PAPER ID-311070

Subject Code: RCE502

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

BTECH
(SEM V) THEORY EXAMINATION 2023-24
DESIGN OF STRUCTURE-I

TIME: 3 HRS **M.MARKS: 70**

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

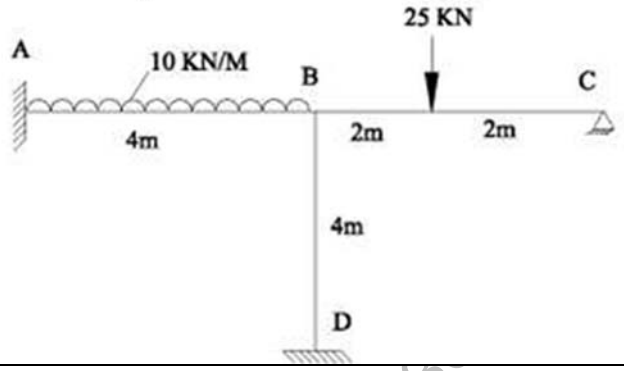
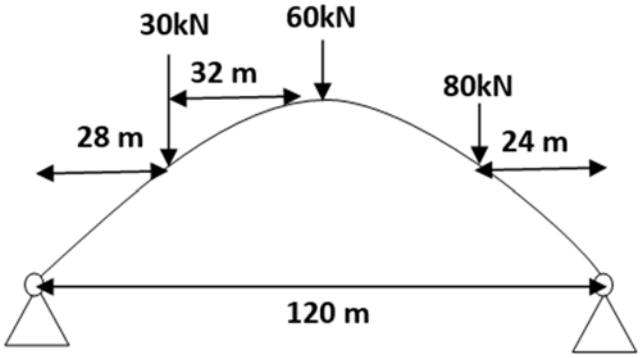
SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a.	Define Stiffness & Relative Stiffness of the member.
b.	Define Normal thrust & Radial shear in a two hinged parabolic Arch.
c.	Write the elements of suspension Bridges.
d.	What is flexibility and stiffness coefficient?
e.	Explain the differences between force method & displacement method.
f.	What is plastic hinge?
g.	Define shape factor & write the value of shape factor for triangular section.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Analyze the given beam by moment distribution method. 
b.	Analyse the given arch. Find bending moment, normal shear and radial thrust at a section 24m from left end. 
c.	A suspension bridge of 100 m span has two three hinged stiffening girders supported by two cables having central dip 10m. The dead load on bridge is 5 kN/m2, and live load is 10 kN/m? which covers left half of span only. Find SF and BM at 30 m from left end if road way is 6m wide.
d.	Develop the flexibility matrix of given beam.

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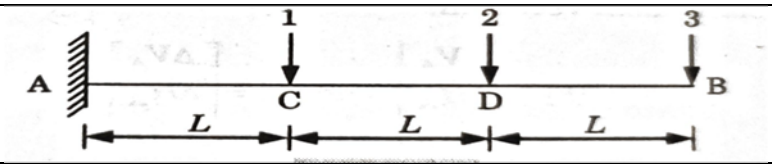
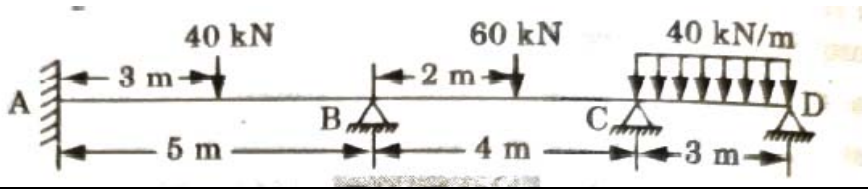
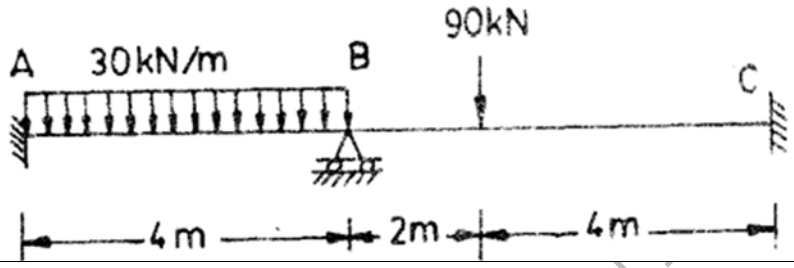
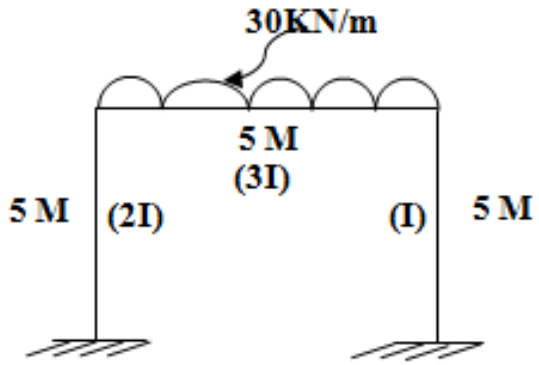
	
