Bachelor of Engineering (Civil Engineering) - Third Year - First Semester

Theory of Structures- II

PART-I

Time: Three Hours

Full Marks 100
(50 marks for 1st part)

Use a separate Answer-Script for each part

[No code or handbook is allowed]

No. of questions	Answer any two from the followings	Marks
1(a)	Analyze the beam and draw Bending Moment Diagram by slope deflection method.(Fig.1)	12
(b)	Analyze the beam and draw Bending Moment Diagram by moment distribution method.(Fig.1)	13
2	Analyse the Portal frame by Moment distribution method. A is roller supported and D is hinged. Flexural rigidity of AB, BC and CD are EI, 2EI and 3EI respectively.	25

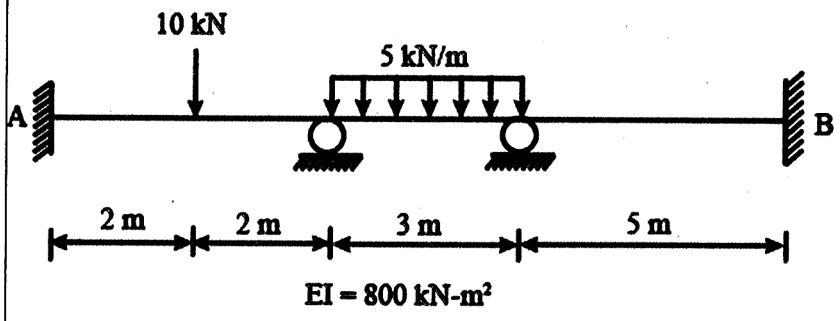

Fig.1

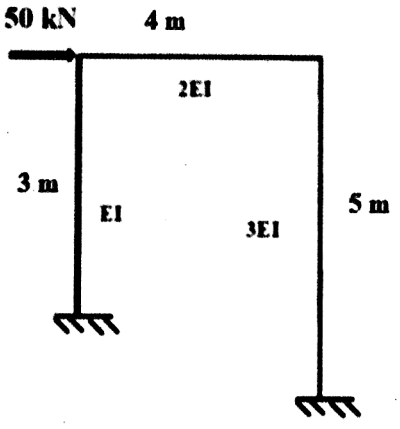

Fig.2

Ex/CE/5/T/303/2024

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Theory of Structures- II

PART-I

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No. of questions	Answer any two from the followings	Marks
3(a)	Prove that moment carry by a member of a joint is proportional to its stiffness.	6
(b)	Derive the slope deflection equation.	8
(c)	Find out the horizontal reactions of a semicircular two hinge arch whose radius is R and a concentrated load at crown is acting over it.	11
4(a)	Find out the horizontal reactions, radial shear, normal thurst of a cubic parabola two hinge arch and a UDL (w) is acting over its whole span.	18
(b)	What is two hinge and three hinge arch? Why parabolic arch is preferable?	7

Ref. No.: Ex/CE/5/T/303/2024

Bachelor of Engineering (Civil Engineering) Third Year First Semester Exam. - 2024

