

B.E. Civil Engineering (Model Curriculum) Sem-V
PCCCE504 : Structural Analysis I

P. Pages : 3

Time : Three Hours

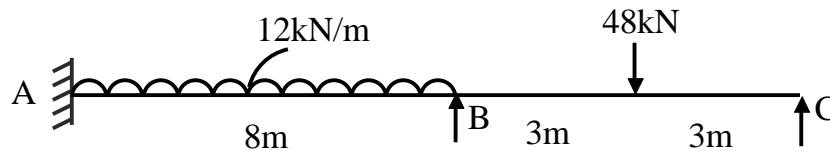


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Max. Marks : 80

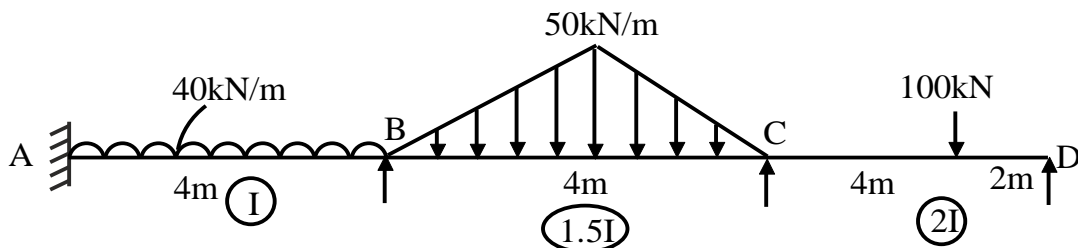
- Notes :
1. All questions carry equal marks.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answers wherever necessary with the help of neat sketches.

1. A continuous beam of uniform flexural rigidity is fixed at A and supported over B and C. Shown in figure. Using Clapeyron's theorem calculate support moments and draw bending moment diagram. **16**

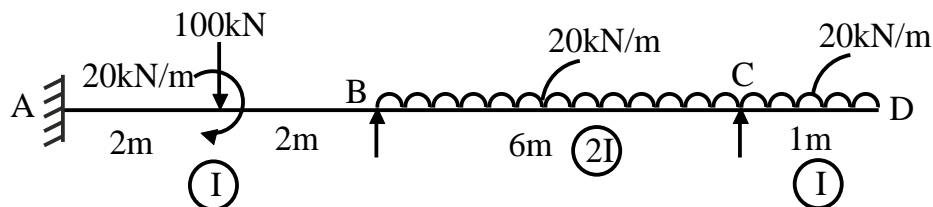


OR

2. Analyse the continuous beam shown in figure by slope deflection method and bending moment and shear force diagram. Support B sinks by 12mm and C sinks by 5mm. **16**

