DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. **Branch : Civil** **Semester : IV**

Subject Code & Name: BTCVC403 Structural Mechanics -I

Max Marks: 60 **Date: 22/08/2022** **Duration: 3.45 Hr.**

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 Gpa	Analysis	6

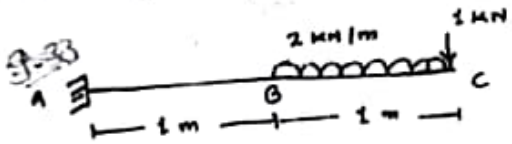

Fig (1)

C)	Compute the max deflection of beam shown in fig 2 Take E = 2×10^5 Mpa and I = 3×10^7 mm^4. Use conjugate beam method.	Application	6

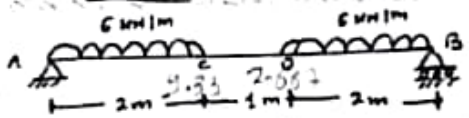

Fig (2)

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

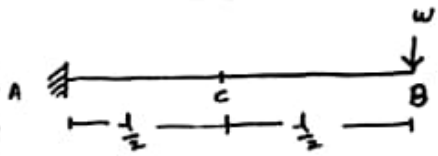

Fig (3)

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 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 7.5m from left side respectively. Find the fixed end moments. Analysis

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

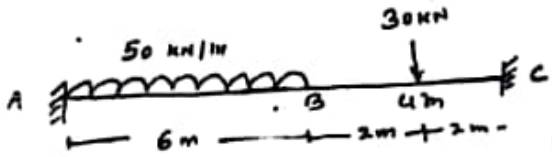

Fig (4)

C) Draw SFD and BMD of frame as shown in fig 5 if Ma = 3.43 Kn-m and Mb = 6.86 Kn-m clockwise at beam AB. Analysis 6

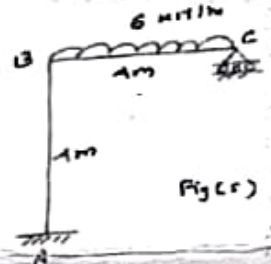

Fig (5)

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

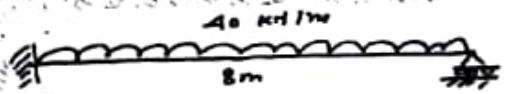

Fig (6)

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

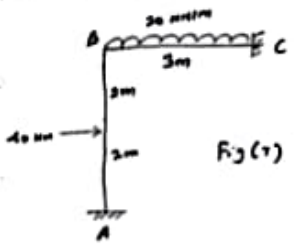

Fig (7)

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

End