e.	Determine the Plastic moment capacity M_p, required for the continuous beam shown in fig. Assume the same flexural rigidity throughout the beam. 

SECTION C

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

a.	Analyze the given beam by slope deflection method. 
b.	Analyze the portal frame shown below by moment distribution method. 

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

a.	Prove that horizontal thrust developed due to point load W acting at crown in a two hinged semicircular arch of radius R is independent of its radius. Consider EI as constant.
b.	Determine the influence line for Ra for the continuous beam as shown in Figure. Compute I.L ordinates at 1 m intervals.

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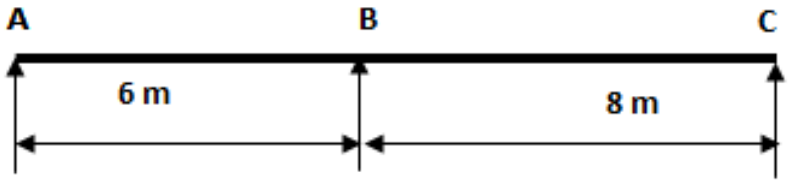
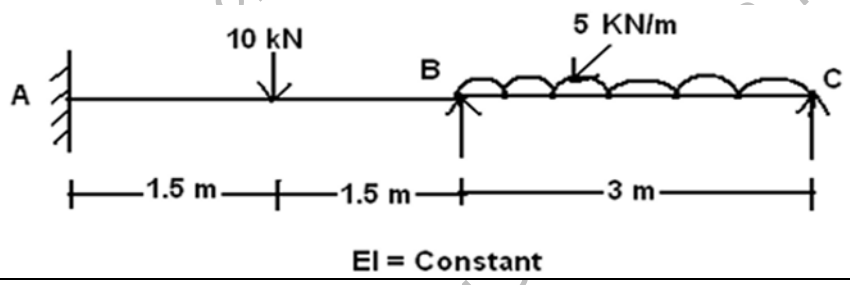
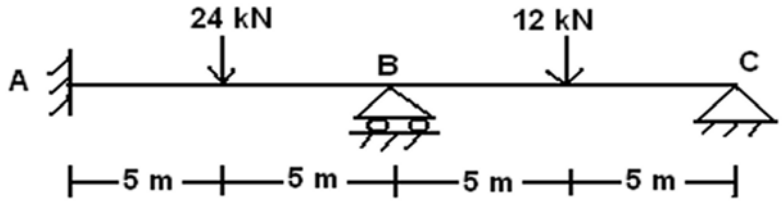


5. Attempt any *one* part of the following: 7 x 1 = 7

a.	A three hinged stiffening girder of a suspension bridge of 120 m span subjected to two-point loads 15 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 40 m from each end. Also determine the maximum tension in the cable which has a central dip of 10 m.
b.	A two hinged stiffening girder of a suspension bridge of 140 m span subjected to two-point loads 50 kN each placed at 30 m and 40 m respectively from the left-hand hinge. Determine the bending moment and shear force in the girder at section 35 m from left end.

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

a.	Analyse the continuous beam shown in figure using stiffness matrix method. 
b.	Analyse the continuous beam shown in figure using flexibility matrix method. 

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

a.	Find out the shape factor for Triangular and diamond section.
b.	A beam of rectangular cross section b*d is subjected to a bending moment stress 0.9Mp. Find out the depth of elastic core.