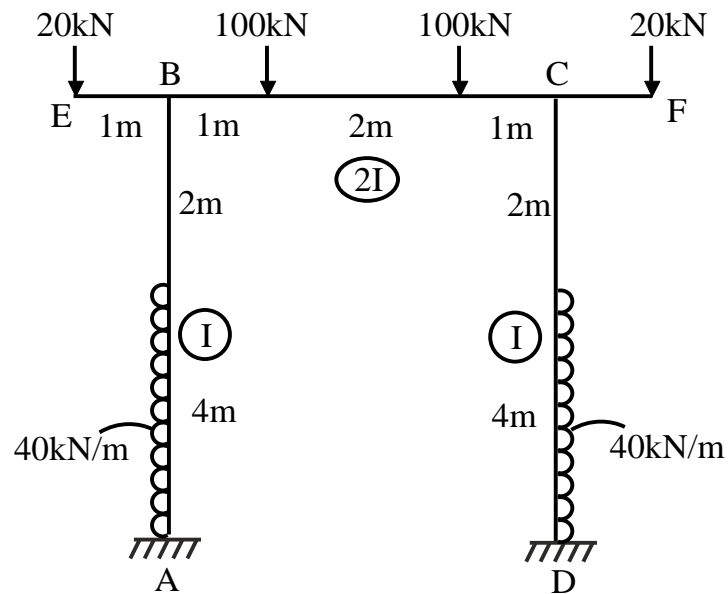


3. Draw BMD and SFD for a beam shown in figure. Use MDM for the analysis. **16**



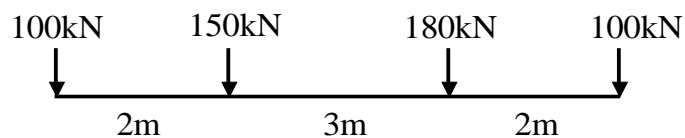
OR

4. Analyse the portal frame using MDM. Draw BMD. 16



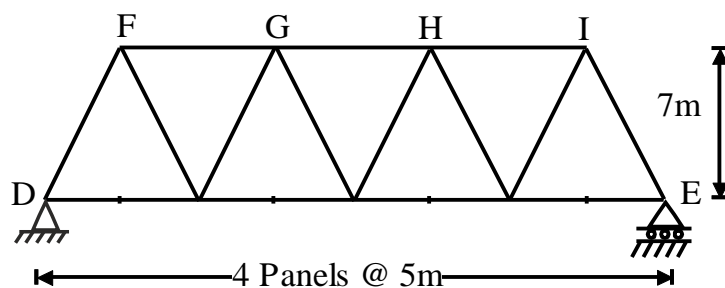
5. The rolling train moves on girder of span 30m from left to right. Determine 16

- MaX BM at 12m from left hand support
- Absolute maximum BM at any where in the span

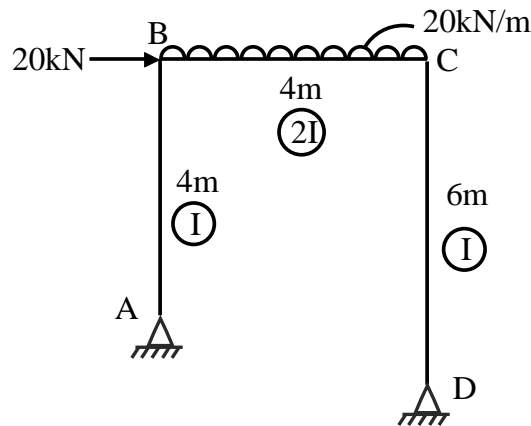


OR

6. A vehicle moves left to right through upper chord of the truss bridge. If the vehicle weights 75kN. Find the axial force using ILD in members with double cross. 16

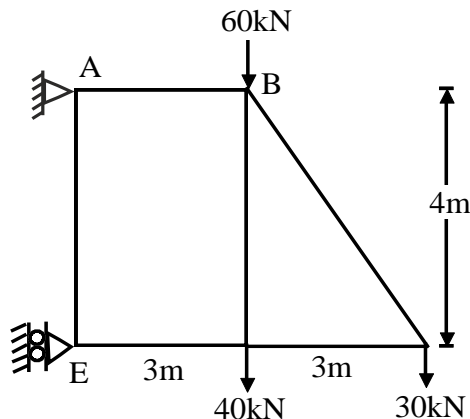


7. Find the horizontal thrust for the portal frame as shown in figure. Use strain energy method draw BMD. 16



OR

8. Find the vertical deflection of the joint C of the loaded truss shown in figure. The sectional areas of members are as follows.
 Horizontal members = 3000 mm^2 ,
 Vertical members = 4000 mm^2 ,
 Inclined members = 5000 mm^2 ,
 Take $E = 200 \text{ kN/mm}^2$ 16



9. a) Derive the expression of buckling load of column if both ends are hinged. 8
 b) A hollow cast iron column 5m long is fixed at both ends has an external diameter of 300mm. The column supports an axial load of 1200 kN. Find the internal diameter of the column, adopting a factor of safety of 5. Take $\sigma_C = 550 \text{ N/mm}^2$ and $\alpha = \frac{1}{1600}$. 8

OR

10. A two-hinged parabolic arch of span 18m and rise 3.60 m carries two concentrated loads of 25kN each at the crown and at the left quarter span section. Find the horizontal thrust at each support and the bending moments at the loaded sections. 16
