Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech

PCCI 4304

Sixth Semester Regular / Back Examination – 2015

STRUCTURAL ANALYSIS - II

BRANCH : CIVIL

QUESTION CODE : J 133

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) Draw the flexural stress distribution diagram for a rectangular beam when the member reaches the plastic limit stage.

(b) What do you mean by *shape factor*? What is the value of the *shape factor* for a circular cross section ?

(c) For the same span and for the same loading, which of the two cases has higher *collapse load*? A simply supported beam and a fixed beam. Explain the reason.

(d) Distinguish between *stiffness* and *relative stiffness*.

(e) What do you mean by *distribution factor*? What is the sum of *distribution factors* at a common joint in a beam ?

(f) Explain, how the symmetry wrt *geometry* and *loading* of a structure can be useful to analyse the structure by *moment distribution method*.

(g) State the inter relationship between *flexibility matrix* and *stiffness matrix* for the same member.

(h) Draw the figure for a two hinged parabolic arch subjected to a point load, W at the centre. Show the external forces developed specifying the values.

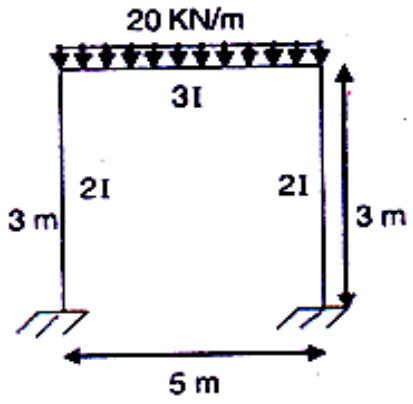
P.T.O.

(i) Why *flexibility method of analysis* is also named as *force method of analysis*?

(j) Distinguish between *static indeterminacy* and *kinematic indeterminacy*. State example for each one.

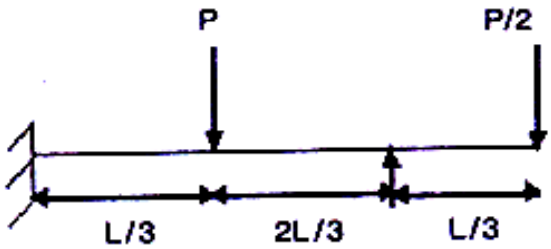
2. A two span continuous beam has each span length, L and the beam is having fixed support at both the ends. The beam is acted by externally applied uniformly distributed load of w per m length for both the spans. If the EI value is same for both, analyse the beam applying *slope deflection method*. Draw bending moment diagram. 10

3. Analyse the portal frame shown below applying moment distribution method. 10



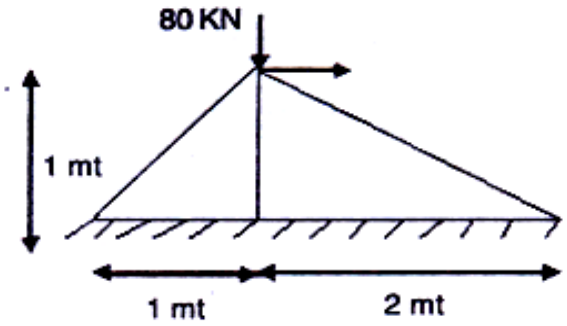
4. (a) What is importance of finding the *plastic moment value*, M_p in a structure? 3

(b) Calculate the plastic moment value and the collapse load for the propped cantilever shown below. EI value s same throughout the beam. 7



5. A two hinged semi circular arch of radius R having uniform flexural rigidity carries an uniformly distributed load of w/m for the right half portion of the arch. Calculate the horizontal thrust at each support. 10

6. Analyse the pin-jointed truss shown below using any suitable method. Area of cross-section for each member is 600 mm^2 and E = 210 KN/mm^2. The truss is subjected to a vertical load of 80 kN at top joint. 10



7. (a) Find the shape factor for a symmetrical I beam having width of flange = 230 mm and overall depth of 300 mm. The thickness of flange is 20 mm and the thickness of web is 30 mm. 5

   (b) State the various steps involved in solving a two span continuous beam with left end fixed and right end hinged subjected to a concentrated load of W at centre of each span applying stiffness method of analysis. Assume each span length as L. Assume uniform EI. 5

8. Write short notes on any **four** of the following : 2.5×4

   (a) Plastic moment

   (b) Redundant plane truss

   (c) Suspension cable

   (d) Upper bound theorem

   (e) Stiffnes method of analysis.