22402

Seat No.

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any <u>FIVE</u> of the following:** 10

   a) Define core of section with sketch.

   b) Give relationship between slope, deflection and radius of curvature.

   c) State effect of continuity on continuous beam.

   d) Define carry over factor and stiffness factor.

   e) Draw neat sketch of symmetrical and unsymmetrical portal frame.

   f) Draw stress distribution diagram for $6_0 = 6_b$, $6_0 > 6_b$

   g) Define Redundant frame with sketch.

   h) Define continuous beam and draw sketch of it.

Marks

2. **Attempt any THREE of the following:** 12

   a) Explain with expression four conditions of stability of dam.

   b) A hollow circular column having external diameter 500 mm and Internal diameter 300 mm carries an vertical load of 200 kN acting at an eccentricity of 60 mm from c.g Calculate maximum and minimum stresses developed.

   c) Find maximum and minimum stress intensities induced on the base of a masonry wall 6 m high, 4 m wide and 1.5 m thick subjected to a horizontal wind pressure 1.5 kN/m^2 acting on 4 m side. The density of masonry material is 24 kN/m^3.

   d) Calculate core of section for circular section having diameter 400 mm and draw sketch of it.

3. **Attempt any THREE of the following:** 12

   a) A simply supported beam carries u.d.l of 4 kN/m over entire span of 4 m. Find the deflection at mid span in terms of EI.

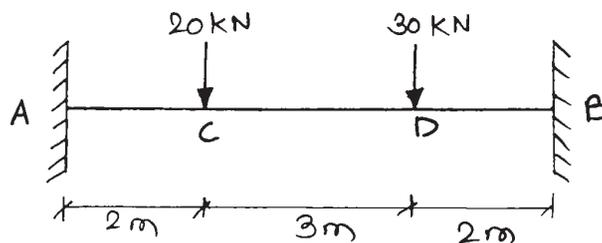   b) Calculate fixed end moments and draw B.M.D as shown in Fig. No 1.

Fig. No. 1

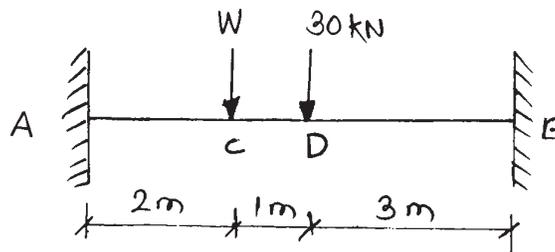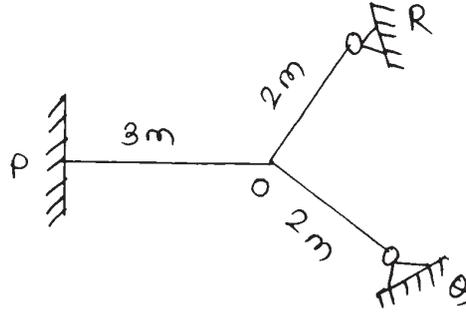   c) Calculate value of load 'W' for a fixed beam as shown in Fig. No. 2

Fig. No. 2

   d) Explain principle of super position with example.

4. Attempt any THREE of the following: 12

a) State and explain Clapeyron's theorem of three moments.

b) Calculate distribution factors for the member OP, OQ and OR for the joint 'O' as shown in Fig. No. 3.

Fig. No. 3

c) Draw four types of trusses.

d) Draw SFD for a continuous beam as shown in Fig. No. 4 having negative B.M at support B as 66.14 kN/m.
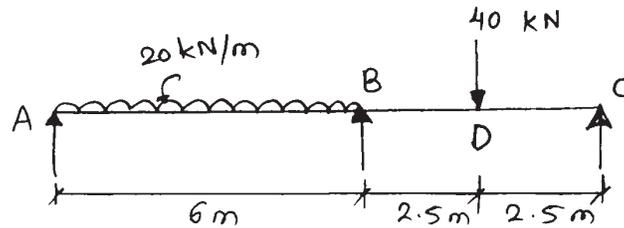
Fig. No. 4

e) Using moment distribution method determine the moments at fixed end of a proped cantilever of span 5 m carrying a u.d.l of 25 kN/m over entire.

5. Attempt any TWO of the following: 12

a) A cantilever of span 3.5 m carries a point load at free end. If the maximum slope at the free end is 1°, determine the maximum deflection in mm.

b) A continuous beam ABC of uniform M.I carries a central point load of 85 kN on span AB. A u.d.l of 30 kN/m is acting over the entire span BC. Plot BM diagram. Span AB and BC are 6 m and 4 m respectively. A and C are simple supports. Use three moment theorem.

c) A simply supported bean of span 6 m carrying 'W' kN at
4 m from left. Find the value of 'W':F deflection at centre is
20 mm. Take EI = 2000 kN.m^2. Use Macaulay's method.

6.   **Attempt any <u>TWO</u> of the following:**   **12**

a) Calculate the support moment using moment distribution
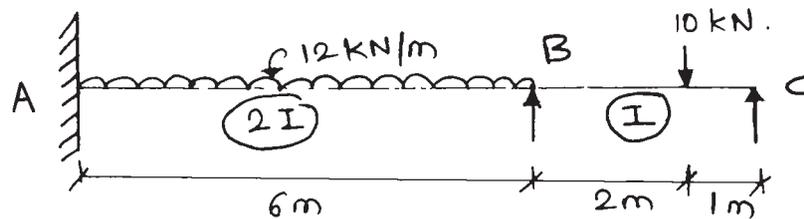method Refer Fig. No. 5.

Fig. No. 5

b) A cantilever truss is loaded as shown in Fig. No. 6. Find the
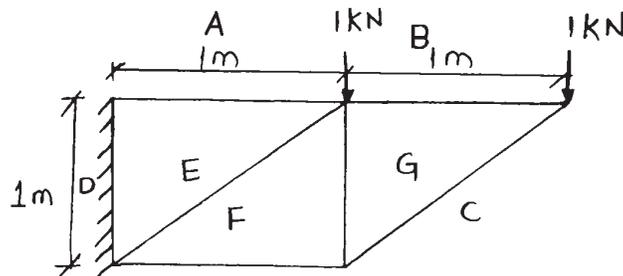stresses in members by method of joint.

Fig. No. 6

c) Using method of section. Find the forces in the member BC,
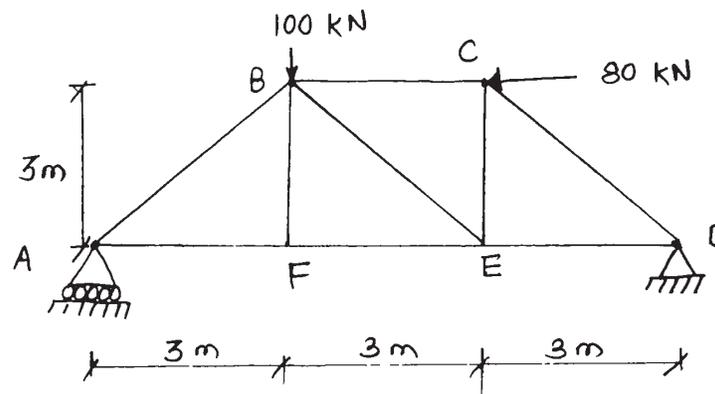BE and FE of the frame as shown in Fig. No. 7

Fig. No. 7