Q. Code: 752488

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fifth Semester

CE18503 – STRUCTURAL ANALYSIS

(Civil Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Analyze the pin-jointed and rigid jointed frames using consistent deformation method.	**3**
CO 2	Analyse the continuous beams and rigid frames by slope deflection method.	**3**
CO 3	Apply the concept of moment distribution and analyse continuous beams and rigid frames with and without sway.	**3**
CO 4	Apply the concept of matrix stiffness method to analyse continuous beams, pin jointed trusses and rigid plane frames.	**3**
CO 5	Analyse the indeterminate pin jointed plane frames, continuous beams and rigid frames using matrix flexibility method.	**3**

PART- A (10 x 2 = 20 Marks)

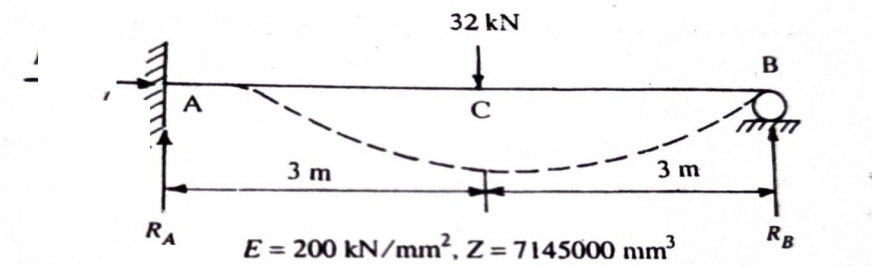
(Answer all Questions)

		CO	RBT LEVEL
1.	Differentiate static and kinematic indeterminacy of structure.	**1**	**2**
2.	A cantilever is subjected to a single concentrated load P at the middle of the span. Calculate the static indeterminacy of the beam.	**1**	**3**
3.	What are the limitations of the slope deflection method?	**2**	**1**
4.	How does one account for sway in the slope deflection method for the portal frames?	**2**	**1**
5.	Define carry over moment.	**3**	**1**
6.	What are the advantages of a Continuous beam over simply supported beam?	**3**	**2**
7.	What is the relationship between the flexibility and stiffness matrix?	**4**	**2**
8.	What are the applications of stiffness matrix method?	**4**	**2**
9.	What is meant by compatibility condition?	**5**	**1**

		Marks	CO	RBT LEVEL
10.	Give the mathematical expression for the degree of static indeterminacy of rigid jointed plane frames.	**5**	**1**	

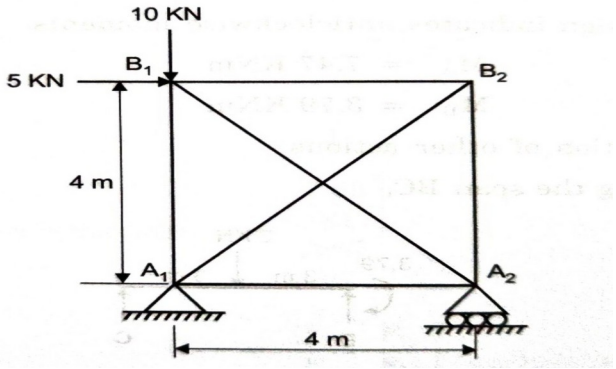
PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Determine the reactions and draw the shear and bending moment diagrams for the beam shown by the method of consistent deformation method.	**(14)**	**1**	**3**

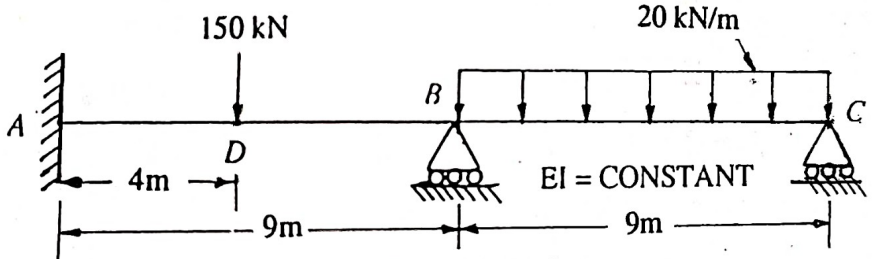


(OR)

