Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18CE3023** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DESIGN OF ADVANCED CONCRETE STRUCTURES** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Elaborate the factors influencing the short term deflection. | CO1 | 4 |
| b. | In a hall, a rectangular beam of 300 x 450mm is reinforced with 3 bars of 20mm dia. at an effective depth of 420mm. Two hanger bars of 12mm φ are provided at the compression face. The effective span of the beam is 6m. The beam supports a live load of 12kN/m. Check for the deflection if M25 concrete and Fe415 steel are used. | CO3 | 12 |
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| 2. | a. | Explain the concept of Plastic hinge formation with neat sketch. | CO2 | 4 |
| b. | A Tee beam ABC is continuous over two span of 8m each and it carries uniformly distributed factored load of 75kN/m. Check for the max. moment to reduce by 30% and redistribute to the spans. Flange width – 1000mm, web width – 300mm and slab thickness 150mm. Overall depth 820mm and effective depth 770 mm. Use M25 concrete and Fe 415 steel. | CO5 | 12 |
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| 3. | a. | Differentiate between ‘RC wall’ and ‘Shear wall’. | CO3 | 4 |
| b. | Discuss the interaction of shear walls and describe the given principles of shear walls. | CO6 | 12 |
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| 4. | a. | Illustrate the characteristic features of Yield line and the assumptions made in the yield line analysis. | CO3 | 4 |
| b. | A hexagonal slab of side 3.6m is simply supported along edges and is isotropically reinforced with 10mm dia. bars at 150mm c/c. The effective depth is 125mm and overall depth of slab is 150mm. If M20 concrete and Fe 415 steel are used, determine its load carrying capcity by yield line analysis method. | CO6 | 12 |
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| 5. | a. | Differentiate between ‘Bunkers’ and ‘Silos’. | CO3 | 4 |
| b. | Design the side walls of a rectangular bunker of capacity 300kN to store coal using M20 concrete and Fe 415 steel. Unit weight of coal is 8kN/m3 and angle of repose of coal is 25O | CO5 | 12 |
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| 6. | a. | In a hall, a rectangular beam of size 400 x 600mm is reinforced with 4 # 16mm φ with 35mm cover. If the beam is subjected to a moment of 480kN.m, compute the crack width at a point midway between bars at the tension face. | CO6 | 8 |
| b. | Explain the concepts of plastic hinges and moment redistribution. | CO6 | 8 |
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| 7. | a. | Explain the Strut and Tie mechanism in Beam-column joint with neat sketch. | CO2 | 4 |
| b. | A concrete wall 200mm thick is reinforced with 10mm φ @150mm c/c in both direction with the clear cover of 25mm. Check the wall for cracks due to early thermal cracking for a change of temperature of 32OC. Coefficient of thermal cracking is 12x10-6o C and the Restraint coefficient as 0.8. | CO5 | 12 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Discuss the beam – column connections for roofs and floors in the precast construction with neat diagram. | CO4 | 5 |
| b. | Design the column bracket to carry an ultimate load of 600kN at distance of 250mm from the face of a column of size 400 x 400mm. M25 concrete and Fe 415 steel are used. Take bearing stress of concrete as 0.8fy. Draw the reinforcement details. | CO5 | 15 |