Section D

7. Using Influence line diagrams determine the shear force and bending moment at section C in the simply supported beam as shown in Fig. 4 : **15**
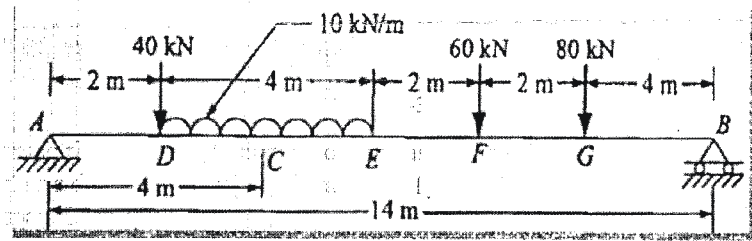

Figure-4

8. Write notes on the following : **15**

   (a) The Muller-Breslau Principle

   (b) Influence line.

9. (a) Write in brief about statically determinate and indeterminate structures.

   (b) Differentiate between force method and displacement method.

   (c) State Betti's theorem.

MAR-21-210045

B. Tech. EXAMINATION, March 2021

Semester IV (CBCS)

STRUCTURAL ANALYSIS-I

CE-401

Time : 2 Hours   *Maximum Marks : 60*

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from each Sections A, B, C and D. All questions carry equal marks.

Section A

1. Write brief notes on the following :

   (a) Superposition

   (b) Conditions of Equilibrium

   (c) Compatibility conditions.   **15**

2. Determine the rotations at A, B, C, E and deflection at C, D and E in the beam shown in the Fig. 1 : **15**
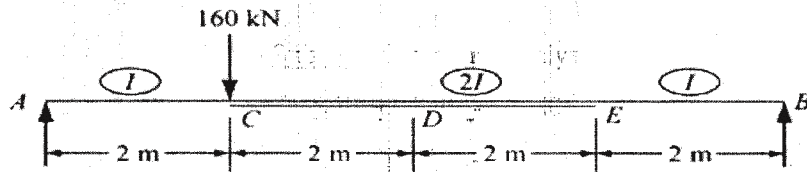

Figure-1

Section B

3. Determine the horizontal displacement of the roller end D of the portal frame shown in the Fig. 2. EI is 8000 kNm^2 throughout. **15**
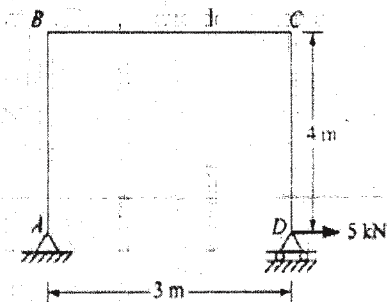

Figure-2

4. Derive Maxwell Theorem of Reciprocal Deflection. **15**

Section C

5. A light cable is supported at two points 20 m apart which are at same level. The cable supports three concentrated loads as shown in Fig. 3. The deflection at first point is found to be 0.8 m. Determine the tension in the different segments and total length of the cable. **15**
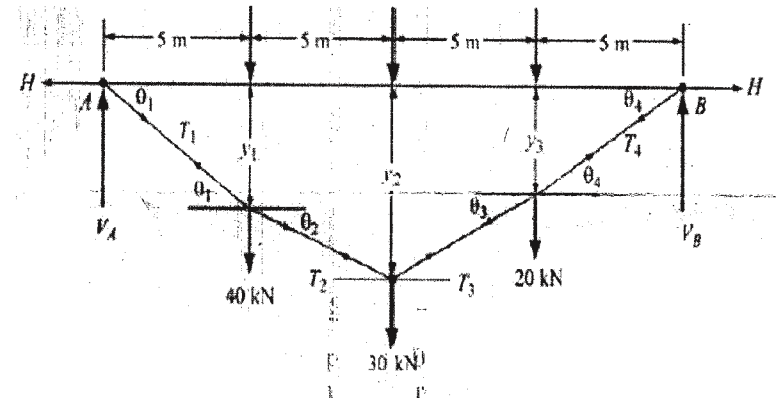

Figure-3

6. A symmetric three-hinged parabolic arch has a span of 30 m and a central rise of 6 m. The arch carries a distributed load which varies uniformly from 40 kN/m at each abutment to zero at mid span. Determine :

(a) The horizontal thrust at the abutments.

(b) Maximum positive bending moment in the arch.

15

(d) Find fix end moments at A corresponding to the loading as shown in Fig. 5 :

Figure-5

(e) A note on restrained and unrestrained joints.

(f) Describe Maxwell method.

(g) Mention Anchor cables.

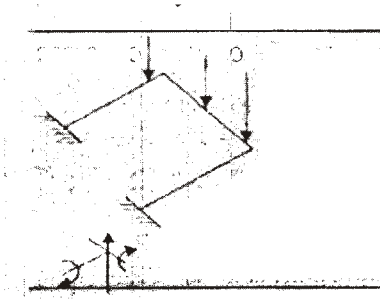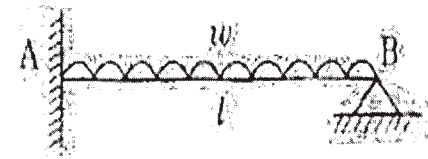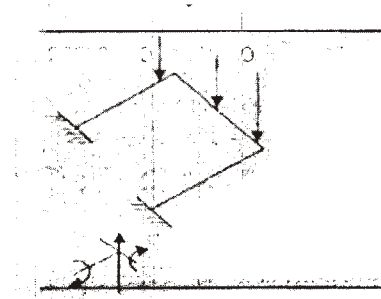(h) Find the number of static indeterminacy for a structure as shown in Fig. 6 :

Figure-6

(i) Write the methods used in finding deflections of Determinate beams ?

(j) State Eddy's theorem   **1.5×10=15**