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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM END-TERM EXAMINATION AUG-2024

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| **Semester : V** | **Date : 8 August, 2024** |
| **Course Code : CIV3003** | **Time : 1:00pm – 4:00pm** |
| **Course Name : Design of RC Structural Elements** | **Max Marks : 100** |
| **Program : B.Tech Civil Engineering** | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | What are the assumptions taken in limit state of collapse - flexure? | (CO 1) | [Knowledge] |
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| 2 | Draw and explain the design stress strain curve for mild steel. | (CO 1) | [Knowledge] |
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| 3 | Explain the classification of slabs. | (CO 1) | [Knowledge] |
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| 4 | List out the type of loads considered for structural analysis and design. | (CO 1) | [Knowledge] |
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| 5 | Define characteristic strength and characteristic load. | (CO 1) | [Knowledge] |
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| 6 | What are the advantages of using Reinforced Cement Concrete? | (CO 1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | Discuss the different methods of reinforced cement concrete design. | (CO 1) | [Comprehension] |
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| 8 | What are the different types of shear cracks formed on a beam section? Explain with neat sketch. | (CO 1) | [Comprehension] |
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| 9 | Give the classification of columns based on slenderness ratio, loading and type of reinforcement. | (CO 1) | [Comprehension] |
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| 10 | What are the different types of shear reinforcement provided for a beam section? | (CO 1) | [Comprehension] |
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| 11 | An RC beam, 300mm wide is reinforced with 1436 mm2 of Fe415 HYSD bars at an effective depth of 500mm. If M20 grade concrete is used, estimate the moment of resistance of the section. | (CO 3) | [Comprehension] |
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| 12 | An RCC beam of rectangular section has a width of 250mm and effective depth of 500mm. The beam is reinforced with 4 bars of 20mm diameter on the tension side. Two of the tension bars are bent-up at 40 degrees near the support section. In addition the beam is provided with 8mm diameter 2 legged stirrups at a spacing of 200mm near the supports. Using M25 grade concrete and Fe500 HYSD bars, estimate the shear strength of the support section. | (CO 2) | [Comprehension] |
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| 13 | Design the reinforcement in a column of size diameter 450mm, subjected to an axial factored load of 2000kN. The effective length is 3.5m. Use M25 concrete and Fe500 steel. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Design a simply supported reinforced concrete beam for the following data:  Effective span = 4m  Width of supports = 300mm  Live Load = 5kN/m  M20 grade concrete and Fe415 HYSD bars  Also design the shear reinforcement. | (CO 3) | [Application] |
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| 15 | Design a simply supported RCC slab, for a room having clear dimensions, 3.5m by 4.5m. Adopt M25 grade concrete and Fe415 HYSD bars. Take floor finish = 0.6 kN/m2 and live load = 4kN/m2 | (CO 3) | [Application] |
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| 16 | 1) A RC beam section with 350mm width and 500mm effective depth is reinforced with tension reinforcement of area 3000mm2. Check the ultimate flexural strength of the section. Use M20 grade concrete and Fe415 HYSD bars.  2) State whether the section is under or over-reinforced with fck = 30N/mm2, fy = 415 N/mm2 for the following values of Ast:  (a) 2100 and (b) 2960 | (CO 2) | [Application] |
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