PAPER ID-310456

Roll No: | | | | | | | | | | | | | |

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

TIME: 3 HRS **M.MARKS: 100**

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

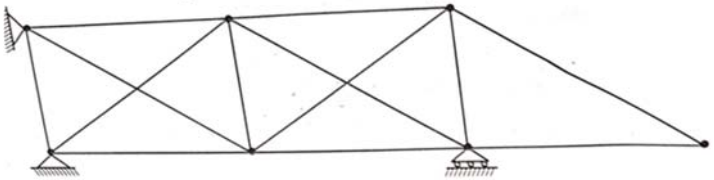
SECTION A

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

Q no.	Question	CO	Level
a.	Classify the structures base on stability	1	K1
b.	What do you mean by Compound truss?	1	K1
c.	Give the classification of truss	2	K1
d.	What is the load transfer mechanism in structures?	2	K1
e.	What is the use of Maxwell's reciprocal theorem?	3	K1
f.	What are the assumptions made in the unit load method?	3	K1
g.	How do you use Muller-Breslau principle?	4	K1
h.	What are the advantages of influence line diagram?	4	K1
i.	Define the terms theoretical arch.	5	K1
j.	What is the principle of Eddy's theorem?	5	K1

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a.	Determine the degree of indeterminacy of the truss shown in figure. 	1	K5
b.	Enumerate the assumptions made while finding out the force in frame.	2	K3
c.	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 x 10^6 kN/m^2 and I = 14.0 x 10^{-6} m^4.	3	K6
d.	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.	4	K5
e.	Define the terms normal thrust and radial shear force as applied in three hinged arches. Obtain expression for the same.	5	K1

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

a.	What do you mean by static indeterminacy? Explain giving at least two examples with reference to trusses	1	K1
b.	What are stress resultants? Write down the basic approaches used for structural analysis.	1	K1

4. Attempt any *one* part of the following: **10 x 1 = 10**

a.	Explain simple truss with sketch those are stable in form independent of support	2	K3

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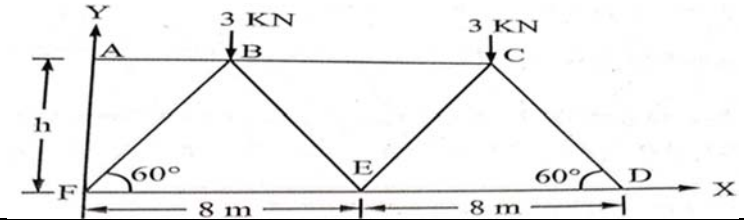
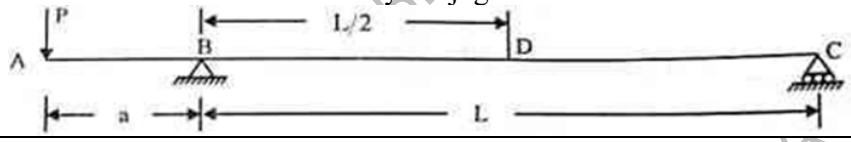
b.	Figure shows a Warren type cantilever truss along with the imposed loads. Solve the truss for find the forces in all members, by using method of tension coefficients. 	2	K6

5. Attempt any *one* part of the following: 10 x 1 = 10

a.	A simply supported beam of length of l carries a udl of w per unit run over the whole span. Calculate the slope at each end and the deflection at the centre by conjugate beam method.	3	K4
b.	State and examine the Castigliano's first theorem.	3	K2

6. Attempt any *one* part of the following: 10 x 1 = 10

a.	What is Muller-Breslau's principle? Verify the principle with the help of an example.	4	K1
b.	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. 	4	K5

7. Attempt any *one* part of the following: 10 x 1 = 10

a.	Derive an expression for the maximum positive and negative B.M. at a section, when udl rolls over a three hinged arch.	5	K4
b.	Formulate equation of three hinged parabolic arch and equation of three hinged circular arch.	5	K3