B.E. Civil Engineering (Part Time) - Third Year - Second Semester 2017
Theory of Structures-III

Time: Three Hours

Full Marks 100

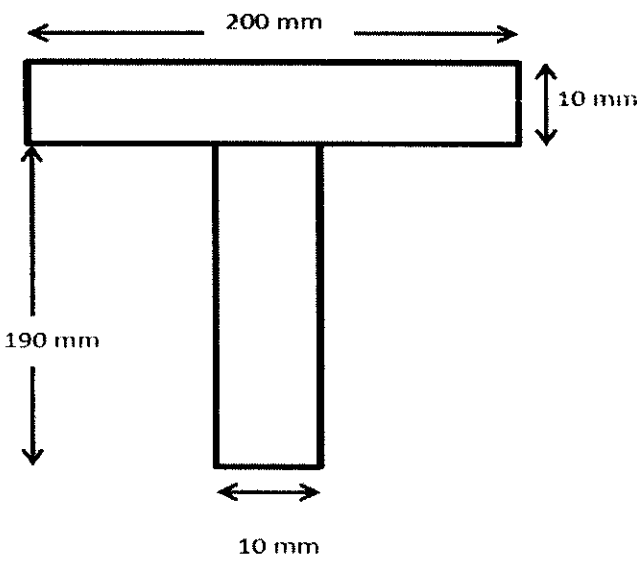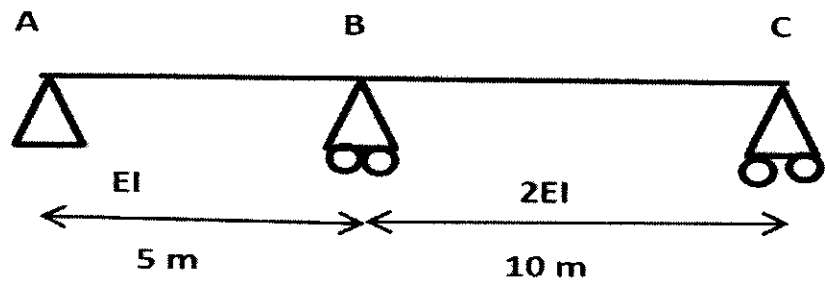### [No code or handbook is allowed]

No. of questions	(Answer Any four of the following questions.)	
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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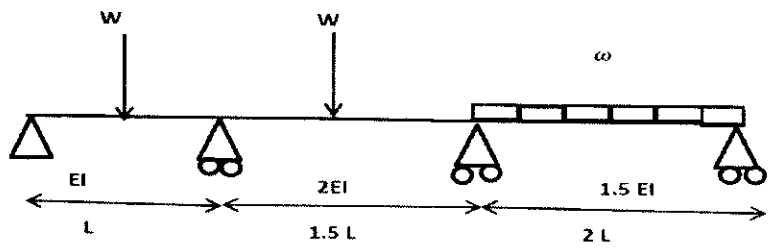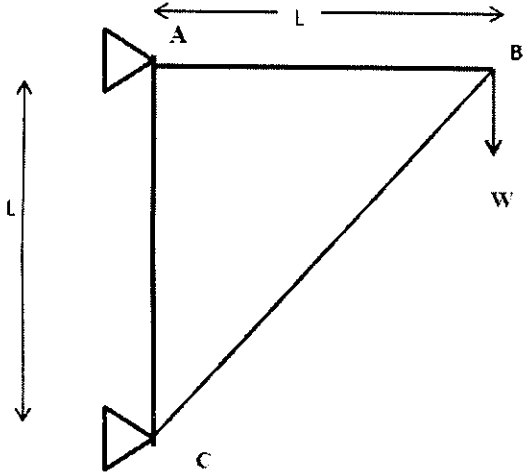
Full Marks

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No. of questions	Answer Any four of the following questions.)	
(b)	Find the Shape factor of the following section. 200 mm 10 mm 190 mm 10 mm	
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. A B C EI 2EI 5 m 10 m	20
(b)	State and explain Mulller-Breslau's principle.	5
4(a)	Determine the stiffness matrix of a flexure member.	10

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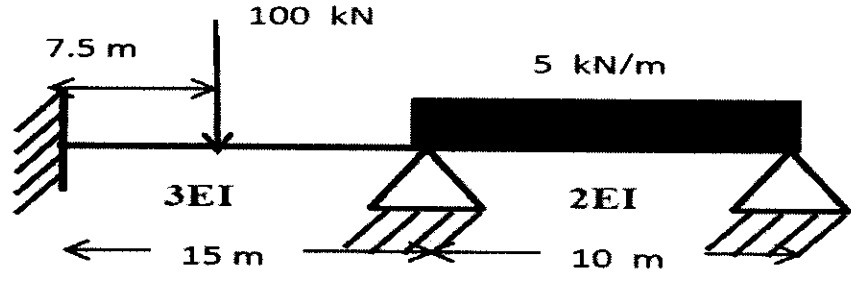
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No. of questions	(Answer Any four of the following questions.)	
(b)	Solve the beam by Flexibility method.	15
5	Solve the truss by Stiffness method. A,E are constant for all the members.	25
6	Draw the B.M, and S.F. of the following beam by stiffness method.M20 grade of concrete. I=0.0864 m^4.	25