

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: B.TECH.
BRANCH: CIVIL**

**SEMESTER: III
SESSION: MO/2022**

SUBJECT: CE202 STRUCTURAL ANALYSIS -I

TIME: 2 HOURS

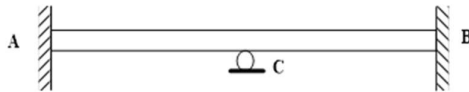
FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
 2. Candidates attempt for all 25 marks.
 3. Before attempting the question paper, be sure that you have got the correct question paper.
 4. The missing data, if any, may be assumed suitably.
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- Q1 (a) State the difference between determinate and indeterminate structures with suitable example. [2] CO1 K1
- Q1 (b) Classify each of the following structures as statically determinate or indeterminate. If statically indeterminate report the number of the degree of indeterminacy. [3] CO1 K2
- i. Beam with the following support conditions:

- ii. Beam with the following support conditions:

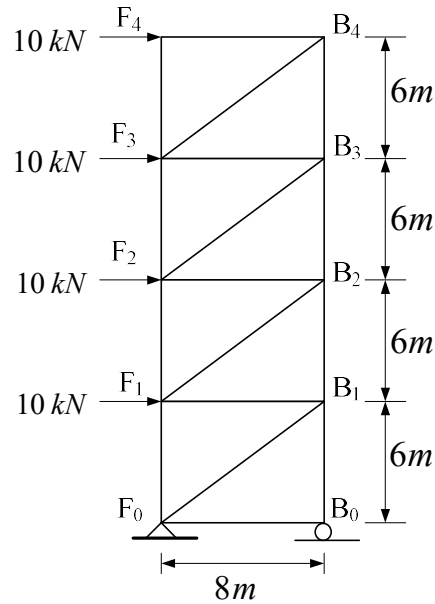


- iii. Plane truss with the following support conditions:

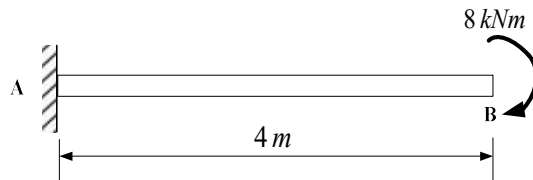
- Q2 (a) Explain the case (with sketches) where the number of equilibrium equations is equal to the number of unknowns in a structure, still the structure is unstable. [2] CO1 K2
- Q2 (b) Consider the cantilever beam shown in the following figure where the free end of the beam (end C) is propped with a roller support and there is intermediate hinge at B. A udl of intensity 6 kN/m is placed over the AB part and there is a couple at end C. Find the support reactions at A and C ends. [3] CO1 K3

- Q3 (a) Use method of joints to find out the zero-force member in the following truss, when there is a vertically downward load at joint 'E'. [2] CO2 K4

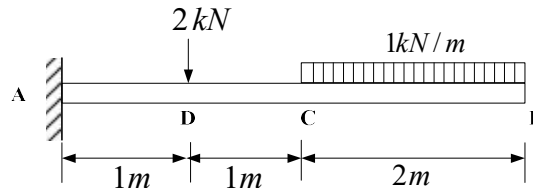
- Q3 (b) Find the forces (with their nature) in the members F_2B_2 , F_1B_2 and F_1F_2 of the tower (truss) loaded as shown in the following figure: [3] CO2 K4



- Q4 (a) Draw the Shear Force and Bending Moment diagrams for a cantilever beam, [1] CO2 K3 shown in the following figure.



- Q4 (b) Draw the Shear Force and Bending Moment diagrams for a cantilever beam, [4] CO2 K3 shown in the following figure.



- Q5 (a) State any two uses of Cables in Civil Engineering Structures. Out of axial, shear and bending what kind of force does a cable carry? [2] CO3 K1

- Q5 (b) Determine the tension in each segment of the cable shown in the following figure and also find the value of h for the given load case? [3] CO3 K3

