Total number of printed pages – 7

Fifth Semester Examination – 2011
STRUCTURAL ANALYSIS – I
Code : 011511

Full Marks – 70

Time : 3 Hours
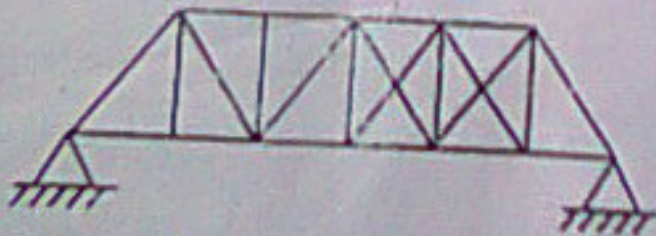
Instructions :

(i) There are **NINE** questions in this paper. All questions carry equal marks.

(ii) Attempt **Five** questions in all.

(iii) Question No. 1 is compulsory.

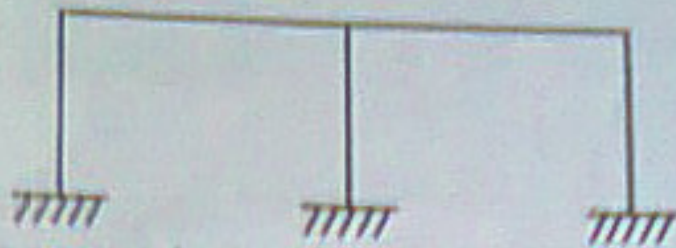1. Answer any seven questions (Fill in the blanks/ select correct answer) of the following :

   (a)

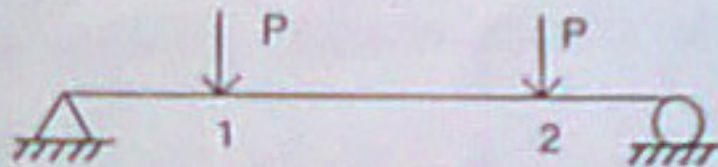   Degree of statical indeterminancy external and internal are _1 & 36_

P.T.O.

(b)

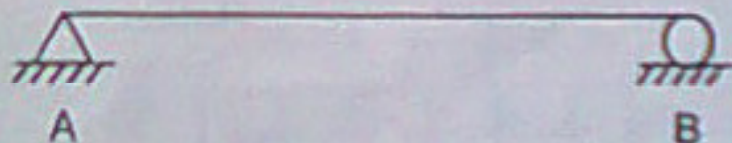Degree of statical indeterminancy is
_____ .

(c) Casliglean's first theorem gives relation between rate of change of strain energy not deflection and _____ .

(d)

The deflection at 1 due to load at 2 will be equal to deflection at 2 due to load at 1 is known as Law of reci _____ .
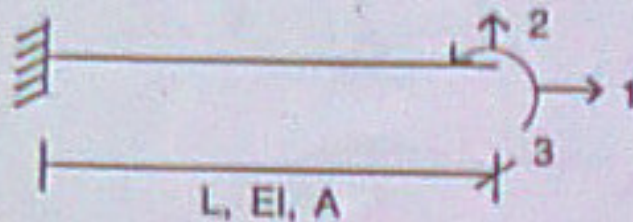
(e)

A   B

Draw the Influence line of reaction at A.

(f) The maximum moment under any given wheel load occurs when its axis and the centroid of the load system on the span are

(i) at the centre of span

(ii) Equidistant from the centre of span

(iii) 1/4th from the centre of span

(iv) 3/4th from the centre of span

(g)

L, EI, A

Generate the flexibility matrix.

(h) Flexibility matirx and stiffness matrix are

(i)   equal

(ii) reciprocal

(iii) not related

(iv) None of these

(i) As per middle third rule the eccentricity of force should not be greater more than

(i) $\dfrac{b}{6}$

(ii) $\dfrac{b}{8}$

(iii) $\dfrac{b}{12}$

(iv) $\dfrac{b}{2}$

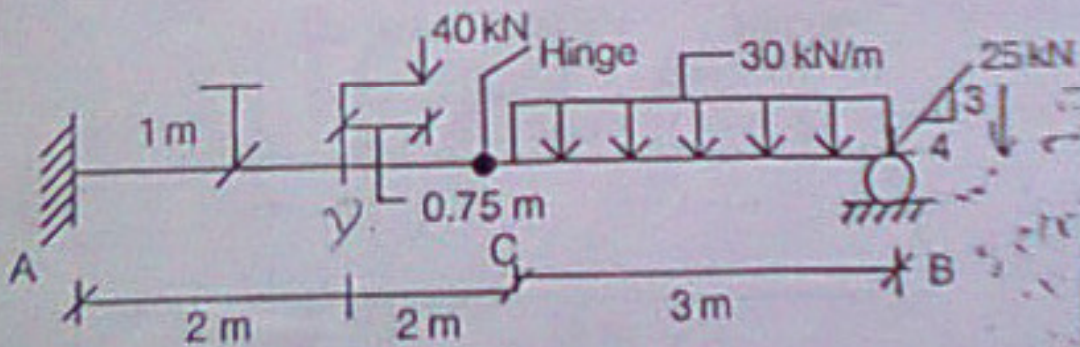Where b is the base width.

