P P SAVANI UNIVERSITY

Fifth Semester of B. Tech. Examination

November 2022

SECV3022 Indeterminate Structural Analysis

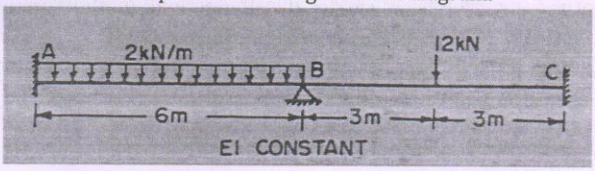
25.11.2022, Friday **Time: 10:00 a.m. To 12:30 p.m.** **Maximum Marks: 60**

Instructions:

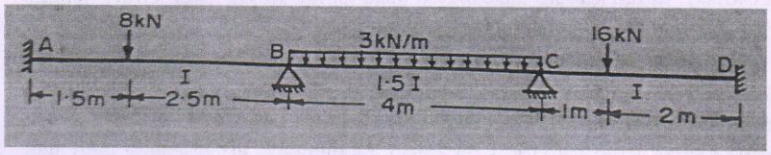
1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 Calculate end moments and plot the bending moment diagram. **[04] CO 3 BTL 4**

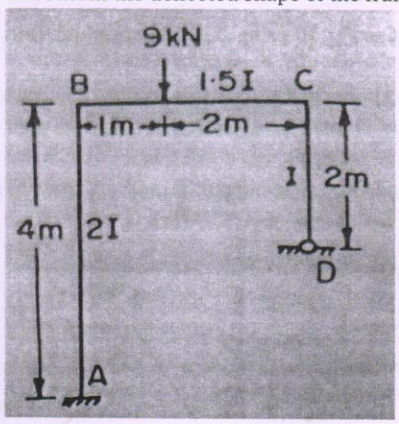


Q - 2 Determine the moments and reactions at the support. Using Moment distribution method. **[10] 3 4**

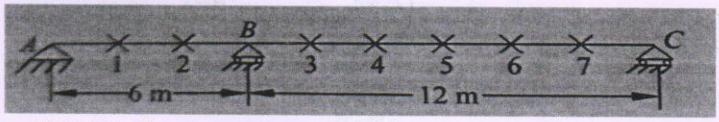


Or

Q - 2 Calculate the reaction and sketch the deflected shape of the frame. **[10] 3 4**



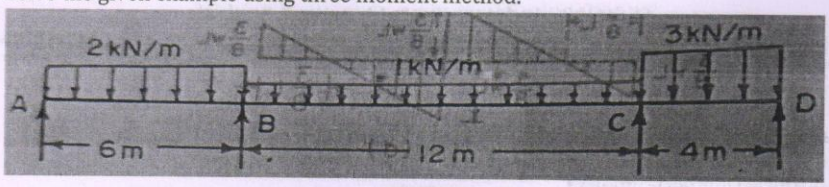
Q - 3 Determine influence line ordinates at 2 m interval for moment at mid span of BC for the given beam. **[08] 2 4**



Q - 4 A beam ABCD 16m long is continuous over three span: AB=6m, BC=5m, CD=5m the support being at the same level. There is UDL of 20kN/mover BC. On AB, is a point **[08] 3 4**

load of 80kN at 2m from A and CD, there is a point load of 60kN at 3m from D. Calculate the moments and reactions at the supports. (Use Three moment method)

OR

Q - 4	Solve the given example using three moment method. 	[05]	3	4

SECTION – II

Q - 1	Differentiate between Flexibility Method and Stiffness method	[04]	4	2
Q - 2 (a)	A two-span continuous beam ABC of constant flexural rigidity EI has hinge support at A and rollers at B and C. The beam carries distributed load of 30 kN/m over entire length. AB=2m, BC=3m. Analyze the beam using stiffness method.	[06]	4	4
Q - 2 (b)	Fig. 8 shows a rigid jointed plane frame. Considering Sway as prevented and axial deformations are to be neglected. How formation of total joint load vector can be developed?	[07]	4	4
	OR			
Q - 2 (a)	A fixed beam ABC is fixed at A & C. Flexural rigidities of AB and BC parts are EI and 2EI respectively. Beam carries distributed load of 60 kN/m over entire length. AB=BC=3m. Analyze the beam using flexibility method.	[06]	4	4
Q - 2 (b)	A portal frame ABCD has columns AB and CD of height 3 m and beam BC of span 3 m. The column ends at A & D are hinged. Beam carries a load of 12 kN at 2 m from B. Calculate support reactions at D using flexibility method.	[07]	4	4
Q - 3 (a)	Fig. 9 shows a plane truss with three members. All members are of length 1000 mm and sectional area 600 mm^2. Young's modulus is 150 kN/mm^2. Analyze using stiffness method.	[06]	4	4
Q - 3 (b)	Analyze the frame shown in Fig. 10 using cantilever method. Draw SFD, BMD & AFD.	[07]	5	4
	OR		4	
Q - 3 (a)	A pin jointed plane truss shown in fig. 11 is subjected to a horizontal load of 10 kN on joint B. Sectional areas of all members are same. Calculate axial forces in members using flexibility method.	[06]		4
Q - 3 (b)	Analyze the frame shown in Fig. 10 using portal method. Draw SFD, BMD & AFD.	[07]	5	4

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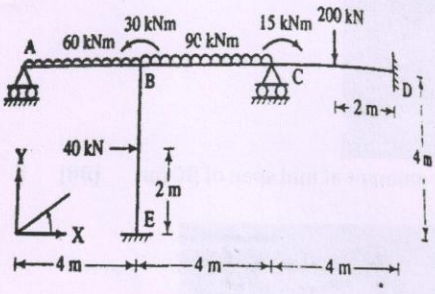

Fig 8

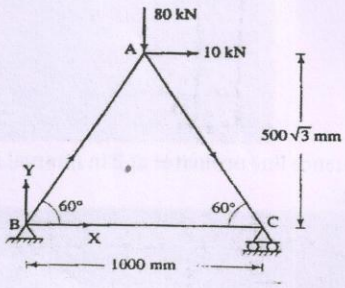

Fig 9

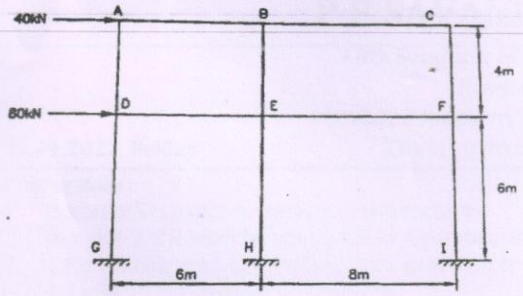

Fig10

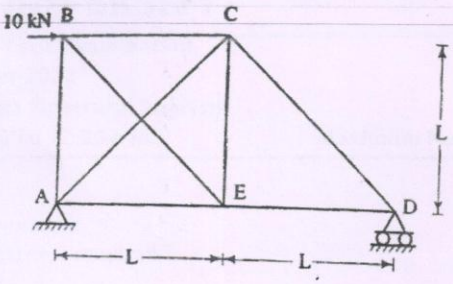

Fig11

CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create