

Instructions to the Students:

1. All the questions are compulsory.
2. Figures to right indicates full marks.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q. 1 Solve Any Two of the following.

- A) State and Explain Moment area theorem's. Knowledge 6
- B) Find the deflection at free end of cantilever beam shown in fig 1. If cross section of beam is 100 mm wide and 200 mm deep. Take $E = 11 \text{ Gpa}$ Analysis 6

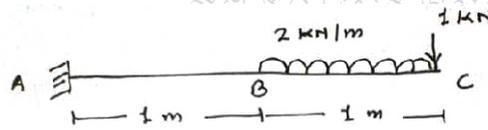


Fig (1)

- C) Compute the max deflection of beam shown in fig 2 Take $E = 2 \times 10^5 \text{ Mpa}$ and $I = 3 \times 10^7 \text{ mm}^4$. Use conjugate beam method. Application 6

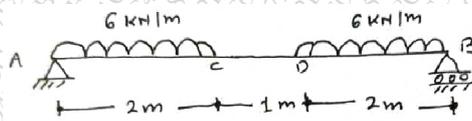


Fig (2)

Q.2 Solve Any Two of the following.

- A) Derive the expression for strain energy due to traction. Understand 6
- B) Determine the deflection at point C and B. of fig 3 Application 6

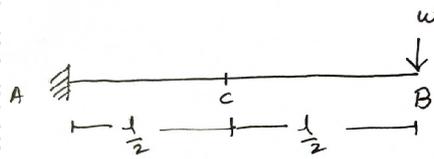


Fig (3)

- C) A simply supported beam AB of span 8 m carries udl of 20 KN/m over the right hand of beam using castigliano's first theorem calculate deflection at mid span $EI = 32000 \text{ Kn-m}^2$ Analysis 6

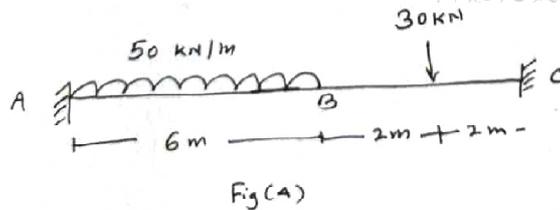
Q. 3 Solve Any Two of the following.

- A) Explain Castigliano's first theorem. Remember 6

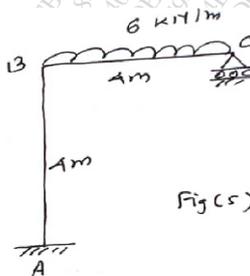
- B) A fixed beam AB of span 15 m two couples 20 KN-m and 30 KN-m are acting at 5m and 7.5 from left side respectively. Find the fixed end moments. Analysis 6
- C) Explain the procedure for analysis of indeterminate beams. Knowledge 6

Q.4 Solve Any Two of the following.

- A) Define Stiffness, relative stiffness, carry over factor, and distribution factor Remember 6
- B) Analyze the beam as shown in fig.4 by moment distribution method. Analysis 6

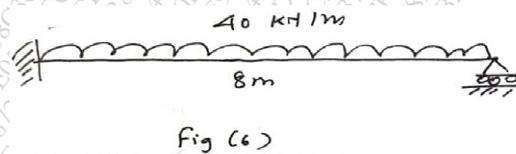


- C) Draw SFD and BMD of frame as shown in fig 5 if $M_a = 3.43 \text{ Kn-m}$ and $M_b = 6.86 \text{ Kn-m}$ clockwise at beam AB. Analysis 6

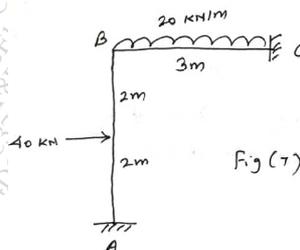


Q. 5 Solve Any Two of the following.

- A) Analyze propped cantilever as shown in fig 6 by slope deflection method draw SFD and BMD. Analysis 6



- B) Using slope deflection method, analyze the frame as shown in fig 7 draw SFD and BMD. Analysis 6



- C) Explain the procedure for analysis of continuous beam with sinking of supports by slope deflection method. Synthesis 6

End