

ANALYSIS OF STRUCTURE

(Code: CET-401)

Full Marks 80

Time 3 hours

Answer any five questions including Q.Nos.1 & 2

Figures in the right-hand margin indicate marks

1. Answer all the questions

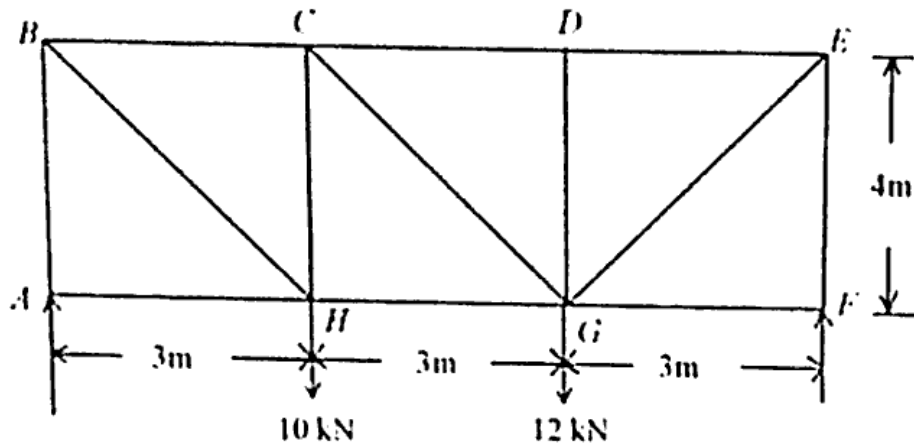
2 × 10

- (a) State the difference between a perfect frame and an imperfect frame
- (b) Write down the assumptions made while finding out the forces in a perfect frame
- (c) State the expression for theorem of three moment.
- (d) State the difference between a deficient frame and a redundant frame
- (e) What will be the equivalent length of a column whose both ends are hinged.
- (f) Define distribution factor.
- (g) What is a symmetrical portal frame.
- (h) Mention any two advantages of fixed beam.
- (i) What is the value of maximum slope and deflection in case of a simply supported beam carries a point load W at its centre.
- (j) A fixed beam AB , 5m long is carrying a central point load of 4 kN. Determine the fixing moments of the beam. Take flexural rigidity of the beam as 5×10^4 kN-m²

2. Answer any six questions

5 × 6

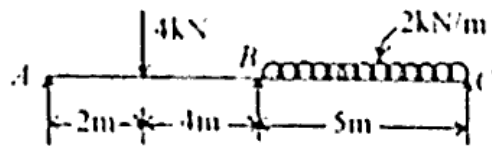
- (a) A cantilever beam 2m long is subjected to an UDL. of 4 kN/m over its entire length. Find the slope and deflection of the beam at its free end. Take $EI = 2 \times 10^{12}$ N mm².
- (b) A cantilever of length 4m is loaded with U.D.L. of 10 kN/m over the entire span is propped at free end. Calculate the prop reaction
- (c) Derive the expression for slope and deflection of a cantilever beam AB of length l carrying a point load W at its free end using moment area method.
- (d) A fixed beam AB of length l subjected to an UDL. of w /unit length over the whole span. Derive the expression for fixed end moments
- (e) A steel rod 6m long and of 40mm diameter is used as a column with one end fixed and other end free. Determine the crippling load by Euler's formula. Take E as 200 GPa
- (f) A three hinged arch of span l and rise h carries a uniformly distributed load of w per unit run over the whole span. Show that the horizontal thrust at each support is $wl^2/8h$



Find the forces in member BC, CH & HG of the given truss using method of section.

3. A simply supported beam AB of uniform section is 10m long and it carries point load of 5kN and 6 kN at a distance of 3m and 6m from left support respectively. Calculate the deflection of the beam under the load. Take $E = 200 \text{ GPa}$ and $I = 160 \times 10^6 \text{ mm}^4$. 10

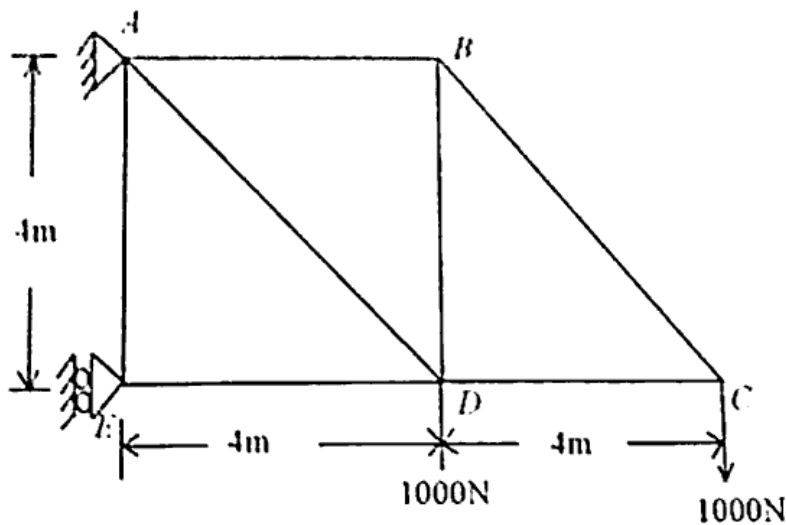
4. A continuous beam ABC, 11m long rests on three support A, B and C at the same level and is loaded as shown in figure.



Determine the moments over the beam and draw B.M.D and S.F.D.

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5.

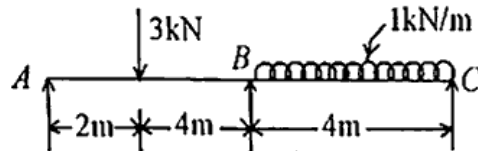


Determine the forces in all the members of the truss as shown in figure.

10

(3)

6. A three hinged parabolic arch of span 20m and central rise of 5m carries a point load of 250 kN at 5m from the left hand support. Draw the B.M.D for the arch and indicate the position and magnitude of maximum B.M over the arch. 10
7. A continuous beam ABC 10m long rest on three supports A, B & C and is loaded as shown in figure.



Determine the moments over the beam and draw B.M.D and S.F.D using moment distribution method. 10
