

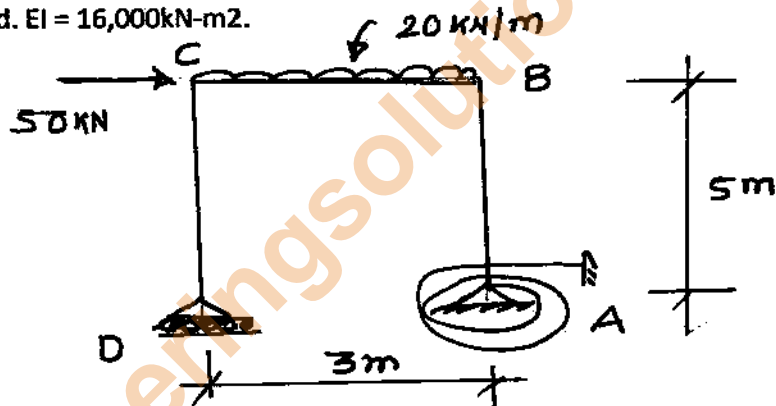
(3 Hours)

[Total Marks: 60]

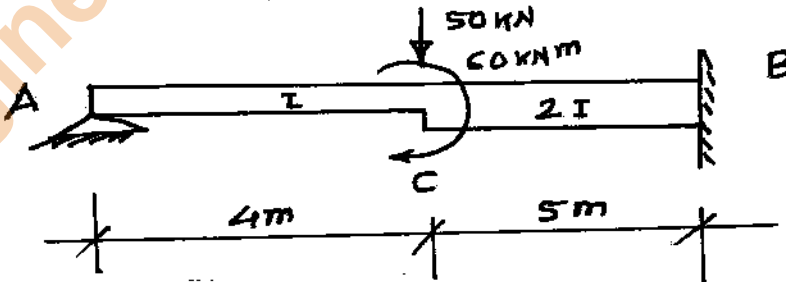
N.B.

- 1) Question No. 1 is compulsory.
- 2) Attempt any three questions from the remaining five questions
- 3) Figures to the right indicate full marks.
- 4) Assume suitable additional data if necessary and state the same clearly in your answer.

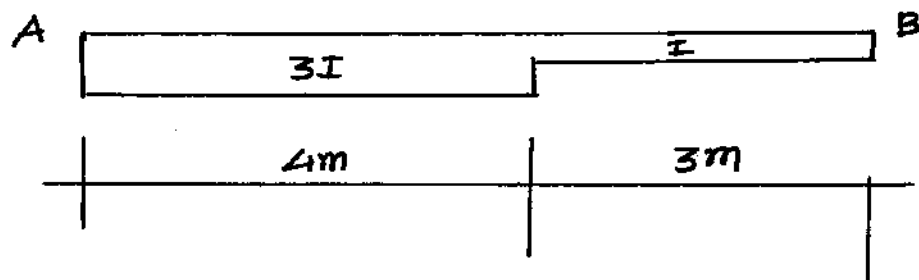
- Q. No. 1
- a) Answer the following :-
 - i) Distinguish clearly between flexibility and stiffness method of analysis. 03
 - ii) The use of Shape function in Finite Element Method 04
 - iii) Explain the term symmetrical structure with symmetrical loading and antisymmetrical loading 03
 - b) Analyse the frame shown in figure by flexibility method and draw BMD 10
 Note that support A is hinge with rotational spring with stiffness $K_r = 9,000 \text{ kN-m/rad}$. $EI = 16,000 \text{ kN-m}^2$.



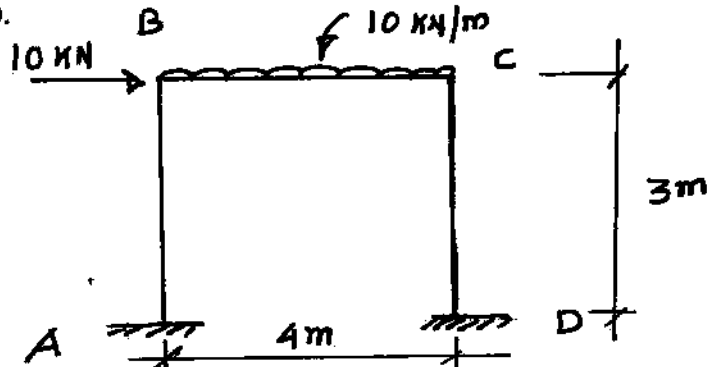
- Q. No. 2
- a) Analyse the beam shown in figure by Column Analogy method and draw BMD. 10



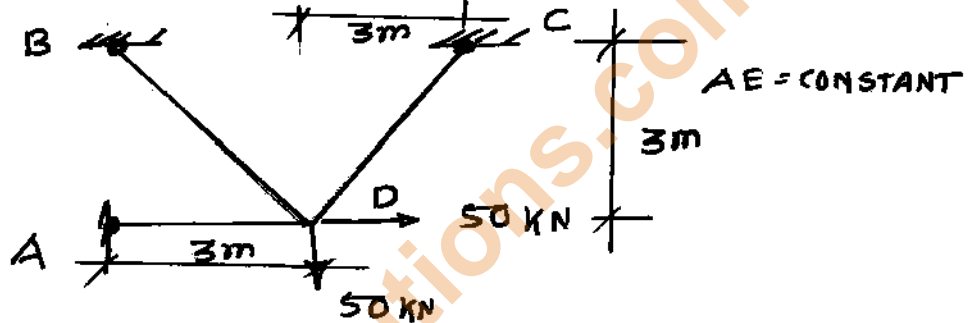
- b) For the non-prismatic beam element shown in figure, calculate the rotational stiffness at B. Also calculate the C.O.F. From A to B 10



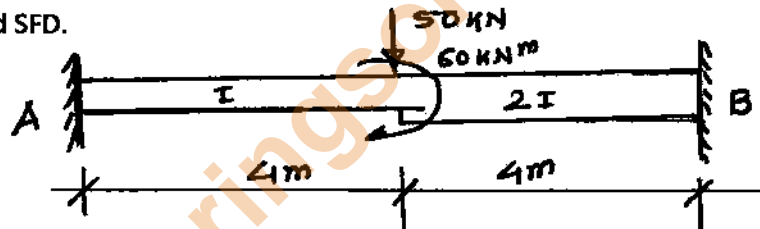
- Q. No. 3 a) Analyse the rigid jointed frame shown in figure by Elastic Centre Method and draw BMD. 20



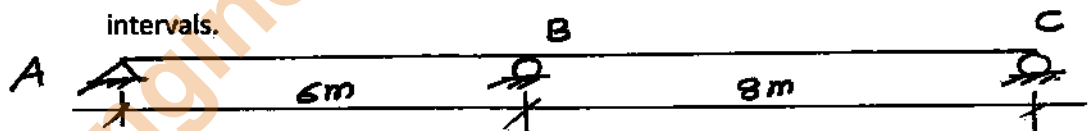
- Q. No. 4 a) Analyse the pin-jointed frame shown in figure by Matrix Stiffness method and calculate member forces and member displacements. 10



- b) Analyse the beam shown in figure by Matrix Stiffness Method and draw BMD and SFD. 10



- Q. No. 5 a) For the beam shown in figure –
Construct ILD for Reaction R_b Calculate the ordinate of ILD at 2m intervals. 10



- b) Derive shape functions for a 8-noded Lagrangian ,2-D element and show them by graphical representation. 10

- Q. No. 6 a) Analyse the frame shown in figure by Modified Moment Distribution Method. Draw BMD and deflected shape.

20