(i)

Draw the conjugate beam.

2. (a)

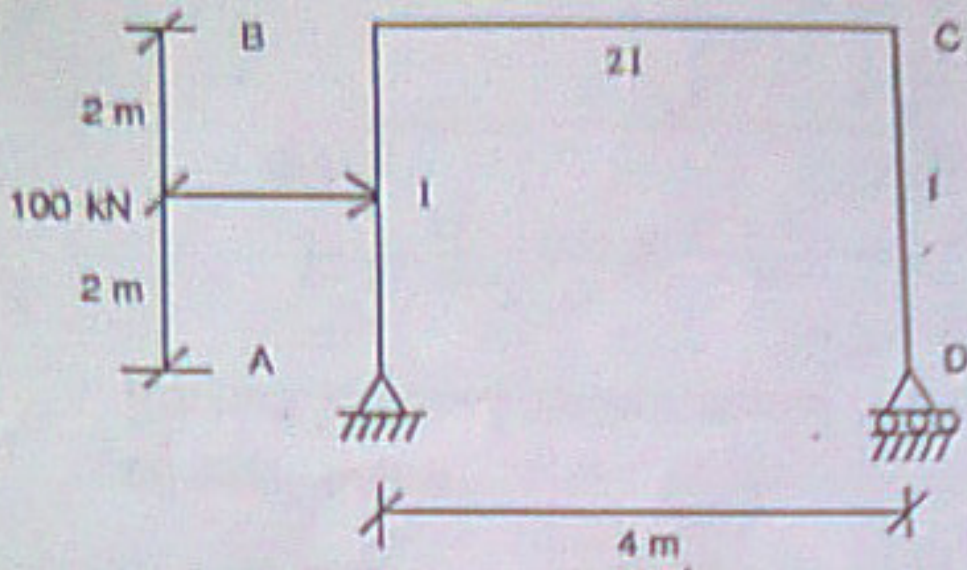Find the statical indeterminancy of the structure.

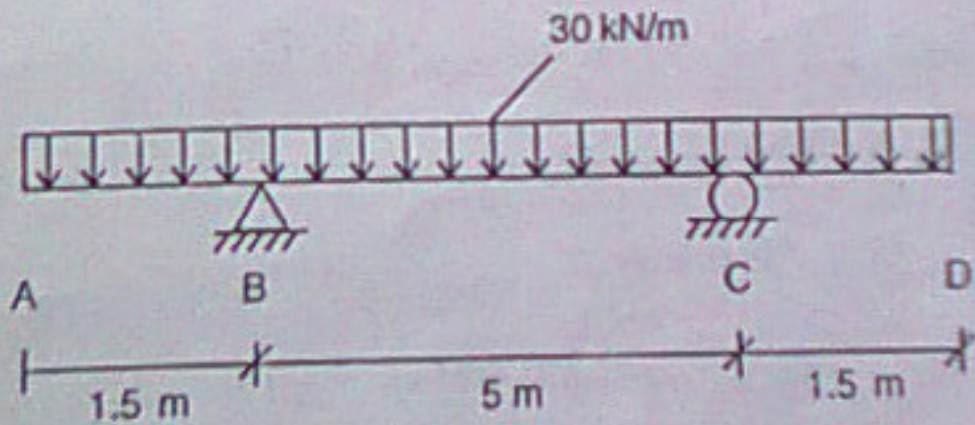(b) State and explain the statical indeterminancy.

3.

