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

Total Number of Pages : 02

B.Tech
PCCI4304

6th Semester Back Examination 2018-19
STRUCTURAL ANALYSIS – II
BRANCH : CIVIL
Time : 3 Hours
Max Marks : 70
Q.CODE : F137

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) Differentiate between force method and displacement method.
- b) Define relative stiffness.
- c) Explain the term carry over factor.
- d) State the relation between stiffness matrix and flexibility matrix.
- e) Write difference between elastic hinge and plastic hinge.
- f) Enumerate the assumptions made in slope deflection method.
- g) Define the term plastic modulus.
- h) State advantages of redundant structures.
- i) Write the various conditions for sway.
- j) Differentiate between rotation factor and distribution factor.

Q2 a) A two hinged arch parabolic arch of span 20 m and rise 4m carries a uniformly distributed load of 50 kN permeter on left half of the span. Determine the horizontal thrust, reactions and maximum positive bending moment. **(5)**

b) Derive the shape factor for a beam of rectangular section having width B and Depth D. **(5)**

Q3 a) A continuous beam ABC fixed at A and C and simply supported at B, consists spans AB and BC of lengths 5m and 10 m respectively. The span AB carries a uniformly distributed load 12 kN/m and span BC carries a uniformly distributed load 25 kN/m throughout the span. Find moments at supports. Analyze using moment distribution method assuming EI constant. Draws shear force and bending moment for the beam. **(5)**

b) A portal frame ABCD consists of vertical columns AB and CD of 5 m height and beam BC of 10 m length. The ends A and D are fixed. The beam (BC) carries a vertical point load of 150 kN on the beam at a distance 3m from B. The moment of inertia of beam (BC) is four times of columns. Find the support moments. Analyze the frame using moment distribution method. **(5)**

Q4 a) A continuous beam ABC fixed at A and C and simply supported at B, consists spans AB and BC of lengths 4 m and 6 m respectively. The span AB carries a uniformly distributed load 10 kN/m throughout the span and span BC carries a concentrated load of 25 kN at middle of the span. Find the moments at supports. Analyze using slope deflection method assuming EI constant. **(6)**

b) A simply supported beam of rectangular section carries a uniformly distributed load of intensity w per unit run over the whole span. Determine at collapse condition, what part of beam is fully elastic. **(4)**

Q5 **a)** A two hinged portal frame ABCD consist of vertical columns AB and CD of 6 m height and beam BC of 12 m length. The frame carries a vertical point load of 100 kN on the beam at a distance 2.5m from B. The moment of inertia of beam (BC) is two times of columns. Find support moments. Analyze the frame usingKani's rotation contribution method. **(5)**

b) A continuous beam ABC of uniform section consists of spans AB and BC lengths 6 m and 10 m respectively, the ends A and C are being fixed. The spans AB and BC carry uniformly distributed loads of 10 kN/m and 5 kN/m respectively. Find support moments. Analyze the beam using Kani's rotation contribution method. EI constant. **(5)**

Q6 The two hinged girders of a suspension bridge have a span of 120 m, the dip of the supporting cable is being 10 m. If the girder is subjected to two point loads of 250 kN and 500 kN at distances of 20m and 80 m from the left end. Find the shear force and bending moment for girder at 30 m from left end. Find the maximum tension in the cable. **(10)**

Q7 A two span continuous beam ABC with end A is fixed and C is hinged. The span AB is loaded with uniformly distributed load having intensity 60 kN/m and the span BC carries a point load of 100 kN at middle. The length of span AB and BC are 4m and 3m respectively. Use stiffness matrix method for analysis assuming uniform flexural rigidity (EI). **(10)**

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

a) Matrix stiffness method

b) Plastic bending of beams

c) Upper bound and lower bound theorems