**Hall Ticket Number:**  **14CE704**

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| **IV/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **Jan/Feb, 2021** | **Civil Engineering** | | |
| **Seventh Semester** | **PRESTRESSED CONCRETE** | | |
| **Time:** Three Hours | | **Maximum :** 60 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X12 = 12 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X12=48 Marks) |
| ***IS 1343 is permitted*** | | |  |

**Part - A**

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| 1 | Answer all questions | | (1X12=12 Marks) | |
|  | a) | What is the use of placing eccentric tendon in pretressed beams? | |  |
|  | b) | When the stress concept used in prestressed beams? | |  |
|  | c) | Write any difference between pre-tensioning and post-tensioning? | |  |
|  | d) | What is loss due to slip of anchorage? | |  |
|  | e) | What is apparent jacking stress? | |  |
|  | f) | What is meant by relaxation of stress in steel? | |  |
|  | g) | Define Kern Distance. | |  |
|  | h) | How much reinforcement need to provide to prevent the failure due to fracture steel in tension? | |  |
|  | i) | List different types of flexural failure modes observed in prestressed concrete beams. | |  |
|  | j) | Write any two major differences between web shear and flexure shear crack | |  |
|  | k) | What are the parameters that influence shear cracks in ultimate shear strength of PSC beams? | |  |
|  | l) | Sketch the anchorage zone reinforcements. | |  |
| **Part - B** | | | | |
| 2 |  | A simply supported beam of 7m span of cross-section is 300mmx500mm is pre-stressed by a parabolic tendon with a prestressing force of 1920KN. The tendon has a sag of 100mm at mid-span. Find the extreme fibre stresses by load balancing concept, if it is subjected to a) total UDL of 300KN, b)total UDL of 420KN. | | 12M |
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| 3 | a) | Explain with neat sketches of different methods of post-tensiong. | | 9M |
|  | b) | Why we are using high strength concrete and high strength steel in prestressed concrete? | | 3M |
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| 4 | a) | What are the factors infusing deflections in priestessed concrete beams. | | 3M |
|  | b) | Determine the midspan deflection of the beam shown below: (i) at transfer with an initial prestress force of 8500kN; (ii) under an imposed load of 27kN/m when the prestress force has been reduced to 4500 kN. Take self weight of beam = 11.26 kN/m; I = 0.006396m4; E = 28 x 106 kN/m2 | | 9M |
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| 5 |  | A post-tensioned prestress concrete beam of 35m span is subjected to a transfer prestress force of 2500KN at 28days strength. The profile of the cable is parabolic with maximum eccentricity of 200mm at midspan. Determine the loss of prestress, and the jacking force required if jacking is done from both ends of the beams. The beam has a cross-section of 550mmx900mm, and is prestressed with 9 cables, each cable consisting of 12 wires of 5mm diameter. Take Es=2E5 N/mm2 and Ec=3.0E4 N/mm2. One cable is tensioned at a time. | | 12M |
| **P.T.O.** | | | | |
| **14CE704** | | | | |
| 6 |  | Design a bonded post-tensioned prestressed concrete beam of type-2 simply supported over an effective span of 10m. The beam has to be of rectangular cross-section. It carries superimposed dead and live loads of 6m and 12KN/m respectively. Use grade M35 concrete and unit weight of concrete as 24KN/m. | | 12M |
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| 7 |  | The cross-section of a symmetrical I-section prestressed beam is 450mmX800mm overall, with flanges and web 100mm thick. The beam is post-tensioned by cables containing 50 wires of 6mm diameter high-tensile steel wires at an eccentricity of 250mm. The strength of concrete in compression is 40N/mm2 and the ultimate tensile strength of wires is 1700N/mm2. Assuming that the grouting of tendons is 100% effective. Determine the ultimate moment of the section. | | 12M |
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| 8 |  | Design the shear reinforcement at support and at quarter span of a simply supported bonded pre-tensioned prestress beam of span 10m and cross-section 450mmx600mm carrying 40KN/m UDL. The prestressing strand, parabolically varying with zero eccentricity at ends and eccentricity of 100mm at mid span, consisting of 5no.s of 12mm diameter HTS, with an effective pre-stress of 1200MPa and M40 grade concrete is used. | | 12M |
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| 9 | a) | Explain about transmission length in pre tensioned beams. | | 6M |
|  | b) | Explain briefly about anchorage zone stresses in post tensioned beams. | | 6M |

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