* R M - 7 0 4 9 / 3 0 0 *

RM-7049

B. E. - III (Sem. VI) (Civil) Examination

May / June – 2010

Structural Analysis - III

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 3 (Sem. 6) (Civil)**

Name of the Subject :

☛ **Structural Analysis - 3**

☛ Subject Code No. : **7 0 4 9** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Assume suitable data if required and mention them clearly.

(3) Use of non-programmable calculator is permitted.

(4) Figures to the right indicate full marks.

SECTION - I

1 Analyse the following frame by cantilever method. Also write assumptions made on cantilever method. **16**

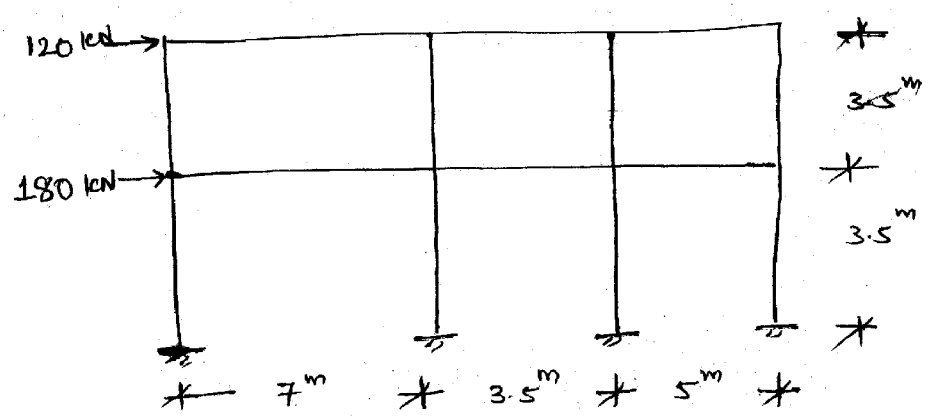


Fig. (1)

2 A rigid beam ABC, is kept in horizontal position by three rods as shown in figure 2. All the three rods are made of same material and have equal c/s area of 200 mm^2. **16**

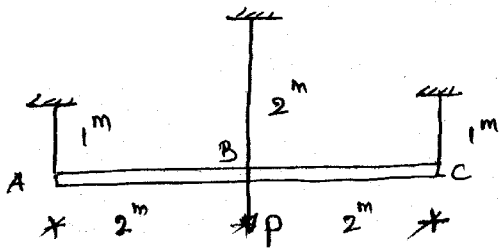


Fig. (2)

Calculate the collapse load for the structure, applied at the centre of the beam. $\sigma_y = 250$ Mpa and E = 2×10^5 Mpa

OR

2 (a) Explain static theorem and kinematic theorem. **6**

(b) Find $W_c = \frac{11.656\, M_p}{l}$ for propped cantilever beam with UDL by both static method and kinematic method. **10**

3 (a) Explain simple harmonic motion and derive the equation for time period. **6**

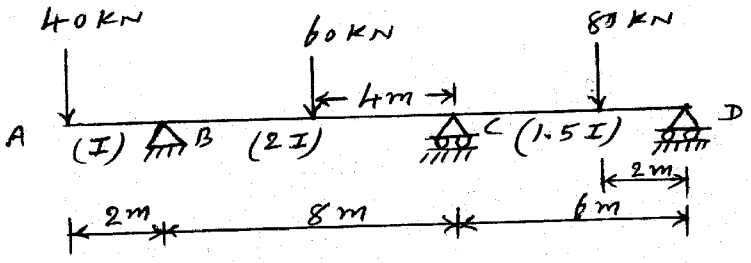
(b) Find the shape factor for typical rectangular section, triangular section and circular section. **12**

OR

(b) Explain the concept of plastic hinge and load factor in detail, with necessary sketches. **12**

SECTION - II

4 Analyse the continuous beam shown in figure 3 by displacement method. **20**



OR

4 Using the stiffness method of analysis, determine the moments at the ends of members for the frame as shown in figure 4. **20**

