QPC: RJ18001121 AR - 18 Reg. No.

GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, June – 2021

(Sixth Semester)

BCEPC6020 – STRUCTURAL ANALYSIS II

(Civil Engineering)

Time: 2 hrs Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer ***ALL*** questions [CO#] [PO#]

a. Which is the correct slope deflection equation for continuous beam AB _____ [CO2] [PO2]

(i)$MAB=MFAB + (4EI\theta A/L +2EI\theta B/L – 6EI\Delta/L^2)$

(ii) $MAB=MFAB + (4EI\theta B/L +2EI\theta A/L – 6EI\Delta/L^2)$

(iii) $MAB=MFAB - (4EI\theta A/L +2EI\theta B/L – 6EI\Delta/L^2)$

(iv) $MAB=MFAB - (4EI\theta B/L +2EI\theta A/L – 6EI\Delta/L^2)$

b. The slope deflection equations give the relationship between [CO2] [PO1]

(i)slope and deflection only

(ii) B.M and rotations only

(iii) B.M and vertical deflection only

(iv) B.M , rotation and deflections

c. A beam is hinged at end A and fixed at B. A moment M is applied at end A. What is the moment development at end B? [CO2] [PO1]

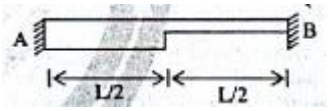
(i) - M

(ii) M

(iii) M/2

(iv) –M/2

d. What is the carry over factor from A to B while using moment distribution for analysing beam as shown in the figure given below? [CO2] [PO2]



(i) 1/2

(ii) 1.0

(iii) < 1/2

(iv) > 1/2

e. For a two hinged arch, if one of the supports settles down vertically, then the horizontal thrust [CO3] [PO1]

(i) is increased

(ii) is decreased

(iii) remains unchanged

(iv) becomes zero

f. What is the maximum tension in the cable [CO3] [PO1]

(i) $Tmax = \sqrt{V^2} - \sqrt{H^2}$

(ii) $Tmax = \sqrt{H^2} - \sqrt{V^2}$

(iii) $Tmax = \sqrt{V^2} + \sqrt{H^2}$

(iv) $Tmax = \sqrt{V^2} \pm \sqrt{H^2}$

g. Which of the following methods of structural analysis is a force method? [CO4] [PO1]

(i) slope deflection method

(ii) column analogy method

(iii) moment distribution method

(iv) kani's method

h. Which of the following conditions form the basis of this method? [CO4] [PO2]

(i) equilibrium conditions

(ii) force- displacement conditions

(iii) load applied

(iv) compatibility conditions

i. At the location of plastic hinge [CO5] [PO1]

(i) radius of curvature is infinite

(ii) curvature is infinite

(iii) moment is infinite

(iv) flexural stress is infinite

j. For the plastic analysis, the criteria for the analysis of a structure is based on [CO5] [PO1]

(i) working load (ii) yield load

(iii) ultimate load (iv) breaking load

PART – B: (Short Answer Questions) **(2 x 5 = 10 Marks)**

Q.2. Answer ***ALL*** questions [CO#] [PO#]

a. State the general slope deflection equation for two span continuous beams. [CO2] [PO1]

b. A continuous beam ABC of length 2L (with uniform flexural rigidity EI) is simply supported at the ends A and C and continuous over the support B at mid-length. Using moment distribution method, determine the moment at the support B, if it subjected to a uniformly distributed load 'w' throughout the length. [CO2] [PO2]

c. How will you calculate the horizontal thrust in a two hinged parabolic arch if there is a rise in temperature? [CO3] [PO1]

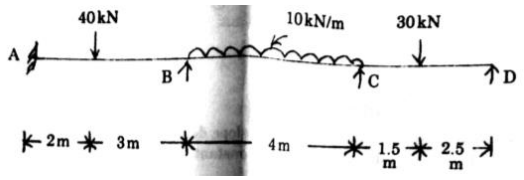
d. Compare flexibility method and stiffness method. [CO4] [PO2]

e. State the upper and lower bound theorems. [CO5] [PO2]

PART – C: (Long Answer Questions) **(6 x 5 = 30 Marks)**

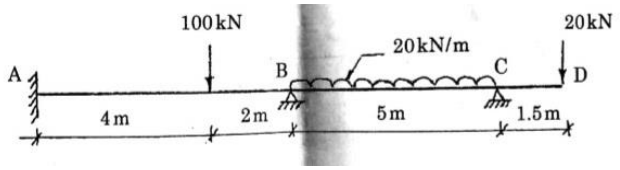
Answer ***ANY FIVE*** questions Marks [CO#] [PO#]

3. Analyze the continuous beam shown in fig: by slope deflection method and draw the bending moment. Take EI= constant.



(6) [CO2] [PO3]

4. Analyze the continuous beam shown in fig: by moment distribution method and draw the SFD and BMD. Take EI= constant.



(6) [CO2] [PO3]

5. A parabolic two hinged arch has a span of 30m and a rise of 5m. A concentrated load 25kN acts at 10m from the left support. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and reactions at the hinge. Also calculate maximum BM. at the section. (6) [CO3] [PO2]

6. A suspension cable 80 m span and 12m dip is stiffened with a two-hinged girder. The girder carries a dead load of 10 kN/m over the entire span and a concentrated load of 600 kN at 50m from the left support. Determine the maximum tension in the cable and the SF and BM at a section 35 m from the left support. (6) [CO3] [PO2]

7. A two span continuous beam ABC is fixed at A and simply supported over the supports B and C. AB=6m and BC=4m. Moment of inertia is constant throughout. A single non concentrated central load of 20 kN acts at 2m from A and a single concentrated central load of 60 kN act on BC. Analyze the beam by force method and draw the BMD and SFD. (6) [CO4] [PO3]

8. A two span continuous beam ABC fixed A and supported B and C. AB=7m and BC=4m. Moment of inertia is constant throughout. A single non concentrated central load of 12 kN acts at 3m from A and a single concentrated central load of 11 kN act on BC. Analyze the beam by stiffness method and draw the **BMD and SF.** (6) [CO4] [PO3]

9. Determine the shape factor of a T-section beam of flange dimension 100 x12mm and web dimension 138 x12mm thick. (6) [CO5] [PO2]

10. A uniform beam of span 5m and fully plastic moment M_p is simply supported at one end and rigidly clamped at other end. A concentrated load of 20 kN may be applied anywhere within the span. Find the smallest value of M_p such that collapse would first occur when the load is in its most unfavorable position. (6) [CO5] [PO3]

--- End of Paper ---