**18CE501**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Civil Engineering** | | |
| **fifth Semester** | **Structural Analysis** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X10 = 10 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X10=40 Marks) |
|  | | | **PART-A** |

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| 1. | a) | A three hinged parabolic arch of span ‘l’ m and central rise yc is subjected to a u.d.l load of w/m run over the entire span. The vertical reaction at the abutments is………… | CO1 |  |
|  | b) | A three hinged arch has a span of 24 m and a central rise of 8 m. The body of the arch is fabricated from rolled steel sections**.** Find the change in central rise due to an increase in temperature of 300C. (Take α = 12 x 10-6/0C) | CO1 |  |
|  | c) | What is the nature of forces in cables? | CO1 |  |
|  | d) | What is the Prop reaction of a propped cantilever beam of span ‘L’ and subjected to UDL of ‘w’ per m? | CO2 |  |
|  | e) | Write the theorem of three moment equation for two span continues beam. | CO2 |  |
|  | f) | What are the fixed end moments for a fixed beam carrying eccentric point load. | CO2 |  |
|  | g) | Define carryover moment. | CO3 |  |
|  | h) | Write down the general slope deflection equations and state what each term represents. | CO3 |  |
|  | i) | For drawing ILD, what value of test load is assumed and why? | CO4 |  |
|  | j) | Draw the ILD for vertical reactions (RA and RB) for simply supported beam. | CO4 |  |
| **PART-B** | | | | |
| 2. |  | A three hinged parabolic arch carries a UDL of 30 kN/m on the left half of the span. It has a span of 16 m and a central rise of 3m. Determine the resultant reactions at the supports. Also find the normal thrust, radial shear and bending moment at 2 m from the left end A. | CO1 | 10M |
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| 3. |  | A suspension cable of horizontal span 21 m is to be used to support six equal loads of 40 kN each at 3 m spacing. The central dip of the cable is limited to 2 m. Find the length of the cable required and also its sectional area if the safe tensile stress is 750 N/mm2. | CO1 | 10M |
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| 4. |  | A fixed beam AB of span 6 m is carrying a uniformly distributed load of 4 kN/m over the left half of the span find the fixing moments and support reactions. Also draw the bending moment diagram for the fixed beam AB. | CO2 | 10M |
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| 5. |  | A continuous beam ABC of uniform section, with span AB as 8 m and BC as 6 m, is fixed at A and simply supported at B and C. The beam is carrying a UDL load of 1 kN/m throughout its length. Find the moments along the beam and reactions at the supports. Also draw the bending moment and shear force diagrams using clapeyron’s theorem of three moments. | CO2 | 10M |
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| 6. |  | Analyse the continuous beam ABC fixed at A and C and simply supported at B consists of spans AB and BC of lengths 4 m and 6 m respectively. The span AB carries a UDL of 20 kN/m while the span BC carries a UDL of 12 kN/m. Find the moments and reactions at the supports using by Slope deflection method. Also draw the bending moment and shear force diagrams for the beam. | CO3 | 10M |
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| 7. |  | Find the support moments and draw bending moment and shear force diagrams for the continuous beam shown in Fig.  C:\Users\lenevo\Desktop\MOMENT.PNG  Fig.1 | CO3 | 10M |
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| 8. |  | Construct the ILD for continuous beam as shown in Fig.2 for the following cases, CO 4  i) Reaction @ A (VA) ii) Reaction @ B (VB)  iii) Shear force @ C (VC) iv) Bending moment @ C (Mc)  C:\Users\lenevo\Desktop\ild exam.PNG  Fig.2 | CO4 | 10M |
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| 9. |  | Two wheel loads 200 kN and 80 kN spaced at 2 m apart move on the girder of span 16 m. Find the maximum positive shear force and bending moment that can occur at a section 6 m from the left end. Any wheel load can lead the other using Influence line diagrams. | CO4 | 10M |

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