CLASS: B.TECH.   SEMESTER : III
BRANCH: CIVIL   SESSION : MO/2023

SUBJECT: CE202 STRUCTURAL ANALYSIS -I

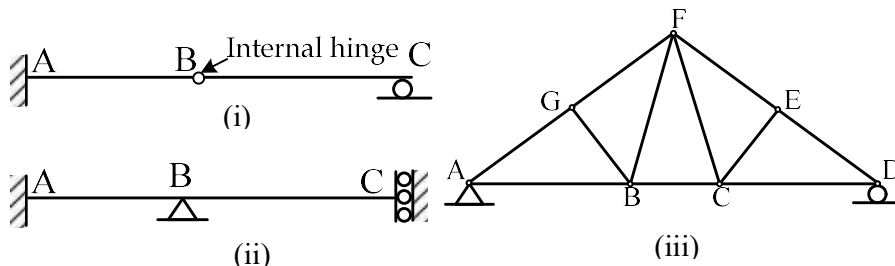TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. **Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**


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Q.1(a) Define the degree of freedom. In two-dimension how many degrees of freedom does a   [2]   1   1
roller support have?

Q.1(b) Classify each of the following structures as statically determinate or indeterminate. If   [3]   1   2
statically indeterminate, report the number of the degree of indeterminacy.

Q.2(a) Consider the cantilever beam shown in the following figure where the free end of the   [5]   2   3
beam (end C) is propped with a roller support, and there is an intermediate hinge at B.
Span AD is subjected to udl of intensity 5 kN/m and span DB is subjected to uvl varying
for 5 kN/m to 10 KN/m as shown in the figure. A clockwise couple of 15 kN-m acts at
end C. Find the support reactions at A, B and C.
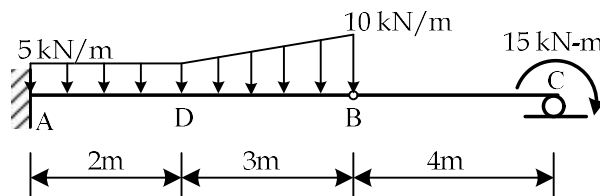
Q.3(a) Use the method of joints to find out the zero-force member in the following truss when   [2]   2   3
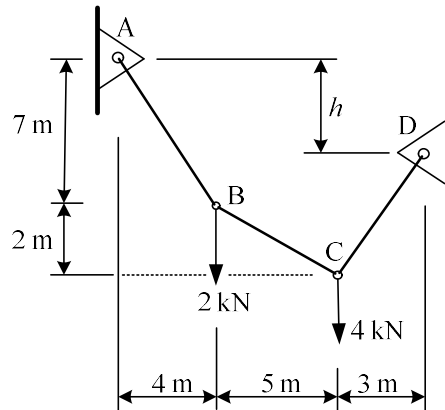there is a vertically downward load at joint 'G'
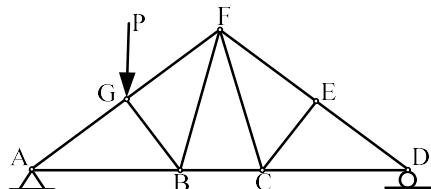
Q.3(b) A truss, as shown in the figure, is carrying 200 kN load at node C. Calculate the force [3] 2 4
(with nature) at member IJ and NI.

6 panels @ 4m = 24m
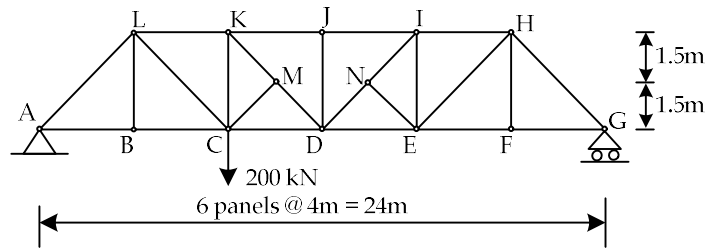
Q.4(a) A horizontal beam ABC is hinged at A and roller supported at B. The span AB is 8m. The [5] 2 3
overhang portion BC is 3m long. A concentrated force of 20 kN and a clockwise couple
of 150 kN-m act on the free end C. An udl of intensity 40 kN/m acts over the span AB.
Derive the equations for the beam's bending moment and shear force and draw the shear
force and bending moment diagram. Calculate the maximum value of the sagging and
hogging bending moment.
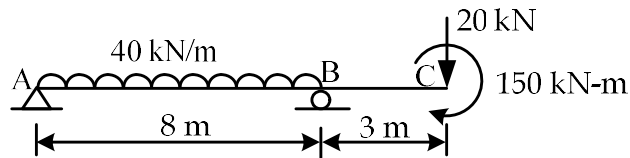
Q.5(a) Determine the tension in each segment of the cable shown in the figure. Also, Calculate [5] 3 3
the vertical distance h.

::::::21/09/2023 E::::::