

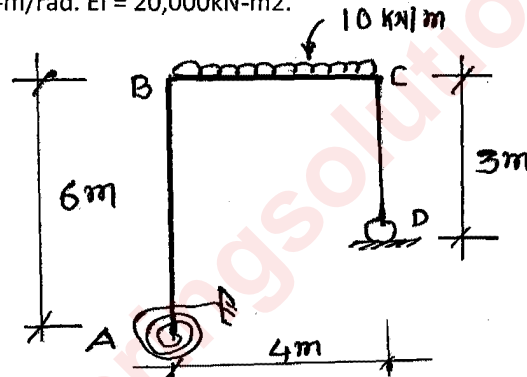
3 -Hours

Marks - 80

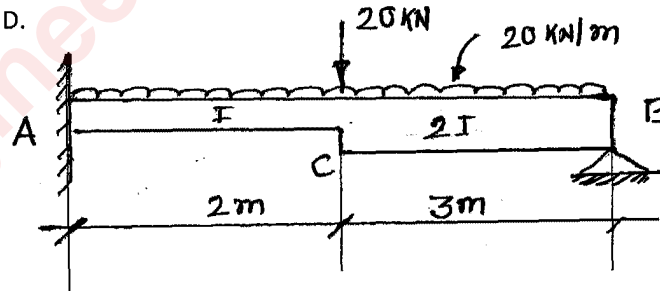
N.B.

- 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.

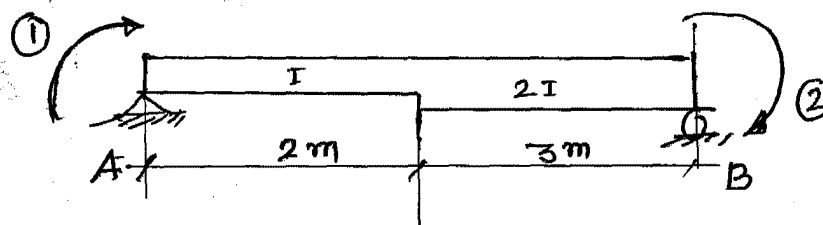
- Q. No. 1
- a) Answer the following :-
 - i) Distinguish clearly between flexibility and stiffness method of analysis. 03
 - ii) Distinguish between plane rigid jointed frame and plane grid in terms of their structural behavior, internal stresses, degree of freedom 04
 - iii) Explain the term symmetrical 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 $K_r = 10,000$ kN-m/rad. $EI = 20,000$ kN-m².



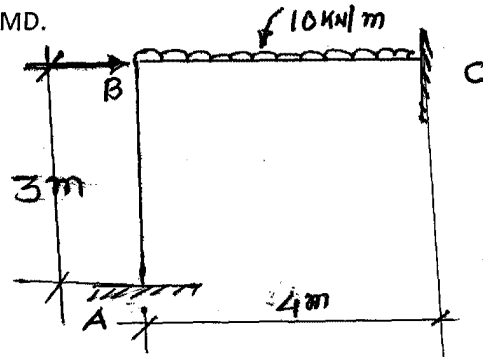
- Q. No. 2
- a) Analyse the beam shown in figure by Column Analogy method and draw BMD. 10



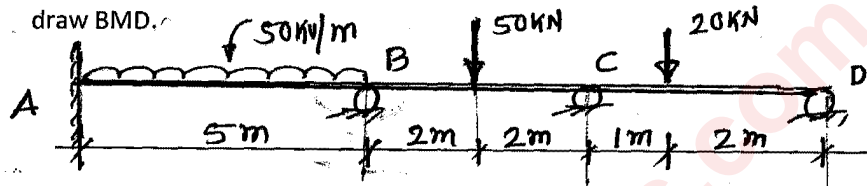
- b) For the non-prismatic beam element shown in figure, calculate the rotational stiffness at B. Also calculate the C.O.F. From A to B 10



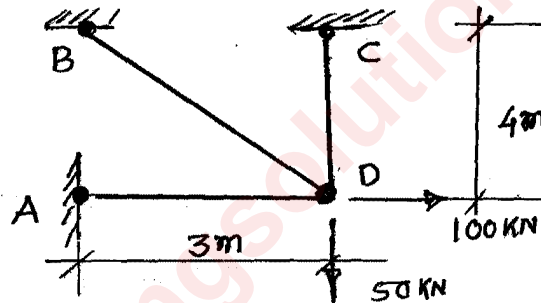
- Q. No. 3 a) Analyse the rigid jointed frame shown in figure by **Elastic Centre Method** and draw BMD. 12



