Form A: Paper –Setting Blank

Ref No. –Ex/CE/5/T/402/2017(S)

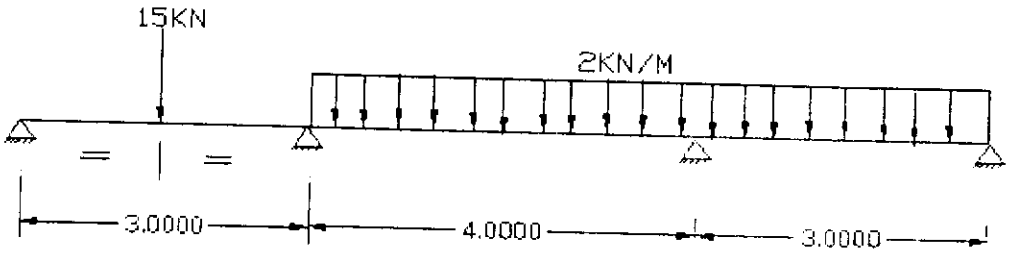
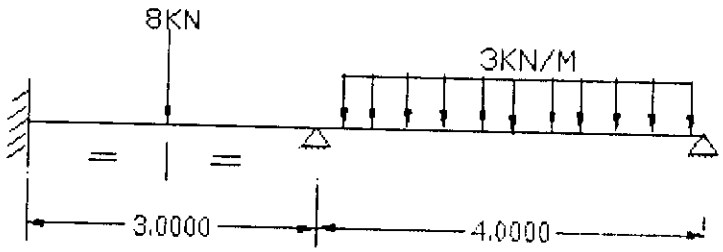
B.CIVIL ENGG. (EVENING) 4th YEAR 1st SEMESTER SUPPLEMENTARY 2017

SUBJECT: THEORY OF STRUCTURE III

Time: Three hours

Full Marks 100 (50 marks for each part)

Use a separate Answer-Script for each part

No. of Question	PART-I	Marks
1	**Answer any two question.** a) Derive the relation between stiffness of a member in member oriented coordinate system and structure oriented system. Hence work out the stiffness matrix for truss member in structure oriented system. b) Find out joint load matrix and stiffness matrix in structure oriented system for continuous beam. EI is constant for the whole span.(Fig-1)  Fig-1 c) A cantilever beam AB having length L is subjected to force P1 (vertical force) & p2 (moment) at free end. The corresponding displacement is denoted by D1 & D2. Proof that the multiplication of flexibility matrix' & stiffness matrix is unit matrix.	8+8+9=25
2	Compute the support reaction and member end force using 'Stiffness method' for the continuous beam shown fig-3. EI is constant for the whole span.  Fig-3	25

No. of Question	
3	Compute the reaction forces and member force of the truss (fig-4) using 'flexibility method' EA is constant for all members.

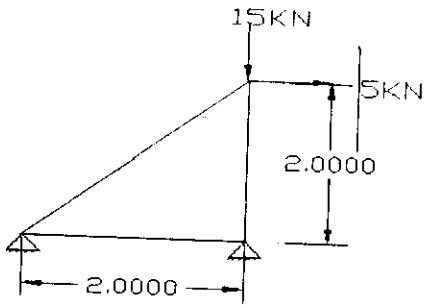


Fig-4

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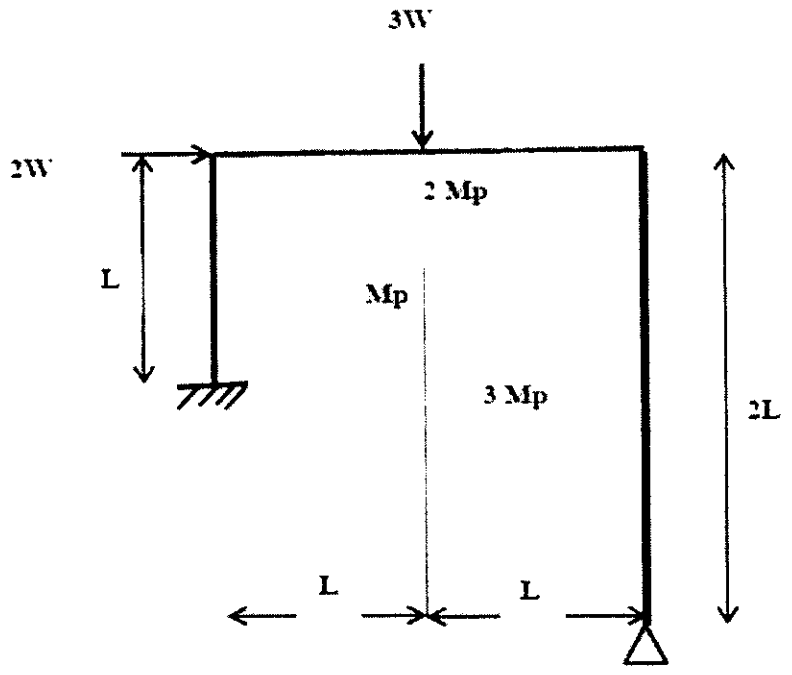
B.E. Civil Engineering (Evening) - Fourth Year – 1st Semester