(b)	Determine the reactions and the forces in each member of the truss.	**(14)**	**1**	**3**

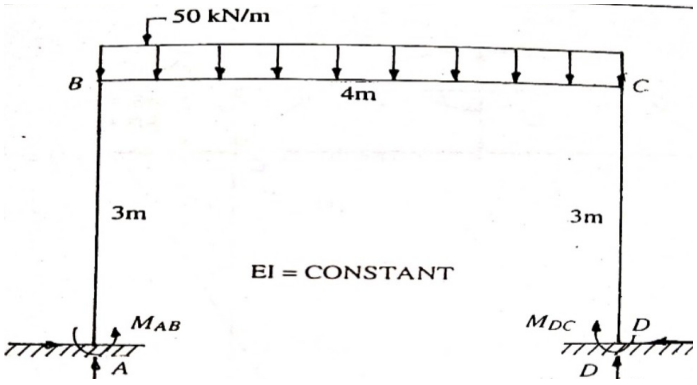


12. (a)	A continuous beam is built in at A and has roller supports at B and C as shown. It carries a point load of 150 kN, 4 m from support A which sinks 10 mm and a uniformly distributed load of 20 kN/m over span BC. Assume E = 2 x 10^5 kN/mm^2 and I = 3 x 10^9 mm^4 uniform throughout. Analyse the beam using slope deflection method.	**(14)**	**2**	**3**

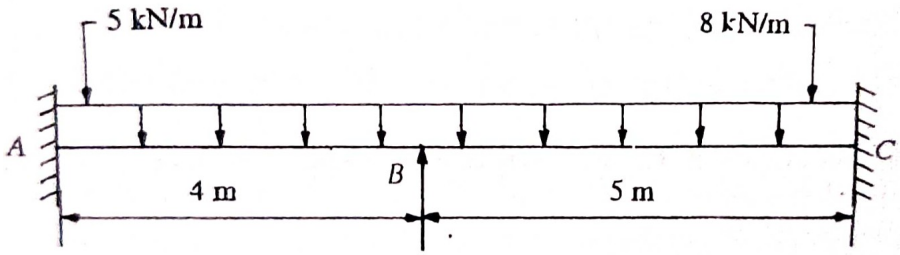


(OR)

(b)	Analyse the frame shown using slope deflection method.	**(14)**	**2**	**3**

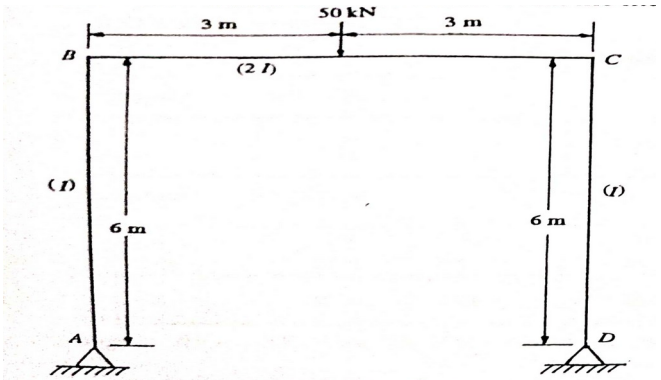


13. (a) Determine the member end moments for the beam shown. **(14)** **3** **3**

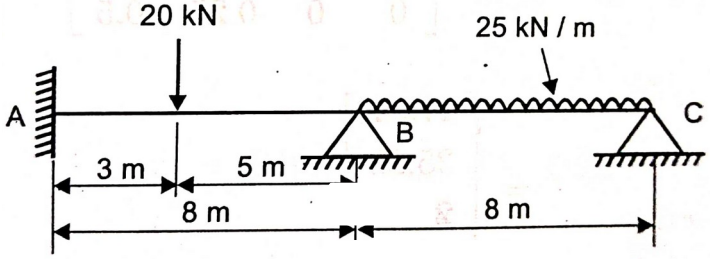


(OR)