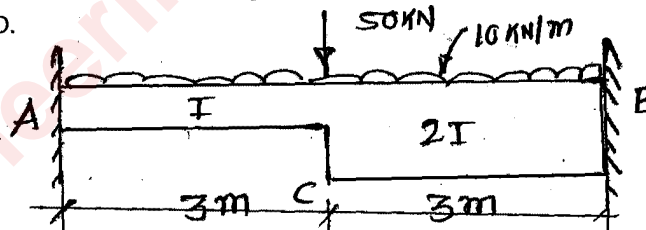
- b) Analyse the beam shown in figure by **Rotation Contribution method** and draw BMD. 08



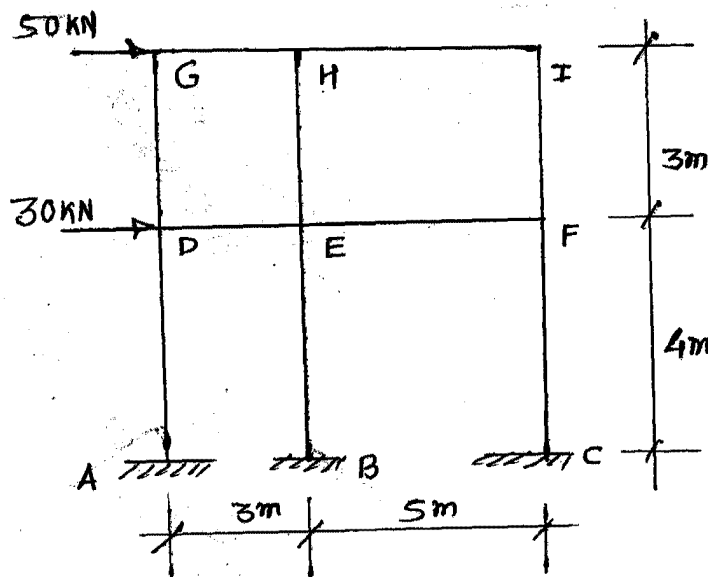
- Q. No. 4 a) Analyse the pin-jointed frame shown in figure by **Matrix Stiffness method** and calculate member forces and member displacements. 10



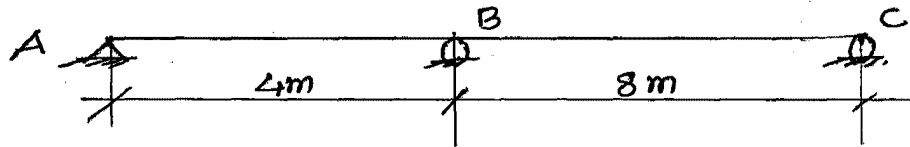
- b) Analyse the beam shown in figure by **Matrix Stiffness Method** and draw BMD and SFD. 10



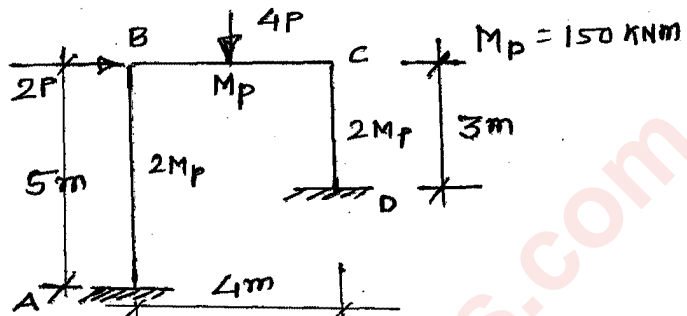
- Q. No. 5 a) Analyse the frame shown in figure by **Cantilever Method** and draw BMD. 12



- b) For the beam shown in figure – 08
 Construct ILD for Reaction R_b Calculate the ordinate of ILD at 2m intervals.



- Q. No. 6 a) Find the collapse load of frame as shown in Figure. If the moment capacity of frame is M_p . 10



- b) Analyse the frame shown in figure by Modified Moment Distribution Method. Draw BMD and deflected shape. 10

