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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

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

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **09CE208/12CE214/CE254** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **STRUCTURAL ANALYSIS-I / STRUCTURAL ANALYSIS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | What is meant by static indeterminacy? | (1) |
| 2. | State the meaning of drawing influence line diagrams for rolling loads. | (1) |
| 3. | Name the principle used for analyzing Influence line for statically indeterminate structure. | (1) |
| 4. | Give an example of arch action in daily life. | (1) |
| 5. | Mention the position where the hinges of three hinged arch is placed. | (1) |
| 6. | Name the method by which space trusses are analyzed. | (1) |
| 7. | On what basis the shape of the cable varies? | (1) |
| 8. | Mention the other name for three moment method. | (1) |
| 9. | State Castgliano’s first theorem. | (1) |
| 10. | Mention where the three moment method is applied. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Determine the deflection in the free end of the cantilever beam applying Castigliano’s theorem. | (3) |
| 12 | Draw the Influence line diagram of a bending moment of a simply supported beam of length ‘l’ with a single concentrated load ‘W’ moving from left to right. | (3) |
| 13 | Draw the suspension bridge and mark its parts. | (3) |
| 14 | State the difference between three hinged arch and two hinged arch. | (3) |
| 15 | Draw the bending moment diagram for the beam shown below in Fig.1 | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | |
| 16. | Determine the deflection and rotation at the free end of the cantilever beam shown in Fig.3. Use unit load method, given E=2 x105 N/mm2 and I=12 x 106 mm4 | (15) |
|  | (OR) |  |
| 17. | Using the method of virtual work, determine the horizontal displacement of the point ‘C’ of the frame shown in Fig.2. Take E=2 x105 N/mm2 and I=2.27 x 109 mm4 | (15) |
|  | | |
| 18. | Draw IL for reaction at B and for the support moment M at A for the propped cantilever shown in Fig.4. Compute the IL ordinate at 1.5m intervals. | (15) |
| (OR) | | |
| 19. | A beam ABC is supported at A, B, C as shown and draw IL for reaction at A, B, C    Fig.5 | (15) |
| 20. | A udl of 4 kN/m covers left half of the span of a three hinged parabolic arch of span 36m and central rise 8m. Determine the horizontal thrust. Also find the BM, SF and normal thrust at the loaded quarter point. | (15) |
| (OR) | | |
| 21. | A two hinged parabolic arch of span 10m has a central rise 2.5m. it is loaded with a udl of 2 kN/m over the half of the span from the left end reaction, horizontal thrust and maximum and minimum BM of the arch. | (15) |
| 22. | A force P is applied at end A of the strut OA which is supported by 2 guys AB and AC. O, B, C are in the same plane and OA normal to the plane. Find the forces in OA, AB and AC | (15) |
| (OR) | | |
| 23. | A cable of span 120 m and dip 10m carries a load of 6 kN/m of horizontal span. Find the maximum tension in the cable and the inclination of the cable at the support. Find the forces transmitted to the supporting pier if the cable passes over the smooth pulley on the top of the pier. The anchor of the cable is at 30o to the horizontal. Determine the maximum bending for the pier if the pier is 15m. | (15) |
| 24. | A continuous beam ABC of length 8m rests on three hinge supports covering two spans. The beam carries udl of 2 kN/m. Applying the Clapeyron’s equation, determine moments over the beam and also draw BMD | (15) |
| (OR) | | |
| 25. | A continuous beam ABC, is fixed at A and C and simply supported at B with load of 10kN/m over the whole span of 5m. Draw BM diagram for the beam. Span AB=2m and span BC=3m. | (15) |

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