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Total number of printed pages – 2

B. Tech
PCCI 4304

Sixth Semester Regular Examination – 2014

STRUCTURAL ANALYSIS - II

BRANCH : CIVIL

QUESTION CODE : F 214

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :

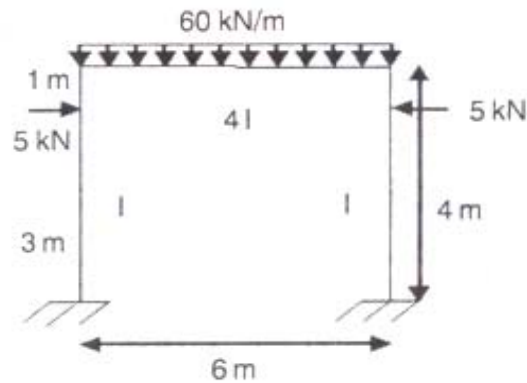
2 × 10

- (a) Why *limit analysis* of structure is preferred to *elastic analysis* ?
- (b) Define *ductility*.
- (c) Define *load factor*.
- (d) What do you mean by a *mechanism* ?
- (e) State *distribution theorem*.
- (f) Define *plastic hinge*.
- (g) A continuous beam ABC has two spans AB = 5 m, BC = 4 m. A point load 100 kN acts at the centre of the AB, whereas a u.d.l of 25 kN/m acts throughout BC. End A is fixed, C is simply supported. $I_{ab} : I_{bc} = 3 : 1$. Find the distribution factor for the members.
- (h) Write the generalized slope deflection equation for a continuous beam.
- (i) Find the *shape factor* for a rectangle.
- (j) Explain *virtual work* principle.



P.T.O.

2. Analyse the portal frame shown in figure using moment distribution method. 10



3. A fixed beam ABC has two spans $AB = 6$ m and $BC = 4$ m. A UDL of 30 kN/m acts on span AB. On BC, a point load of 20 kN acts at 1 m from B. Analyse the beam using slope deflection method. Also draw the bending moment diagram. 10
4. Find the shear shape factor for a hollow rhombus. 10
5. (a) Compute the plastic section modulus, elastic section modulus for a box section with outside depth 30 cm, wall thickness 1 cm and width 15 cm. 5
 (b) Compute the shape factor for the above section. Find the plastic moment M_p , if the yield stress is 2500 kg/cm²? 5
6. A continuous beam ABCD has three spans, $AB = 3$ m, $BC = 4$ m, $CD = 4$ m. And A is simply supported and D is fixed. A point load of 10 kN acts at 1 m from A on span AB. On BC a udl of 5 kN/m acts. On span CD a point load of 20 kN acts at the center. $I_{ab} : I_{bc} : I_{cd} = 1.5 : 2 : 1$. Determine the support moments at A, B, C, D using Kani's method. 10
7. (a) Draw the schematic diagram of a *suspension bridge*. 4
 (b) Find the expression for horizontal tension in a cable. 6
8. Write short notes on : 2.5 × 4
 (a) Plastic moment
 (b) Stiffness and flexibility
 (c) Degree of redundancy
 (d) Two hinged arch.