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BTECH
(SEM V) THEORY EXAMINATION 2024-25
STRUCTURAL ANALYSIS

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

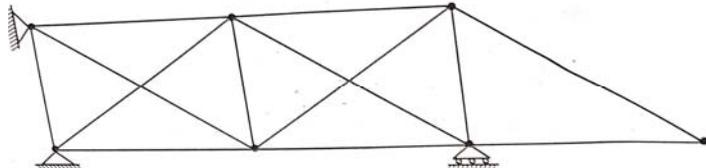
2 x 07 = 14

Q no.	Question	CO	Level
a.	Classify the structures base on stability.	1	K2
b.	Where the loads must be applied on a pin jointed truss?	1	K1
c.	Give the classification of truss.	2	K2
d.	What are the assumptions made in finding the forces in a truss?	2	K1
e.	What is the use of Maxwell's reciprocal theorem?	3	K1
f.	What are the advantages of influence line diagram?	4	K2
g.	What is the principle of Eddy's theorem?	5	K3

SECTION B

2. Attempt any three of the following:

07 x 3 = 07

a.	Determine the degree of indeterminacy of the truss shown in figure. 	1	K5
b.	Explain simple truss with sketch those are stable in form independent of support.	2	K5
c.	A continuous beam ABC of uniform section has two equals spans AB and BC each of length 'l'. During loading support 'B' sinks by δ_1 and support C sinks by δ_2 . Find the reactions at supports in terms δ_1 and δ_2 and l and flexural rigidity EI of the beam by strain energy method.	3	K5
d.	A uniformly distributed load of 15 kN/m covering a length of 3 m crosses a girder of span 10 m. Find the maximum shear force and bending moment at a section 4 m from left hand support.	4	K3
e.	Formulate equation of three hinged parabolic arch and equation of three hinged circular arch.	5	K5

SECTION C

3. Attempt any one part of the following:

07 x 1 = 07

a.	What do you mean by static indeterminacy? Explain giving at least two examples with reference to trusses.	1	K1+K4
b.	A cable of span 100 m has its ends at heights 8 m, above the lowest point of the cable. It carries a Udl of 10 kN/m run of the span. Determine the horizontal and vertical reaction at the support What is the length of the cable?	1	K5



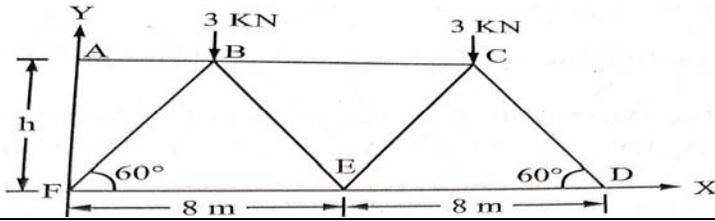
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4. Attempt any one part of the following:		07 x 1 = 07	
a.	Figure shows a Warren type cantilever truss along with the imposed loads. Solve the truss for find the forces in all members, by using method of tension coefficients. 	2	K3
b.	Give the conditions of zero force member in truss.		
5. Attempt any one part of the following:		07 x 1 = 07	
a.	A simply supported beam of span 6 m subjected to a concentrated load of 45 kN at 2 m from left support. Evaluate the deflection under the load point by using unit load method. Take $E = 200 \times 10^6 \text{ kN/m}^2$ and $I = 14.0 \times 10^{-6} \text{ m}^4$.	3	K6
b.	A beam ABCD is simply supported at its A and D over a span of 30 m. It is made up of three portions AB, BC and CD each 10 metres in length. The moments of inertia of the section of these portions are I, 3I and 2I respectively. Where $I = 2 \times 10^{10} \text{ mm}^4$. The beam carries a point load of 150 kN at B and a point load of 300 kN at C. Neglecting the weight of the beam calculate the slopes and deflections at A, B, C and D. Take $E = 200 \text{ kN/mm}^2$. By conjugate beam method.	3	K6
6. Attempt any one part of the following:		07 x 1 = 07	
a.	What is Muller-Breslau's principle? Verify the principle with the help of an example.	4	K4
b.	Draw influence line diagram for S.F. and B.M. at a section 3 m from left end of simply supported beam of length 12 m. Determine also the maximum S.F. and maximum B.M. at the section due to u.d.l. of intensity 2 kN/m and 5 m long.		
7. Attempt any one part of the following:		07 x 1 = 07	
a.	Define the terms normal thrust and radial shear force as applied in three hinged arches. Obtain expression for the same.	5	K1+K6
b.	A three hinged parabolic arch of span 20 mtr and rise 4 mtr, carries a udl of 20 kN/m run on the half span. Find the max. B.M. for the arch.	5	K3