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Question Paper Code	12158
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**

Sixth Semester

**Civil Engineering**

**20CEPC603 - STRUCTURAL ANALYSIS II**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. Where do you get rolling loads in practice?   | <i>2,K2,CO1</i>               |
| 2. List the uses of Influence Lines.   | <i>2,K1,CO1</i>               |
| 3. In a parallel chord truss, the force in a vertical member is a function of .....in the Panel. | <i>2,K1,CO2</i>               |
| 4. What are the forces available in a truss member?  | <i>2,K1,CO2</i>               |
| 5. State Muller Breslau's Principle.   | <i>2,K1,CO3</i>               |
| 6. Draw the qualitative influence line diagrams for the reactions of a fixed beam.               | <i>2,K2,CO3</i>               |
| 7. Why stiffening girders are necessary in the suspension bridges?                               | <i>2,K2,CO5</i>               |
| 8. Differentiate between plane truss and space truss.  | <i>2,K2,CO5</i>               |
| 9. Define shape factor.  | <i>2,K1,CO6</i>               |
| 10. Define plastic hinge.  | <i>2,K1,CO6</i>               |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Draw the ILD for shear force and bending moment for a section at 5m from the left hand support of a simply supported beam, 20m long. Hence, calculate the maximum bending moment and shear force at the section, due to a uniformly distributed rolling load of length 8m and intensity 10kN/m run. *13,K3,CO1*

**OR**

- b) A single rolling load of 100kN moves on a girder of span 20m. *13,K3,CO1*  
(a) Construct IL for (i) shear force and (ii) BM at a section 5m from left support.  
(b) Construct influence lines for the points at which absolute maximum shear and absolute maximum BM develop.
12. a) Explain in detail about Influence lines for Beams and trusses with any example. *13,K2,CO2*

OR

- b) Draw ILD for forces in P, Q, R and S shown in Fig - 1

13,K3,CO2

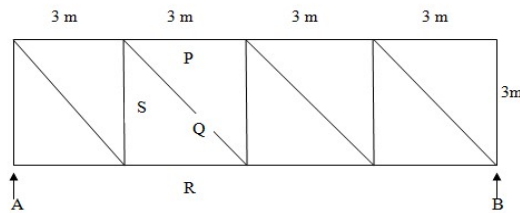


Fig - 1

13. a) Draw the IL for reaction at B and for the support moment  $M_A$  at A for the propped cantilever AB of length 10m. Compute the IL ordinates at every 1.5m interval. 13,K3,CO3

OR

- b) Draw influence lines for the moment at C, 4m from A of a propped cantilever AB of span 6m. 13,K3,CO3
14. a) A suspension bridge of 250m span has two numbers of three hinged stiffening girder supported by cables with a central dip of 25m. If 4 point load of 300kN each are placed at the centre line of the roadway at 20, 30, 40 and 50m from the left hand hinge, Estimate the shear force and bending moment in each girder at 62.5m from left end. Estimate also the maximum tension in the cable. 13,K3,CO5

OR

- b) A cable of span 100 m has its ends at heights 8 m and 15 m above the lowest point of the cables. It carries a UDL of 10KN/m per horizontal run of the span. Determine the horizontal and vertical reactions at the supports. What is the length of the cable? 13,K3,CO5
15. a) Calculate the shape factor for a 6,K3,CO6
- (i) Rectangle section of breadth 'b' and depth 'd',
  - (ii) Diamond section of breadth 'b' and depth 'd'. 7,K3,CO6

OR

- b) A continuous beam ABC is loaded as shown in the Fig - 2. Examine the required Mp if the load factor is 3.2. 13,K3,CO6

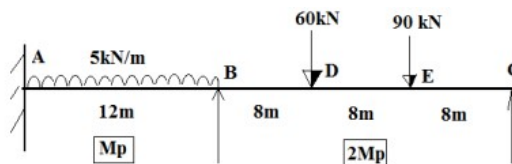


Fig - 2

**PART - C (1 × 15 = 15 Marks)**

16. a) A parabolic 3 hinged arch of span 20m carries point load of 20kN and 30kN at 3m and 7m from the left end and an udl of 25kN/m over the right half of the span. Find the bending moment, normal thrust and radial shear at D, 5m from A. What is the maximum bending moment? *15, K3, CO4*

**OR**

- b) A three circular arch of span 16m and rise 4m is subjected to two point loads 100kN and 80kN at the left and right quarter spans respectively. Find the reactions at the supports. Find also the bending moment, radial shear and normal thrust, 6m from the left support. *15, K3, CO4*