Hall Ticket No | | | | | | | | | | |

Question Paper Code: ACEC14

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech V SEMESTER END EXAMINATIONS (REGULAR/ SUPPLEMENTARY) - FEBRUARY 2024
Regulation: UG20
ANALYSIS OF STRUCTURES
Time: 3 Hours **(CIVIL ENGINEERING)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Differentiate between two hinged and three hinged arches. Classify the types of arches with a neat sketch. [BL: Understand| CO: 1|Marks: 7]

   (b) A three hinged parabolic arch of 20m span and central rise of 4m as shown in Figure.1 carry a point load of 40kN at a distance of 4m from left support. Compute and draw bending moment, shear force under the load point. [BL: Apply| CO: 1|Marks: 7]

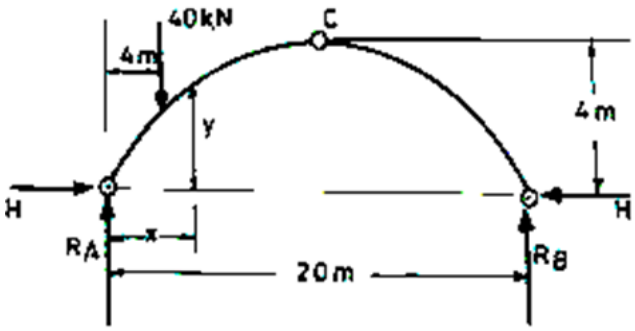

Figure 1

MODULE – II

2. (a) Under what circumstances Castigliano's theorem can be used for the analyzing structures? Write the points to remember while applying Castigliano's theorem for any structure. [BL: Understand| CO: 2|Marks: 7]

   (b) Using castigliano's theorem, calculate vertical deflection at middle of a simply supported beam which carries uniformly distributed load of intensity w over the full length span. Take EI as constant. [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Discuss the assumptions, limitations and sign conventions involved in slope deflection method. [BL: Understand| CO: 3|Marks: 7]

(b) Analyze the beam as shown in Figure 2 by slope deflection method.

[BL: Apply| CO: 3|Marks: 7]

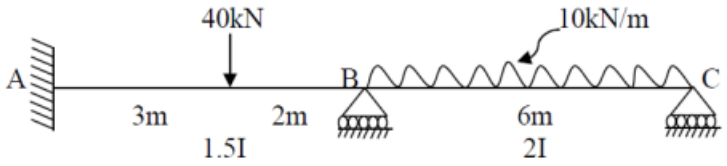

Figure 2

4. (a) What is modified stiffness factor? Explain the term degree of kinematic indeterminacy.

[BL: Understand| CO: 3|Marks: 7]

(b) Analyse the continuous beam by moment distribution method for Figure 3 and draw bending moment diagram. [BL: Apply| CO: 3|Marks: 7]

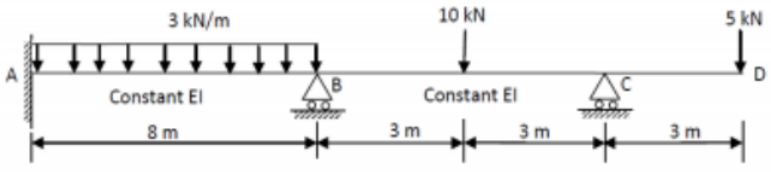

Figure 3

MODULE – IV

5. (a) Explain Kani's method considering a continuous beam with three supports and with uniformly distributed load w/m through out. [BL: Understand| CO: 4|Marks: 7]

(b) Analyse the continuous beam with sinking of support at B by 20mm as shown in Figure 4 by Kani's method. Assume I= 7.0 x 10^6 mm^4. Take E=200kN/mm^2. [BL: Apply| CO: 4|Marks: 7]

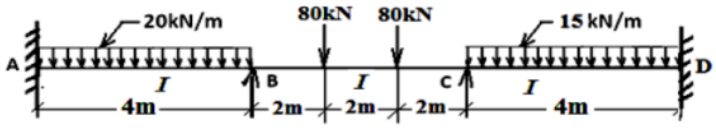

Figure 4

6. (a) Outline abou force method of analysis. Differentiate between sway and non- sway analysis.

[BL: Understand| CO: 4|Marks: 7]

(b) Determine the end moments in a continuous beam shown in Figure 5 using Kani's method. Draw bending moment diagram. [BL: Apply| CO: 4|Marks: 7]

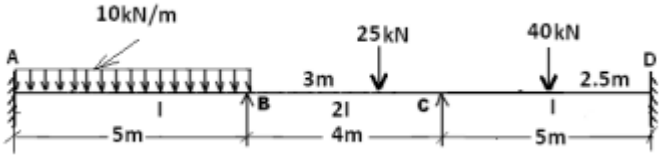

Figure 5

MODULE – V

7. (a) How is the maximum shear force determined in case of rolling loads? Explain equivalent UDL in case of beam. [BL: Understand| CO: 5|Marks: 7]

   (b) A train of wheel loads as shown in Figure 6 crosses a girder of 25m span with 120 kN load leading. Determine the value of

   i) Maximum bending moment at the section 8m from the left end of the girder.

   ii) Absolute maximum bending moment of the girder. [BL: Apply| CO: 5|Marks: 7]

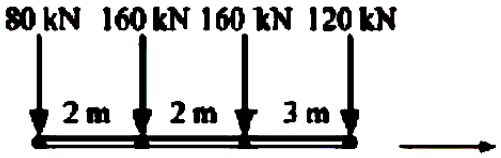

Figure 6

8. (a) Differentiate between live load and dead load. Explain the term dead loads with suitable examples. [BL: Understand| CO: 6|Marks: 7]

   (b) Determine the maximum shear force and bending moment at quarter span from left end when a uniformly distributed load longer than the span of intensity 20kN/m, accompanied by a 100kN concentrated load crosses the span of 12m. Use influence line. The concentrated load can occupy in any position. [BL: Apply| CO: 6|Marks: 7]

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