bent-up at 45o near the support section. In addition the beam is provided with 8mm diameter 2 legged stirrups at a spacing of 150mm near the supports. Using M20 grade concrete and Fe415 HYSD bars, estimate the shear strength of the support section. | **12 Marks** | **L2** | **CO2** |
| **Or** | | | | | | |
| **14.** | A reinforced concrete beam of rectangular section 300mm 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 350 kN at support section. Assuming M20 concrete and Fe415 HYSD bars, design vertical stirrups for the section. | | | **20 Marks** | **L3** | **CO2** |

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| **15.** | 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 4kN/m2 . Adopt M20 grade concrete and Fe415 HYSD bars. Take floor finish = 1.0 kN/m2. | **20 Marks** | **L3** | **CO3** |
| **Or** | | | | |
| **16.** | Design a simply supported RCC slab, for a room having clear dimensions, 4m by 6m with corners free to lift up. Adopt M20 grade concrete and Fe415 HYSD bars. Take floor finish = 1 kN/m2 and live load = 3kN/m2 | **20 Marks** | **L3** | **CO3** |

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| **17.** | Design the reinforcement in a column of size 400mm x 600mm, subjected to an axial service load of 2300 kN. The effective length in both directions is 4m. Use M20 concrete and Fe415 steel. | **20 Marks** | **L3** | **CO3** |
| **Or** | | | | |
| **18.** | Design the reinforcement in a column of size diameter 400 mm, subjected to an axial factored load of 2000 kN. The effective length is 3.4 m. Use M 20 concrete and Fe 415 steel. | **20 Marks** | **L3** | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***