Dr Umesh Kr Pandey (40) 1/12/2022

Roll No.....

National Institute of Technology, Hamirpur (H.P.)

Name of the Examination: B.Tech. (End Semester, Year Nov-Dec-2022) (M)

Branch: Civil Engineering **Semester: III[rd]**

Course Name: Determinate Structures **Course Code: -CE-211**

Time Allowed: 3 Hours **Maximum Marks: 50.00**

(Note: ***All Questions are compulsory and distribution of marks are shown in all questions*****)**

Q-1 Find the slope and deflection at point B in the simply supported beam as shown in Figure-1, using conjugate beam method. Let the Flexural stiffness (*EI*) is constant. **(10.0 Marks)**

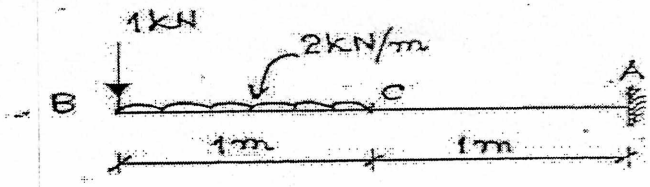

Figure 1

Q-2 A simply supported beam of length 6 meters and carries the moments as shown in Figure.2 Using the moment area method, find the slope at A & D and deflection at B & C. The flexural rigidity of the beam is uniform throughout its length. **(10.0 Marks)**

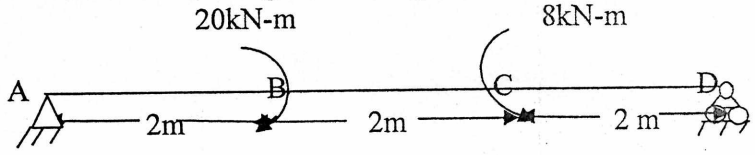

Figure 2

Q-3 Analyze the cantilever truss hinged at A and roller at C as shown in Figure-3 The nodes are having co-ordinates as A (0, 3) B (3, 3), C (0, 0), D (3, 0) and E (6, 0). Use any method for analysis and find the vertical deflection at D by unit load method. For each member, the axial stiffness (*AE*) can be assumed to be constant. **(10.0 Marks)**

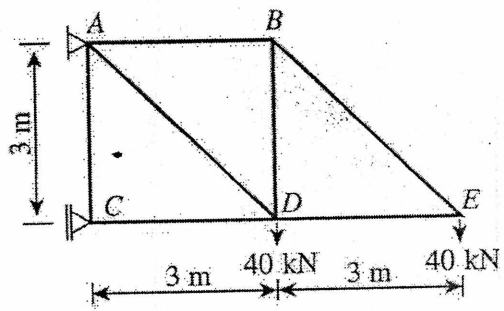

Figure 3

Q-4 A three hinge parabolic arch has a horizontal span of 20m having a central hinge with a central rise of 5m. Find the influence line for bending moment and shear force at a section 5 m away from the left support. Also draw the influence line for vertical reactions at both the supports and horizontal thrust at the support. **(10.0 Marks)**

Q-5 **(a)** Derive the general cable equation. **(4.0 Marks)**

(b) Draw the influence line for reaction at A and Influence line for Bending moment and Shear force at C for the beam shown in Figure-1. **(6.0 Marks)**