(b) Analyse the portal frame by moment distribution method. **(14)** **3** **3**

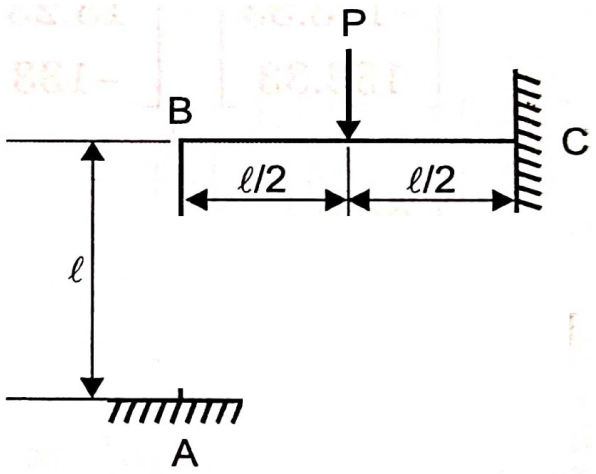


14. (a) A two span continuous beam is fixed at A and hinged over the supports B and C, AB = 8 m and BC = 8 m. The moment of inertia is constant throughout. It is loaded as shown. Analyse the beam by stiffness matrix method. **(14)** **4** **3**

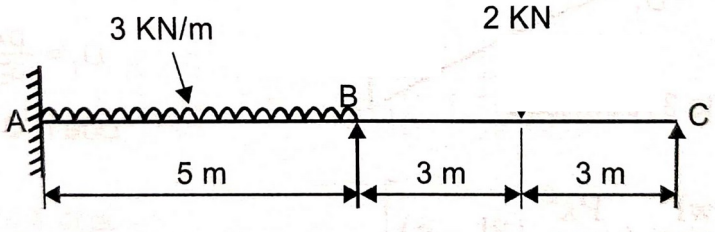


(OR)

(b) Analyse the frame shown using stiffness method. **(14)** **4** **3**

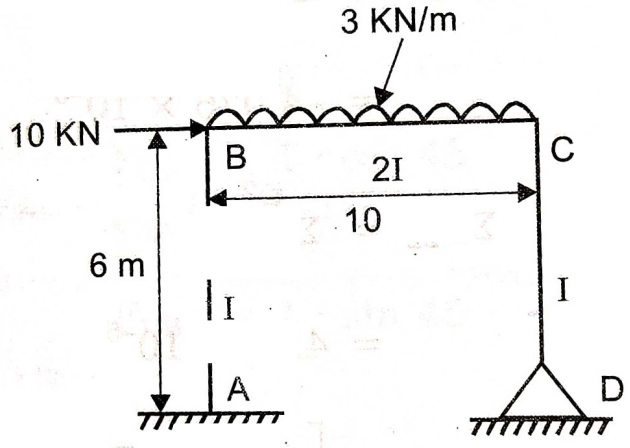


15. (a)	Analyse the continuous beam shown in figure by flexibility matrix method and draw shear force and bending moment diagram.	**(14)**	**5**	**3**



(OR)

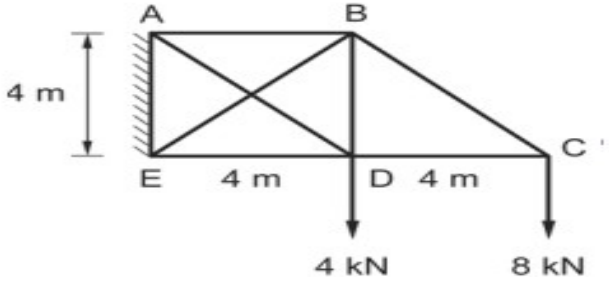
(b)	Analyse the portal frame using flexibility matrix method.	**(14)**	**5**	**3**



PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Analyse the given truss using consistent deformation method.	**(10)**	1	**3**



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