Supplementary

Theory of Structures-III (part-II)

Time: Three Hours | Full Marks 100

[No code or handbook is allowed]

No. of questions	Part II (Answer Any four of the following questions.)	Marks (2X25=50)
1 (a)	A suspension cable of 80 meters horizontal span and central dip 6 m has a stiffening girder hinged at both ends. The load transmitted to the cable including its own weight is 1800 kN. The girder carries live load 22 kN/m UDL over the left quarter of the span. Assuming the girder to be rigid, calculate the shear force, bending moment in the girder at 12 m from the left support. Also calculate the maximum tension in the cable.	10
(b)	A suspension bridge is of 150 m span. The cable of the bridge has a dip of 12m. The cable is stiffened by a girder with hinges at either end and at centre. The dead load of the girder is 20 kN/m. A single concentrated load of 300 kN passes through it. i) What is the value of maximum horizontal pull? ii) What will be the maximum load intensity (w) of load transmitted to the cable? iii) What will be the maximum bending moment at 12 m from left end? iv) Find the greatest positive and negative bending moment of the girder when Also find the maximum tension in the cable.	15
2 (a)	Find the collapse load for the following portal frame. 	15

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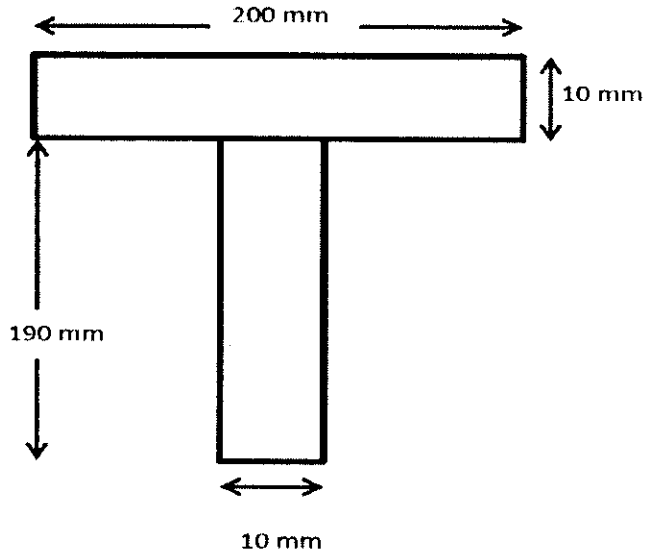
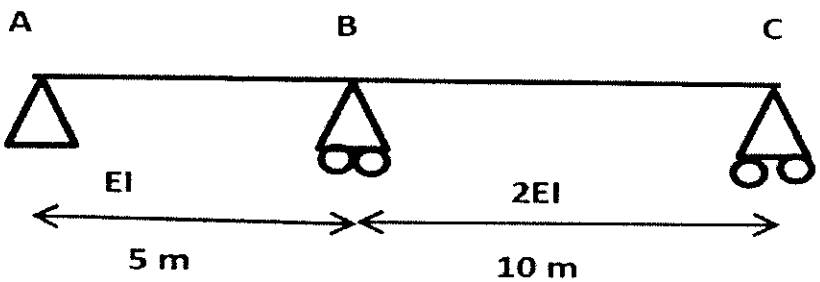
B.E. Civil Engineering (Evenng) - Fourth Year – 1st Semester

Supplementary

Theory of Structures-III (part-II)

Time: Three Hours | Full Marks 100

[No code or handbook is allowed]

No. of questions	Part II (Answer Any four of the following questions.)	Marks (2X25=50)
(b)	Find the Shape factor of the following section.  	10
3 (a)	Find the maximum value of R_A, R_B, R_C, M_B, B.M. and S.F. at midpoint of AB of the beam ABC if 100 kN load passes over ABC. The beam is made of M20 grade of concrete. I=0.0864 m^4.  	20
(b)	State and explain Mulller-Breslau's principle.	5