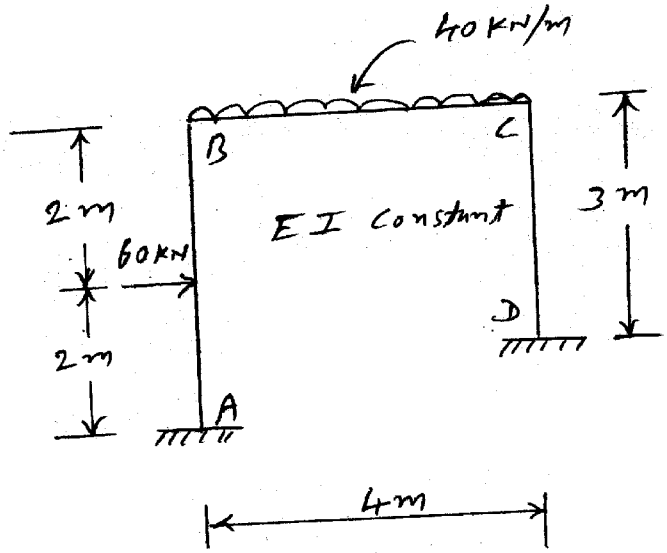


Fig. 4

5 Using the stiffness method determine the displacements at the joint B of a pin jointed frame shown in figure 5. Also calculate the forces in members AB and BC due to the given loading. The values of area of cross section are indicated. Take E = 2×10^5 N/mm^2. **15**

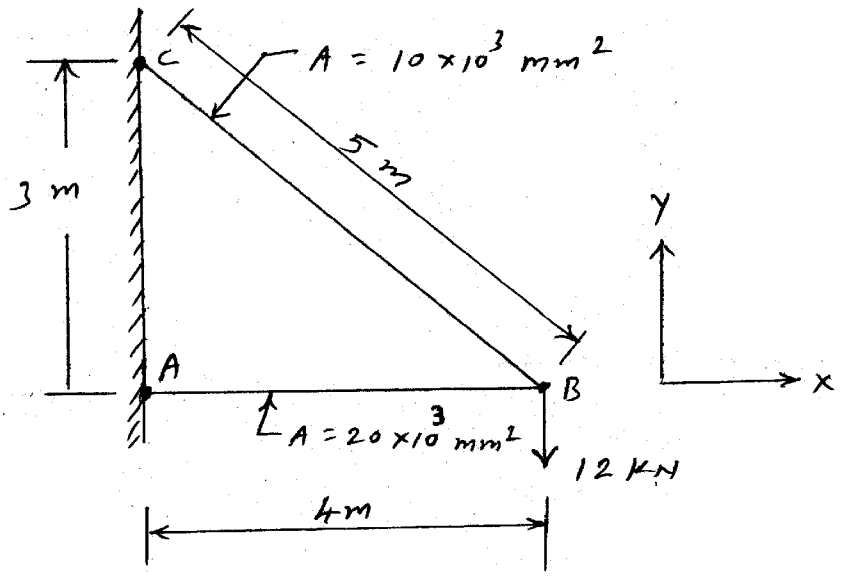


Fig. 5

6 Draw the influence line diagram at B in the continuous beam shown in figure 6 after calculating ordinates at 2m intervals. Assume flexural rigidity is constant throughout. **15**

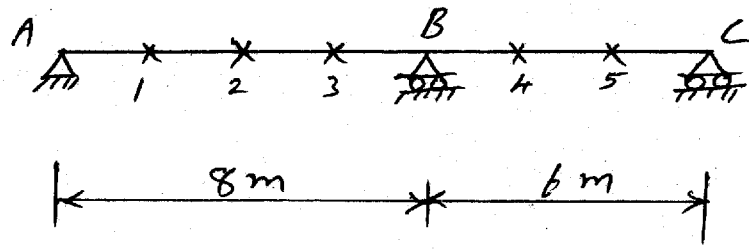


Fig. 6