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

Total Number of Pages: 03 **B.Tech**

PCI5I101

5th Semester Regular Examination 2017-18

Structural Analysis-II

BRANCH: CIVIL

Time: 3 Hours

Max Marks: 100

Q.CODE: B260

Answer Question No.1 and 2 which are compulsory and any four from the rest.

The figures in the right hand margin indicate marks.

Q1 **Answer the following questions: *multiple type or dash fill up type*** **(2 x 10)**

a) In slope deflection equation, the deformations are considered to be caused by i) bending moment ii) shear force iii) axial force iv) twisting force

b) Which of the following is not a displacement method?
i) equilibrium method ii) column anlogy method iii) moment distribution method iv) kani's method

c) Select the correct statement
i)flexibility method is a square symmetrical matrix
ii) flexibility method is a square symmetrical matrix
iii) both (i) and (ii)
iv) none of the above

d) What is the degree of indeterminacy of a fixed arch?
i)1 ii)2 iii)3 iv) 4

e) Shape factor for triangular section i)1.5 ii) 2.345 iii) 1.697 iv) 2

f) A propped cantilever of span *L* carries a vertical concentrated load at the mid-span. If the plastic moment capacity of the section is Mp, the magnitude of the collapse load is i) 8MpL ii) 6MpL iii) 4MpL iv) 2MpL

g) The carryover factor in a prismatic member whose far end is hinged is i) 0 ii) ½ iii) ¾ iv) 1

h) In moment distribution method, the sum of distribution factor of all the members meeting at any point is always i) zero ii) less than 1 iii) 1 iv) greater than 1

i) For a symmetrical two hinged parabolic arch, if one of te supports settles horizontally, then the horizontal thrust i) in increased ii) is decreased iii) remains unchanged iv) becomes zero

j) The hinged length of the plasticity zone in case of a simply supported rectangular beam loaded with a unit load, i) 0ne third the span ii) half the span iii) quarter the span iv) zero

Q2 **Answer the following questions: Short answer type** **(2 x 10)**

a) What is the nature of forces in the cables?

b) Explain the terms *carry over moment* and *carry over factor*.

c) What are the main functions of stiffening girders in suspension bridges?

d) Differentiate between *plane truss* and *space truss*.

e) Differentiate between *stiffness* and *relative stiffness.*

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

g) Define stiffness coefficient kij. What is the basic aim of the stiffness method?

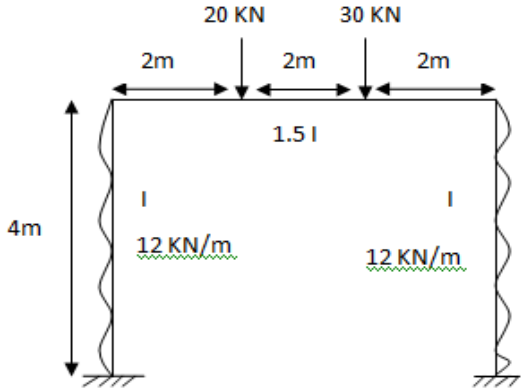
h) Write the element stiffness matrix for a beam element.

i) Define *plastic moment*.

j) Flexibility method is a force method or displacement method? Explain.

Q3 A continuous beam ABCD consists of three spans AB= 6m, BC= 5m CD= 5m. Span AB is loaded with an udl of 2kN/m ,BC with a point load of 5 kN at a distance of 3m from B, and CD with a point load of 8 KN at a distance of 2.5 m from C. Ends A and D are fixed. Determine the bending moments at the supports and plot the bending moment diagram.(Slope deflection method) **(15)**

Q4 Analyse the frame by moment distribution method. **(15)**

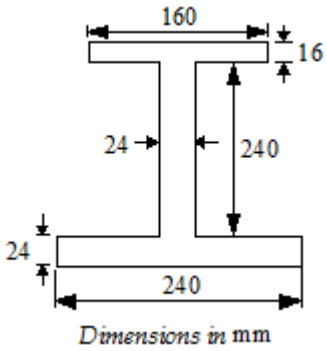


Q5 A two hinged parabolic arch of span 40m and rise 6m carries an uniformly distributed load of 30 kN/m for the left half of the span and a unit load of 100 kN at 5m from right support. Determine the
horizontal thrust
maximum positive and negative moment
shear force and normal thrust at 10m from the left support. **(15)**

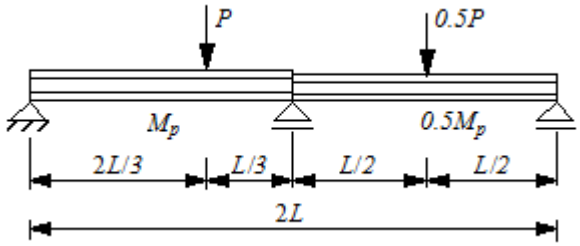
Q6 A suspension cable of 75 m horizontal span and central dip 6 m has a stiffening girder hinged at both ends. The dead load transmitted to the cable including its own weight is 1500 kN. The girder carries a live load of 30 kN/m uniformly distributed over the left half of the span. Assuming the girder to be rigid, calculate the shear force and bending moment in the girder at 20 m from left support. Also calculate the maximum tension in the cable. **(15)**

Q7 A continuous beam ABCD hinged at ends has 3 spans AB, BC and CD each of 10m length. Span AB carries a uniformly distributed load of 40 kN/m, BC carries a unit load of 100 KN at 4m from end B and span CD carries a uniformly distributed load of 20 KN/m. Analyse the beam by flexibility matrix method. **(15)**

Q8 **a)** Find the shape factor for the unsymmetrical I beam shown in figure. **(10)**



b) Find the collapse load by different method of analysis. **(5)**



Q9 **Write short notes on any THREE.** **(5x3)**

a) Stiffness method of analysis
b) Kani's method
c) Suspension cable
d) Lower bound theorem
e) Load factor