

PER ID-410696

Roll No:

BTECH

(SEM VI) THEORY EXAMINATION 2023-24

ADVANCE STRUCTURAL ANALYSIS

TIME: 3 HRS

M.MARKS: 100

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

1. Attempt all questions in brief.

a.	What are statically indeterminate structures.	2					
b.	Differentiate between Pin-jointed & Rigid-jointed structures.	2					
c.	What is meant by influence lines?	2					
d.	What will be the absolute maximum bending moment in a simply supported beam when two concentrated wheel loads cross it?	2					
e.	What is the use of a suspension bridge?	2					
f.	How does suspension bridge work?	2					
g.	Write the element stiffness matrix for a truss element.	2					
h.		2					
i.	What is difference between plastic hinge and mechanical hinge?	2					
j.	List out the assumptions made for plastic analysis.	2					
	SECTION B						
2.	Attempt any <i>three</i> of the following:	N2.					
9	A continuous beam ABCD 16 m long is simply supported at A B C D the	10					

SECTION B

2. Attempt any three of the following:

a. A continuous beam ABCD 16 m long is simply supported at A, B, C,	D. the 10
beam consists of spans AB, BC, & CD of lengths 4 m, 6m, & 6m respect	tively.
It carries a point load of 64 KN on the span "AB" at a distance of 1m from	n "A",
a load of 45 KN on the span "BC" at a distance of 2 m from "B" and a U	DL of
12 KN/m on the span "CD". Find the support moments & reactions.	
b. Explain in detail about the necessity of Influence lines and elaborate	10
its applications.	
c. Explain the effect of temperature on the horizontal thrust of a two hinger	d arch 10
subjected to a system of vertical loads?	
d. The three hinged stiffening girder of a suspension bridge of span 12	20m is 10
subjected to two-point loads of 240 KN & 300 KN at distances 25 m &	z 80 m
from the left end. Find the shear force & bending moment for the girde	er at a
distance of 40 m from the left end. The supporting cable has a central dip	o of 12
m. Find also max. tension in the cable.	
e. Calculate the shape factor for a (a)rectangle section of breadth'b' and dep	oth 'd', 10
(b)diamond section of breadth'b' and depth'd'.	

SECTION C

3. Attempt any one part of the following:

a.	A fixed beam of length 6 m carries two-point loads of 30 kN each at a distance	10		
	of 2 m from both ends. Determine the fixed end moments.			
b.	Give the procedure for analyzing the continuous beams with fixed ends using	10		
	three moment equations?			
4. Attempt any <i>one</i> part of the following:				
a.	Draw the ILD for shear force and bending moment for a section at50m from the	10		

left-hand support of a simply supported beam, 200m long, hence calculate the



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	maximum bending moment and shear force at the section due to an uniformly distributed rolling load of length 80m and intensity 100kN/m.	
b.	Draw the influence line for the continuous beam ABC simply supported at A and C using Muller Breslau's principle. AB=3m, BC=4m.EI is constant.	10
5.	Attempt any one part of the following:	
a.	A single load of 100 KN rolls along a girder of 20 m span. Draw the diagrams of maximum bending moment and shear force (positive and negative). What will be the absolute maximum positive shear force and bending moment?	10
b.	A three hinged stiffening girder of a suspension bridge of 100 m span subjected to two-point loads 10 kN each placed at 20 m and 40 m, respectively from the left-hand hinge. Determine the bending moment and shear force in the girder at section 30 m from each end. Also determine the maximum tension in the cable which has a central dip of 10 m.	10
5.	Attempt any one part of the following:	
a.	Analyze the Continuous beam shown in Fig. using flexibility method and draw Bending diagram. 20 kN/m $2 m$ $30 kN$ $1 m$ $120 kN4 m$ $4 m$ $6 m$ $6 m$	
b.	Analyse the portal frame ABCD shown in figure by stiffness method and also draw the bending moment diagram.	10
	B 2.5 m 2.5 m C	
	$5 \text{ m} \qquad \text{El} = \text{constant} \qquad 5 \text{ m} \qquad .0^{\circ}$	
7.	Attempt any <i>one</i> part of the following:	
		10

a.	Find the shape factor of the I-section with top flange 100mm wide, bottom flange	10
	150mm wide,20mm tk and web depth 150mm and web thickness 20mm	L
b.	Determine the collapse load for the frame shown in the diagram, Mp is the same	10
	for all members.	l
	20	