

Code: 19CE3501

III B.Tech - I Semester – Regular Examinations – JANUARY 2022**STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.
 2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
 3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
 4. All parts of Question paper must be answered in one place
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PART – A

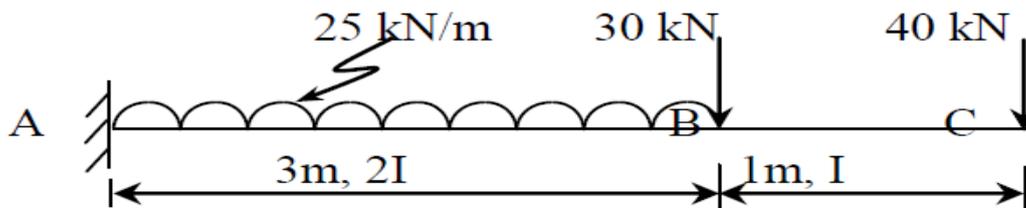
1. a) Define statically determinate and indeterminate structures.
- b) What are the assumptions made in slope-deflection method?
- c) List out, what are the steps involved in the Kani's method?
- d) Mention the limitations of Euler's formula.
- e) Define hoop stress & longitudinal stress.

PART – B**UNIT – I**

2. A steel cantilever beam of 6m long carries 2 point loads 15KN at the free end and 25KN at the distance of 2.5m from the free end. Determine the slope at free end & also deflection at free end. Take $I = 1.3 \times 10^8 \text{ mm}^4$,
 $E = 2 \times 10^5 \text{ N/mm}^2$. 12 M

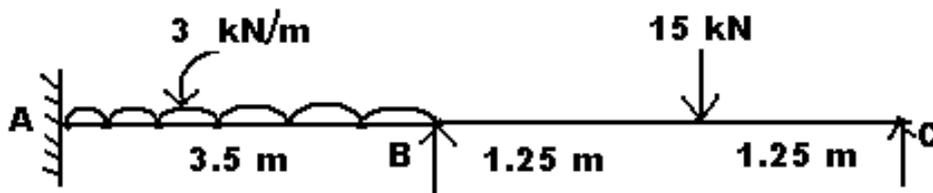
OR

3. Compute the slope and deflection at B and C of the cantilever beam shown in figure by moment area method. 12 M



UNIT – II

4. Analyze the continuous beam ABC shown in figure by slope deflection method. Also draw the bending moment diagram. Take $EI = \text{constant}$.



12 M

Fig.

OR

5. A fixed beam AB of span 8 m is subjected to a point load of 64kN at 2m from A and a clockwise couple of 20kN-m at mid-span. Find the fixed end moments. Draw the B.M.D. and S.F.D.

12 M

UNIT-III

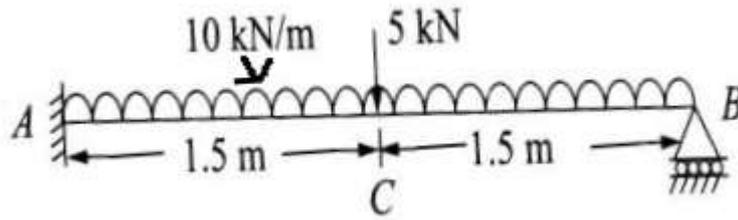
6. A beam ABC 16m long fixed at A and C and continuous over support B carries an udl of 3kN/m over the span AB and a point load of 10kN at mid span of BC. Span AB = 8m and BC = 8m. Take EI is constant throughout. Analyse the beam using moment distribution method.

12 M

OR

7. Analyse the continuous beam shown in figure using Kani's method. Draw Shear Force and Bending Moment diagrams (EI is same throughout).

12 M



UNIT – IV

8. A rectangular section of dimensions 120 x 200mm is used as a beam on a 3m span, if the beam is loaded by a concentrated load (P) at the centre. Find the maximum value of the load 'P' in kN, if the maximum bending stress is not to exceed 12MPa.

12 M

OR

9. A column 4 meters long of circular section made of cast iron with 200mm external diameter and 20mm thick is used as a column. Both ends of the column are fixed. The column carries a load of 150kN at an eccentricity of 25mm from the axis of the column. (a) Find the extreme stress on the column section, and (b) Find also the maximum eccentricity in order to have no tension anywhere on the section. Take $E = 9.4 \times 10^4 \text{MPa}$.

12 M

UNIT – V

10. A thin cylindrical shell with following dimensions is filled with a liquid at atmospheric pressure. Length=1.2m, external diameter=20cm, thickness of metal=8mm. Find the value of the pressure exerted by the liquid on the walls of the cylinder and the hoop stress induced if an additional volume of 25cm^3 of liquid is pumped into the cylinder. Take $E=2.1 \times 10^5 \text{N/mm}^2$ and poisson's ratio=0.33.

12 M

OR

11. The internal and external diameters of a thick hollow cylinder are 60mm and 100mm respectively. It is subjected to an external pressure of 30N/mm^2 and an internal pressure of 100N/mm^2 . Calculate the circumferential stress at the external and internal surfaces and determine the radial and circumferential stresses at the mean radius.

12 M