

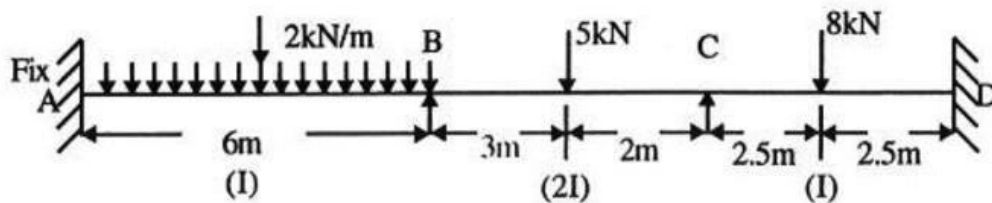
Note: i) Attempt any five questions.

ii) All questions carry equal marks.

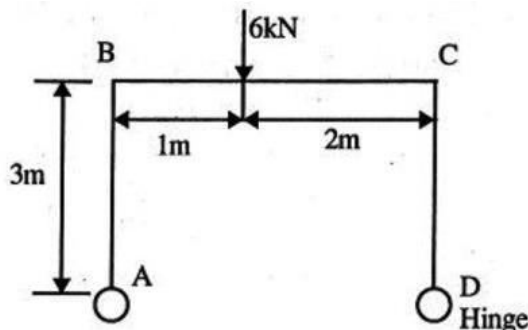
1. State principle of virtual work. Explain its application to flexural members. Find vertical deflection and rotation at the end of cantilever beam of span L subjected to a concentrated load P at the free end. EI is constant.

2. A three hinged parabolic arch of 20 metre span and 4m central rise carries a point load of 4kN at 4m horizontally from the left hand hinge. Calculate the normal thrust and shear force at section under the load. Also, calculate the maximum B.M. positive and negative.

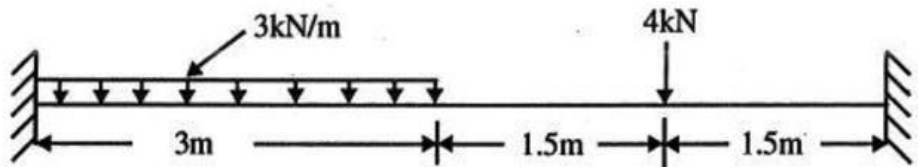
3. Analyse the beam by slope deflection method. OR Moment distribution method plot the B.M. diagram and Deflected shape.



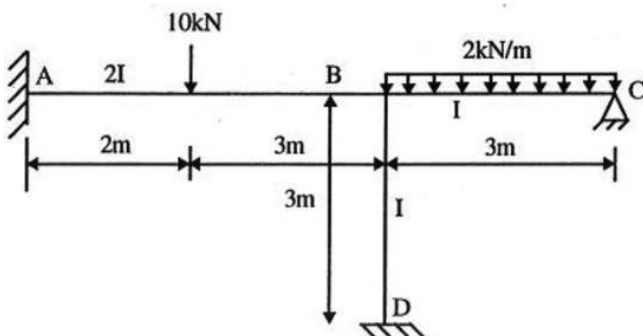
4. A portal frame ABCD is hinged A and D. and has rigid joints B and C. The frame is loaded as shown in fig. using the method of minimum strain energy, analyse the frame and plot the B.M. Diagram.



5. Analyse the beam as shown in Fig. draw BMD and SFD.



6. Analyse the frame as shown in Fig. by slope deflection method.



7. Four wheel loads of 6, 4, 8, and 5kN cross a girder of 20m span, from left to right followed by U.D.L. of 4kN/m and 4m long with the 6kN load leading. The spacing between the loads in the same order is 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5kN load. Using influence lines, calculate the S.F. and B.M. at a section 8m from the left support when the 4kN load is at center of the span.

8. Write short notes (any two):

(a) Castigliano's first and second theorem of strain energy.

(b) Influence lines, Muller-Breslau principle

(c) Deformation of cable.
