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**B.TECH.**  
**(SEM V) THEORY EXAMINATION 2020-21**  
**STRUCTURAL ANALYSIS**

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

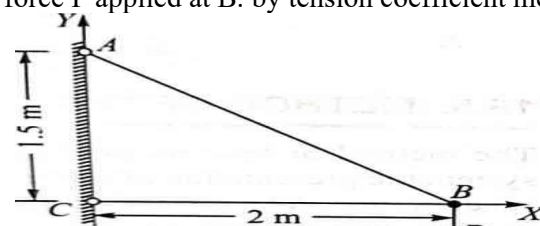
**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Qno.	Question	Marks	CO
a.	From the beams shown in below , state whether they are statically determinate or indeterminate 	2	1
b.	Define suspenders.	2	1
c.	What do you know about tension coefficient method?	2	2
d.	Define looped structure.	2	2
e.	What do you understand by strain energy?	2	3
f.	What point to remember while applying Castigliano's theorems?	2	3
g.	Define conjugate beam method.	2	4
h.	What are the basic procedure for constructing influence lines of indeterminate structure?	2	4
i.	What are the uses of arches?	2	5
j.	Define spandrel braces arch.	2	5

**SECTION B****2. Attempt any three of the following:**

Qno.	Question	Marks	CO
a.	Find the maximum and minimum tension in cable carrying uniformly distribute load, span of cable L and dip is 'h'.	10	1
b.	Write the procedure of find the forces in truss by method of tension coefficients.	10	2
c.	A continuous beam ABC of uniform section has two equal spans. AB and BC each of length 'l'. During loading support B sinks by $\delta_1$ and support C sinks by $\delta_2$ . Find the reactions at support in terms of $\delta_1$ and $\delta_2$ and I and flexural rigidity EI of the beam by strain energy method.	10	3
d.	How you will be determine which members of a truss do not carry forces?	10	4
e.	A three hinged parabolic arc of a span 20 mtr and rise 4 m , carries a udl of 20 kN/m run on the left half of the span . Find the maximum B.M. for the arch.	10	5

**SECTION C****3. Attempt any one part of the following:**

Qno.	Question	Marks	CO
a.	A plane frame consist of two members AB and CB, hinged at A and C to the wall, as shown in figure . Determine the forces in the two members due to vertical force P applied at B. by tension coefficient method. 	10	1



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b.	Determine the forces in all the members of the truss loaded and supported as shown in figure by M.O.J.	10	1
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**4. Attempt any one part of the following:**

Qno.	Question	Marks	CO
a.	Write the steps of Maxwell's unit load method one degree truss.	10	2
b.	A single load of 100 kN rolls along a girder of 20 m span. Draw the diagrams of maximum bending moment and shear force . What will be absolute maximum positive shear force and bending moment.	10	2

**5. Attempt any one part of the following:**

Qno.	Question	Marks	CO
a.	A girder having a span of 18 m is simply supported at the ends. It is traversed by a train of loads as shown in fig . The 50 kN load is leading . Find the maximum bending moment which can occur (i) Under the 200 kN (ii) Under 50 kN	10	3

b. Write Muller-Breslau's principal and its application for determinate structures.

**6. Attempt any one part of the following:**

Qno.	Question	Marks	CO
a.	For the beam and loading shown in figure . Determine the slope A, B, C and D and deflection A and D by conjugate beam method.	10	3

b. Explain with neat sketch Arch action. And also define three hinged arch.

**7. Attempt any one part of the following:**

Qno.	Question	Marks	CO
a.	A parabolic three hinged arch of span 'L' is subjected to an u.d.l of w/m run over the entire span. Find the horizontal thrust and bending moment at any section.	10	5
b.	A spandrel braced arch has a varying moment of inertia given by $I = I_G \sec \theta$ . It has a span of 40 m and a central rise of 8 m. Calculate the maximum positive and negative bending moment at a section D 12 m from the left support, due to moving point load of 6 kn. Also draw ILD.	10	5