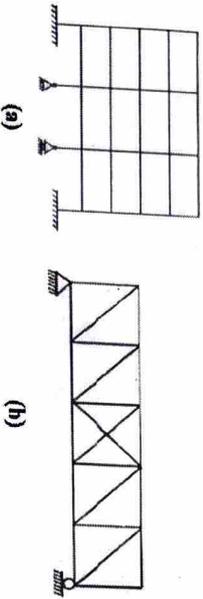


The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

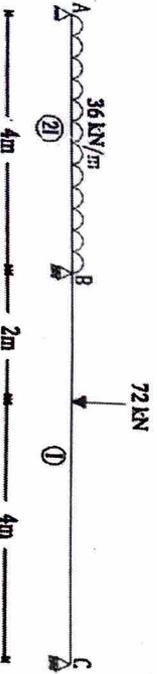
Note: Attempt five questions in all, select one question each from section A, B, C, D. Section E (Question-9) is compulsory.

**SECTION-A**

1. Find static and kinematic indeterminacy for the structures shown in Figure below. (3x4=12)

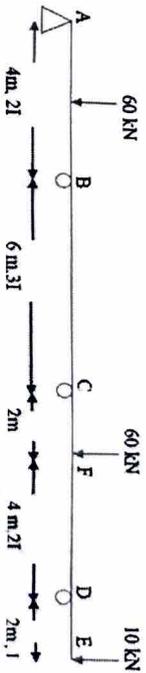


2. Using method of consistent deformations, analyse the given continuous beam and draw shear force and bending moment diagram. A is pinned support, B and C are roller supports. (12)

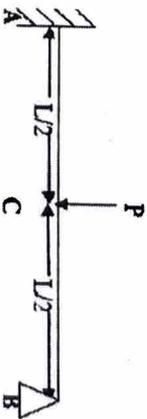


**SECTION - B**

3. Analyse the continuous beam shown in figure below, using moment distribution method. Draw the shear force and bending moment diagrams. Sketch the deflected shape. (A is hinged support, B, D and E are roller supports). (12)

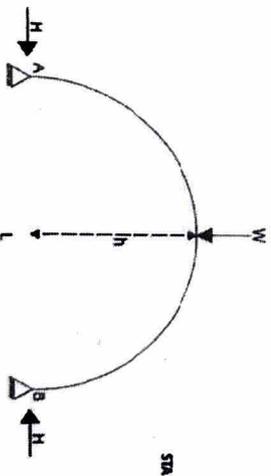


4. Find the slope at end B of the problem shown in Figure below by slope deflection method. (B is a roller support). (12)



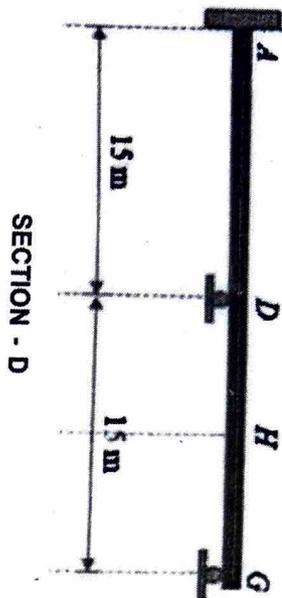
**SECTION - C**

5. Derive horizontal thrust for two hinged arch with centrally applied load as shown in Figure below. (12)

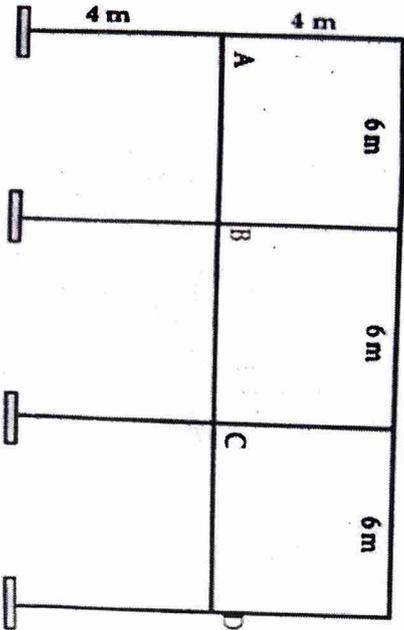


[P.T.O.]

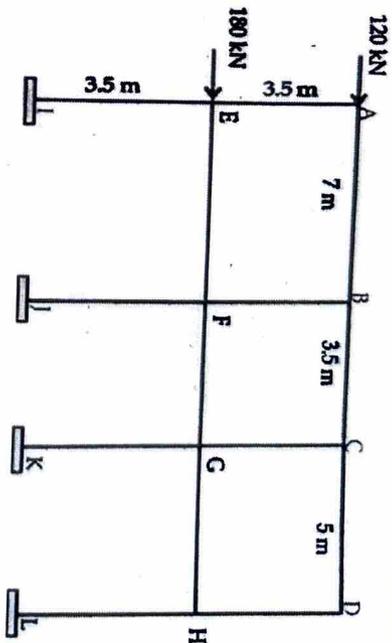
6. Draw influence line diagrams for Moment at A, moment at H, vertical reactions at A, D and G, for the beam shown in the figure below. A is fixed support, D and G are roller supports. (12)



7. Total dead load is 12 kN/m. Total Live load is 20 kN/m. Analyze the frame shown below for midspan positive moment on BC. (12)



8. Draw the shear force and bending moment diagrams of the frames loaded as shown in Figure below using cantilever method. All columns have same cross sectional area. (12)



9. a) What are conditions of equilibrium?  
 b) What are different methods of analysis of indeterminate structures?  
 c) What is the difference between a truss and a rigid frame?  
 d) What is the compatibility condition used in flexibility method?  
 e) Mentions the causes of side sway of portal frames.  
 f) Why do we perform approximate analysis? (6×2=12)

#### SECTION - E (Compulsory)