Draw free body diagram of the entire sturcture and obtain the reactions at A, B and C.
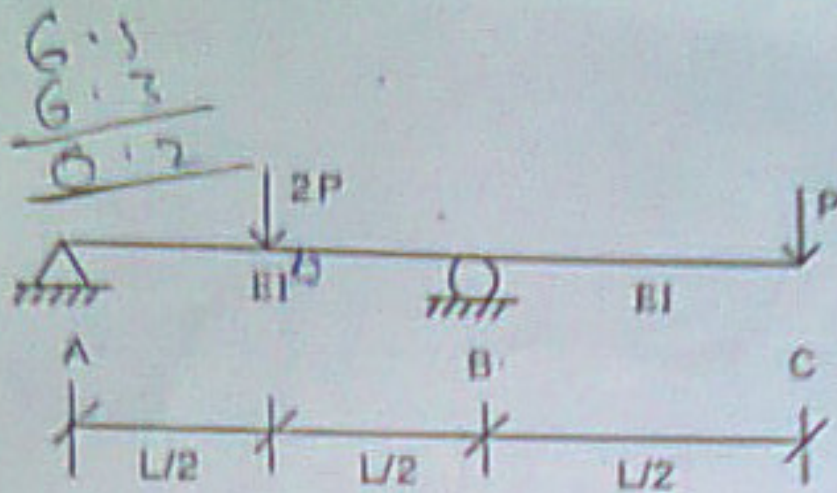
4.

Find the horizontal displacement at D.
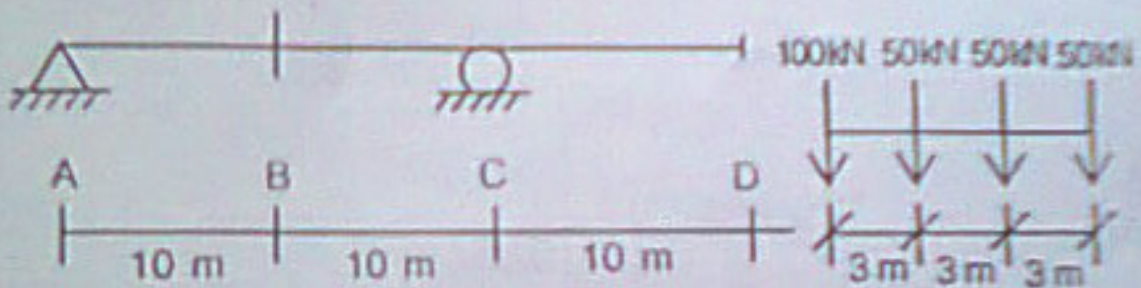$E = 200 \times 10^6$ kN/m², $I = 300 \times 10^{-6}$ m⁴ by using vertual work method.

5.

Find the deflection A and rotation at B by using conjugate beam method.
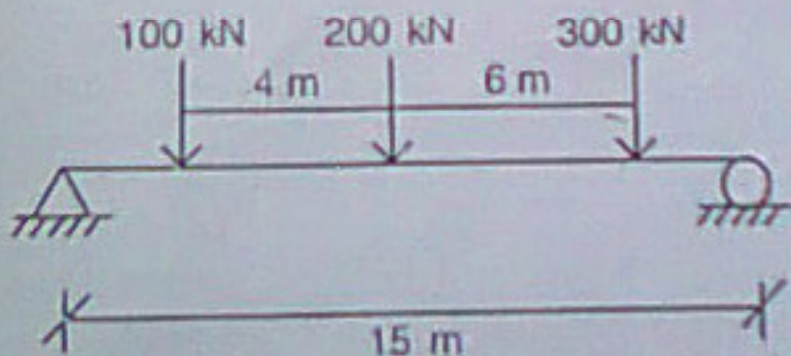
6.

$6:5$
$6:3$
$6:2$

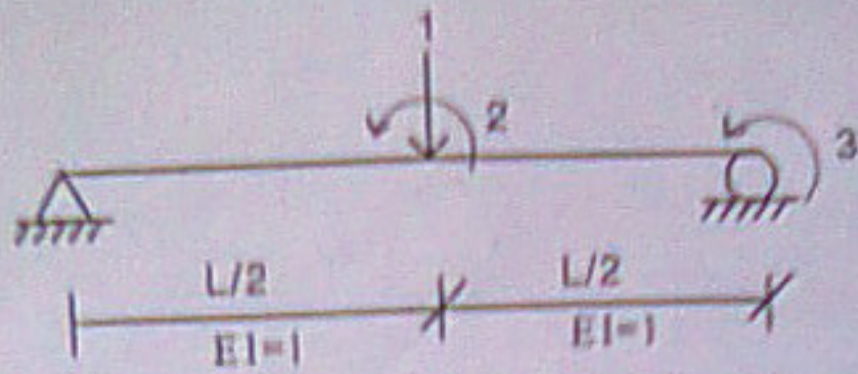Find the deflection at free end by using moment area method.

7.

Find the maximum values for the shear and moment at Section B for the given load system.

8.

Determine the maximum shear force and moment developed anywhere over the beam due to three moving loads as shown.

9.

For the structure shown above generate the flexibility matrix.