GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2022

BPECV7031– Structural Analysis II

(Civil Engineering)

Time: 3 hrs   Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer *ALL* questions   [CO#]   [PO#]

a. The relative stiffness of a member at a joint, whose far end is hinged   CO1   PO2

(i)	0	(ii)	I/2L
(iii)	I/L	(iv)	3I/4L

b. When the far end is fixed, what will be the carry over moment (COM) if the applied moment is M?   CO1   PO2

(i)	0	(ii)	M/2
(iii)	2M	(iv)	M

c. When the far end is hinged, what will be the carry over factor (COF) if the applied moment is M?   CO1   PO2

(i)	0	(ii)	0.5
(iii)	2	(iv)	1

d. For a cantilever supported beam, what will be the carry over factor (COF) if the applied moment is M?   CO1   PO2

(i)	0	(ii)	1
(iii)	-1	(iv)	0.5

e. When the far end is fixed, the stiffness factor (K) is   CO2   PO2

(i)	4EI/L	(ii)	3EI/L
(iii)	2EI/L	(iv)	2EI/L

f. The magnitude of fixed end moment for a span if one of the support sinks by δ is   CO2   PO2

(i)	$3EI\,\delta/L^2$	(ii)	$6EI\,\delta/L^2$
(iii)	$12EI\,\delta/L^2$	(iv)	$EI\,\delta/L^2$

g. A two-hinged semi-circular arch of radius R carries a concentrated load W at the crown. The horizontal thrust at each support is   CO3   PO2

(i)	W/π	(ii)	$W/8\pi$
(iii)	$2W/\pi$	(iv)	0

h. A two-hinged parabolic arch carries a concentrated load W at the crown. The horizontal thrust at each support is   CO3   PO2

(v)	$25Wl/128h$	(vi)	$5Wl/128h$
(vii)	$Wl/128h$	(viii)	$10Wl/128h$

i. In the analysis of structures by plastic theory, the following conditions must be satisfied   CO4   PO1

(i)	Equilibrium condition	(ii)	Mechanism condition
(iii)	Yield condition	(iv)	All of the above

j. A fixed beam of length L is subjected to concentrated load W at mid-span, the collapse load is   CO4   PO2

(i)	$6M_p/L$	(ii)	$8M_p/L$
(iii)	$4M_p/L$	(iv)	$2M_p/L$

PART – B: (Short Answer Questions)   **(2 x 10 = 20 Marks)**

Q.2. Answer *ALL* questions   [CO#]   [PO#]

a.   Differentiate determinate and indeterminate structure.   CO1   PO1

b.   Define Shape factor.   CO4   PO1

c.   What is the shape factor of a triangular section and diamond section?   CO4   PO2

d.   Explain the terms carry over moment and carry over factor.   CO1   PO1

e.   Explain equilibrium equation.   CO1   PO1

f.   State Castigliano's first and second theorem.   CO2   PO1

g.   Define influence line diagram.   CO2   PO1

h.   Write the difference between elastic and plastic analysis.   CO4   PO2

i.   Draw BMD and SFD of simply supported beam carrying an uniformly distributed load.   CO1   PO2

j.   Write the horizontal thrust of a two hinged semi-circular arch of radius R carrying a uniformly distributed load w per unit run over the whole span.   CO3   PO2
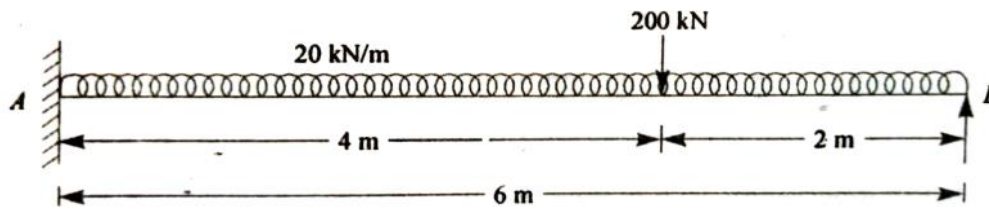
PART – C: (Long Answer Questions)   **(10 x 4 = 40 Marks)**

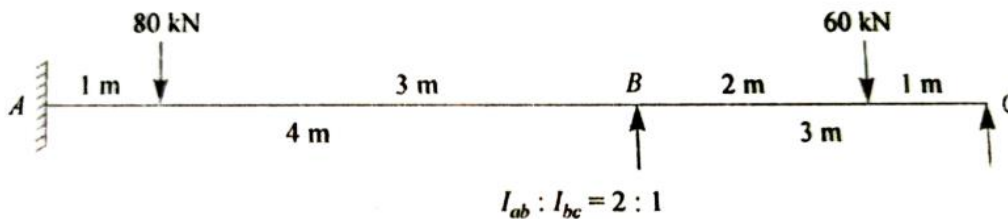Answer *ALL* questions   Marks   [CO#]   [PO#]

3.a.   Find the support moments and draw the B.M diagram using moment distribution method.

