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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION - JULY 2024

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| **Semester : V** | **Date : 1 July, 2024** |
| **Course Code : CIV3003** | **Time : 1:30PM –4:30PM** |
| **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 | A singly reinforced beam of width 230mm and effective depth 400mm is reinforced with 4 number of 16 mm diameter bars. The beam is made up of using M25 grade concrete and Fe415 grade steel materials. Find the moment of resistance of the beam 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. 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 450mm x 450mm, subjected to an axial factored load of 2000kN and factored moment of 300kN. The effective length is 3.5m. Use M25 concrete and Fe415 steel. Consider effective cover d’ = 50mm. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Design a singly reinforced concrete beam for the following data: Effective span = 4.5m Width of supports = 250mm Live Load = 4kN/m M20 grade concrete and Fe415 HYSD bars Also design the shear reinforcement. | (CO 3) | [Application] |
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| 15 | A hall has clear dimension 3m x 5m with wall thickness 230 mm. The live load on the slab is 3 kN/m2 and finishing load of 1 kN/m2. State whether the slab is one way or two way slab and design the reinforcement for the slab. Use M20 grade concrete and Fe 415 grade steel. | (CO 3) | [Application] |
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| 16 | 1) A RC beam section with 300mm width and 500mm overall depth is reinforced with tension reinforcement of area 3000mm2 at an effective cover of 30mm. 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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