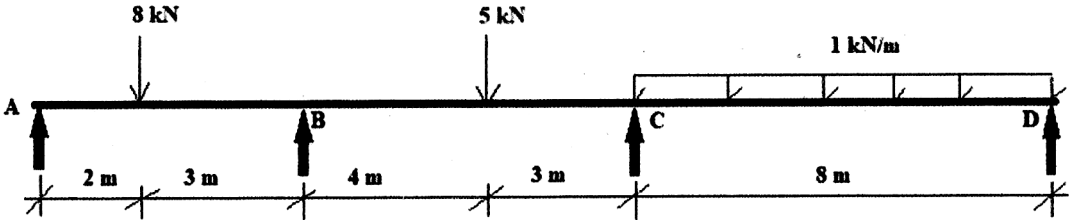
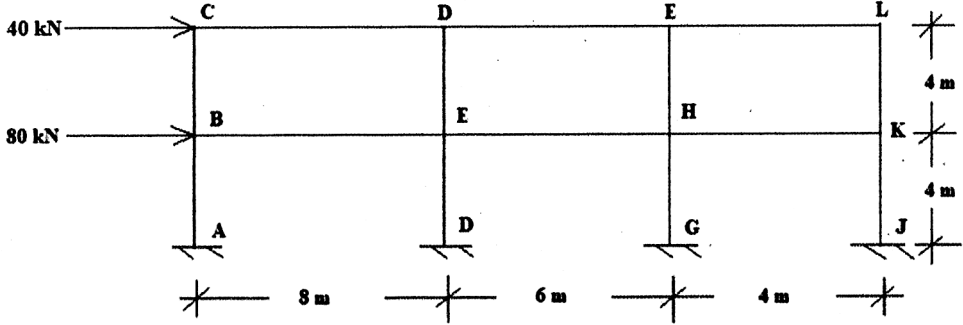
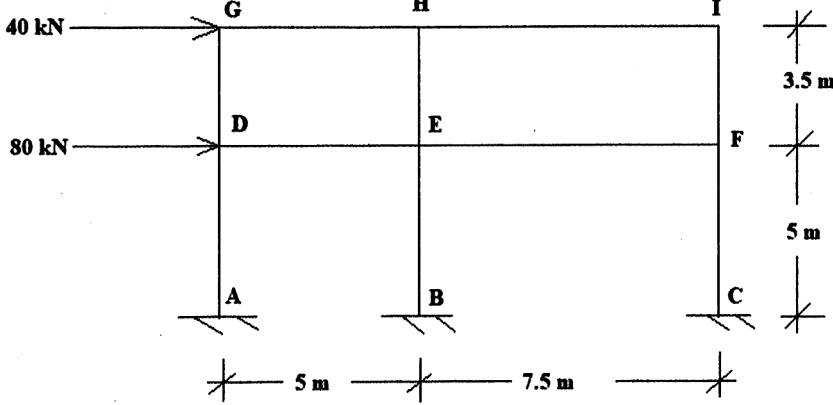
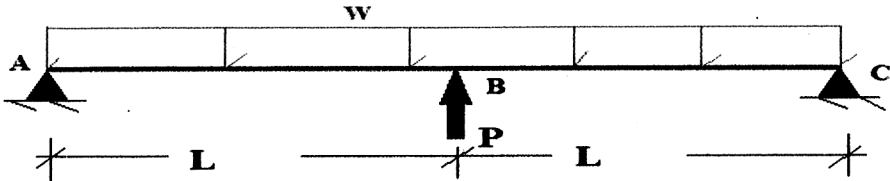
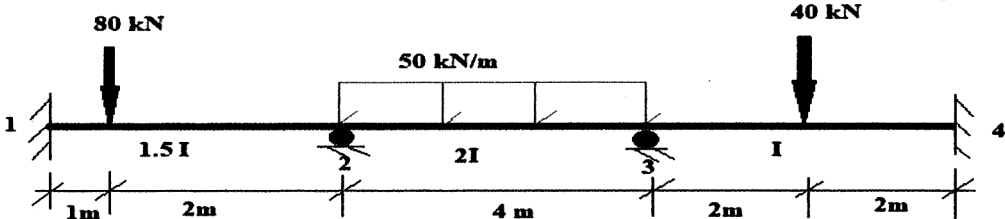
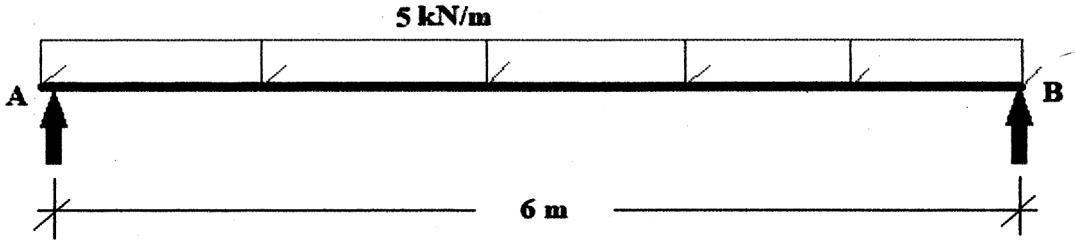


Time: 3 Hr.

Full Marks 100

No. of Q	Answer any five questions	
1	A multi-span continuous beam ABCD, 20 m long is simply supported at its ends and is propped at the same level at B and C as shown in Figure 1. It is loaded as shown in the figure below. If support B sinks by 10 mm, analyze the beam by using moment distribution method and sketch the shear force and bending moment diagrams (SFD and BMD). Take $E = 2.1 \times 10^5 \text{ N/mm}^2$, and $I = 85 \times 10^5 \text{ mm}^4$. 	20
2	Analyze the frame as shown below by using 'Portal Method'. Draw SFD and BMD. 	20
3	Using the 'Cantilever Method', analyze the building frame subjected to horizontal forces as shown below. Sketch relevant SFD and BMD. 	20

No. of Q	Continued	
4	A beam of uniform section and of length $2L$ is freely supported by rigid supports at its ends and by an elastic prop (P) at its center as shown below. If the prop (P) deflects by an amount λ times the load (w) it carries, and if the beam carries a total distributed load of w, show that the load carried by the prop is: $5w/\{8(1 + 6EI\lambda/L^3)\}$. Use strain energy. 	20
5	Determine the support moments for the continuous beam as shown in figure as shown below. Relative 'I' values for all spans are indicated. Use slope-deflection method. 	20
6	Calculate the central deflection and the slope at ends of a simply supported ISMB 500 steel beam carrying a u.d.l of 5 kN/m over the whole span of 6 m. as shown in figure below. Consider EI as $89.2 \times 10^{12} \text{ kN-m}^2$. Use Castigliano's first theorem. 	20