                                                          10   CO1   PO2

(OR)

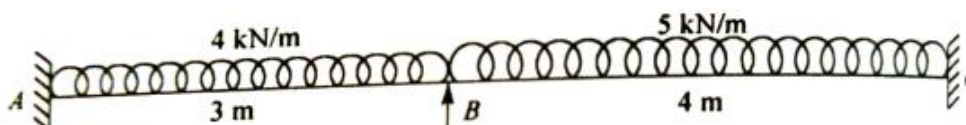b.   Find the support moments and draw the B.M diagram using moment distribution method.

                                                          10   CO1   PO2

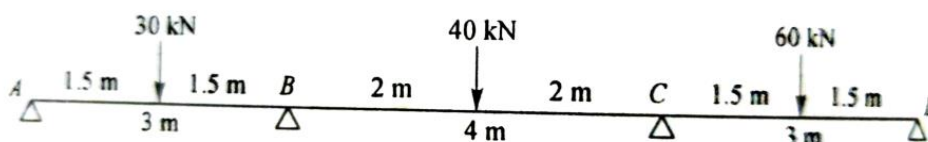4.a.   Find the support moments and draw the B.M diagram using slope deflection method.

                                                          10   CO2   PO2

(OR)

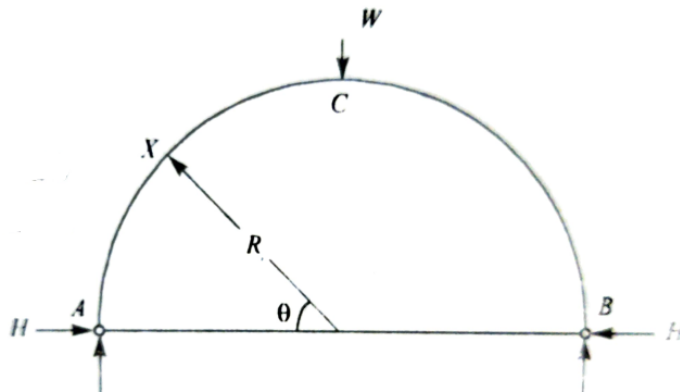b.   Find the support moments and draw the B.M diagram using slope deflection method.

                                                          10   CO2   PO2
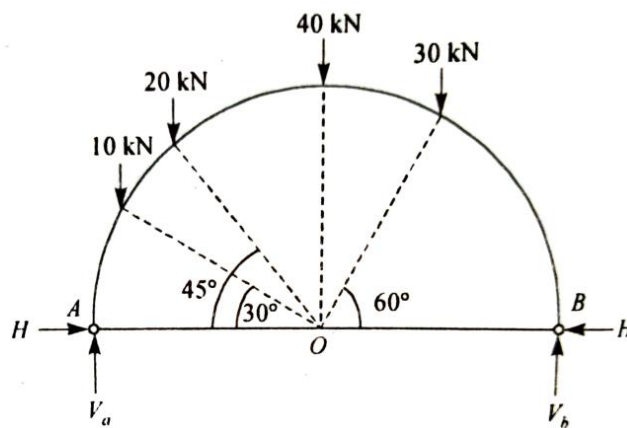
5. a. Find the horizontal thrust of the two-hinged semi-circular arch. Assume uniform flexural rigidity.

6   CO3   PO2

b. Find the horizontal thrust of the two-hinged semi-circular arch shown below.

4   CO3   PO2

(OR)

c. A two-hinged parabolic arch of span l and rise h carries a uniformly distributed load of w per unit run over the whole span. Find the horizontal thrust at each support.

5   CO3   PO2

d. A two-hinged parabolic arch of span l and rise h carries a concentrated load of w at the crown. Find the horizontal thrust at each support.

5   CO3   PO2

6. a. Determine the shape factor of the following sections.

    i.   Rectangular section
    ii.   Circular section

10   CO4   PO2

(OR)

b. Determine the collapse load in the simply supported beam subjected to a point load in the centre using

    i.   Static Method
    ii.   Kinematic method

10   CO4   PO2

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