THEORY OF STRUCTURES – II
PART - II

Answer Question No. 1 and ANY TWO from the rest. **Full Marks – 50**

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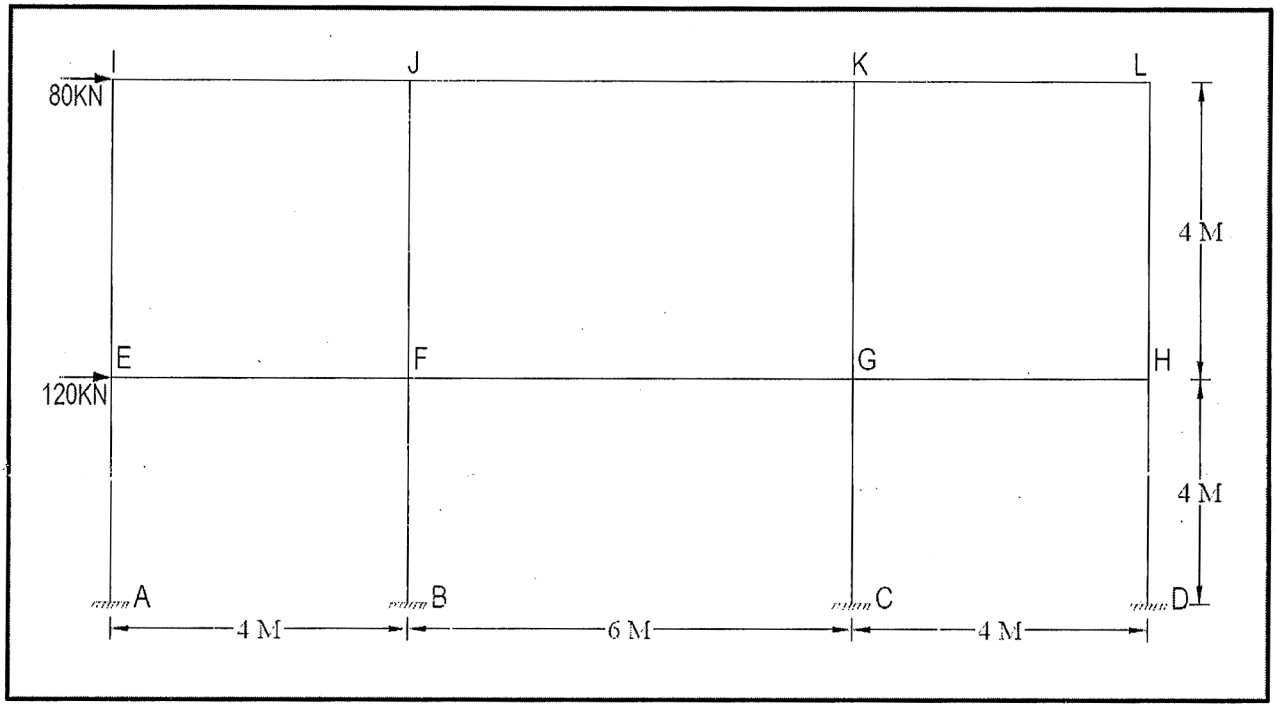
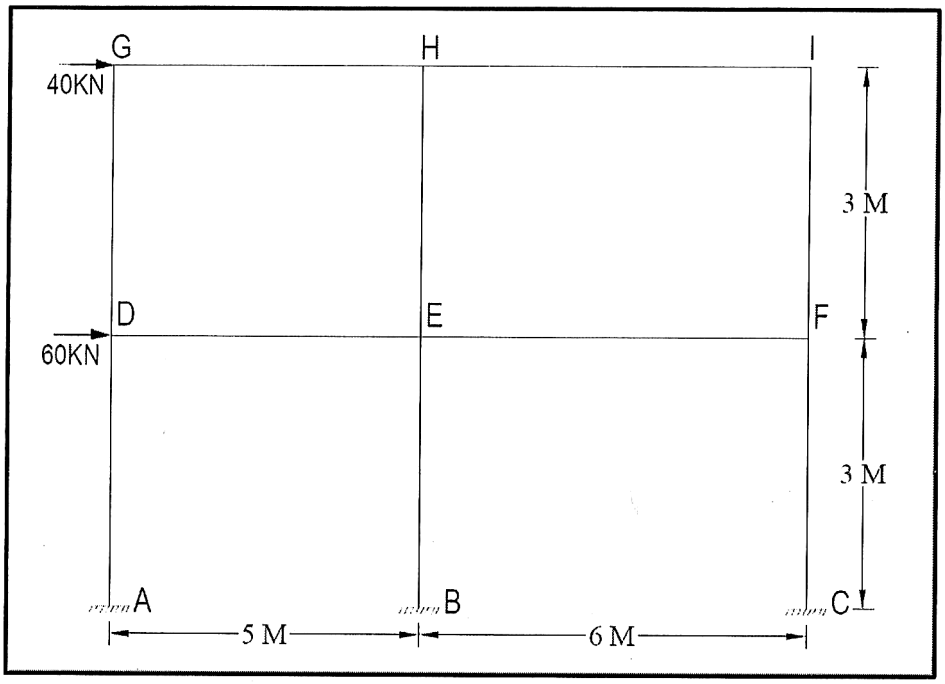
1. Answer all questions - **(5 x 2 = 10)**

(A) In which situations the Portal Method and the Cantilever Method may be used?
(B) State the assumptions of the Portal Method.
(C) State the assumptions of the Cantilever Method.
(D) Discuss how far these assumptions of the Portal method and the Cantilever method are valid in the real scenario.
(E) Discuss the assumptions and the basic theory behind the Substitute Frame Method.

2. Determine the Bending Moment, Shear Force, and Axial force for all the members of the frame shown below by Portal Method. Draw the Bending Moment and Shear Force diagrams.



3. Determine the Bending Moment, Shear Force, and Axial force for all the members of the frame shown below by the Cantilever Method. Draw the Bending Moment and Shear Force diagrams.



4. Analyze the Substitute Frame shown in the figure below to find the maximum Span-Moment in segment FG, for the given Dead Load of 20 kN/m and Live Load of 15 kN/m.