Registration no: | | | | | | | | | | |

Total Number of Pages: 2 **B.Tech**
PCCI4304

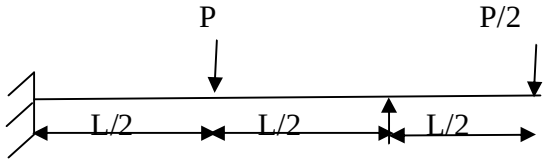
6th Semester Regular / Back Examination 2016-17
STRUCTURAL ANALYSIS - II
BRANCH: CIVIL ENGINEERING
Time: 3 Hours
Max Marks: 70
Q.CODE: Z131

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

Q1 **Answer the following questions:** **(2 x 10)**

a) Draw the stress strain diagram under flexure at plastic stage for a rectangular beam.
b) Calculate the shape factor for a rectangular section.
c) Slope deflection method of analysis is a *force method* or *displacement method*? Explain.
d) For a two span continuous beam with both ends fixed, calculate the no of unknown displacements and no of unknown forces.
e) Distinguish between *stiffness* and *relative stiffness*.
f) State *distribution theorem*.
g) Define Kij wrt stiffness method of analysis.
h) How can assess, whether *stiffness method* or *flexibility method* of analysis is convenient for analyzing a structure?
i) Draw the stress strain curve for mild steel showing the salient features.
j) Write the expression for *horizontal thrust* in a two hinged arch.

Q2 **a)** Calculate the collapse load for the beam shown below. **(5)**



b) Explain, upper bound theorem, lower bound theorem and uniqueness theorem. **(5)**

Q3 A fixed beam ABC has two spans AB =5 m and BC= 4 m. An uniformly distributed load of 15 kN/m acts on span AB. On BC, a point load of 20 KN acts at the ctntre of the span. Analyse the beam using slope deflection method. Also draw the bending moment diagram. **(10)**

Q4 A two hinged semi circular arch of radius R having uniform flexural rigidity carries a concentrated load W at the crown. Find the horizontal thrust at each support. **(10)**

Q5 A continuous beam ABCD is fixed at A and D. AB= 5m, BC=4m,CD= 5m.A point load of 12 KN act at 1m from end A on AB. On BC a udl of 5KN/m is acting throughout the span. At the centre of CD a point load of 5 KN is acting. Calculate the support moments at A,B,C and D using moment distribution method. All members are having uniform EI value. **(10)**

Q6 **a)** Compute the plastic section modulus and the elastic section modulus for a box section with outside depth 25 cm, wall thickness 2 cm and width 15 cm. **(5)**

b) Find the shape factor for the above section. Find the plastic moment Mp, if the yield stress is 2000kg/cm^2. **(5)**

Q7 **a)** A suspension cable 120 m span and 10m central dip carries a load of 5 KN/m. Calculate the maximum and minimum tension in the cable. Find the horizontal and vertical forces in each pier, if the cable passes over a frictionless roller on the top of the piers. **(5)**

b) If the cable is firmly clamped to saddles carried on frictionless roller on top of the piers, find the horizontal and vertical forces in each pier. **(5)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Carry over theorem

b) Degree of redundancy

c) Equilibrium condition in plastic analysis

d) 3x3 flexibility matrix