School of Civil Engineering

Civil Engineering

ETE - Jun 2023

Time : 3 Hours **Marks : 100**

Sem IV - G1UA403B / BCE01T3401

Structural Analysis

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1.	What is the significance of the peak value on an influence line diagram?	K2 CO3	(5)
2.	Consider a cantilever beam with a length of 5 meters and a point load of 30 kN applied at the free end. Find the rotation at the fixed end using Castigliano's theorem.	K2 CO2	(5)
3.	Discuss the concept of statically determinate and statically indeterminate structures in the context of moment equations.	K1 CO1	(5)
4.	A simply supported beam of length 6 meters is subjected to a uniformly distributed load of 10 kN/m. The beam has a rectangular cross-section with a width of 200 mm and a height of 300 mm. Using the strain energy method, determine the maximum deflection of the beam.	K3 CO2	(10)
5.	Explain in detail about three monet equation , its assumptions and its application in strcuture analysis .	K2 CO1	(10)
6.	Consider a continuous beam of length 8 meters with supports at A, B, and C. The beam carries a uniform load of 6 kN/m over its entire length. Draw the influence line diagram for the support reaction at B.	K3 CO3	(10)
7.	Explain the concept of hinge settlements and its effect on arch behavior.	K4 CO4	(10)

OR

	A two-hinged semicircular arch with a radius of 10 meters carries a uniformly distributed load of 5 kN/m over an arc of 120 degrees starting from the left support. Determine the maximum shear force in the arch.	K4 CO4	(10)
8.	How are support conditions and loadings taken into account when applying the three-moment equation method?	K4 CO1	(15)
9.	Explain the concept of redundancy in structural analysis and its significance in applying the three-moment equation method.	K5 CO1	(15)
10.	A parabolic arch with a span of 12 meters and a maximum rise of 3 meters carries a concentrated load of 18 kN at a distance of 5 meters from the left support. Calculate the maximum axial force in the arch.	K5 CO4	(15)

OR

	Consider a simply supported beam AB of length 8 meters subjected to a uniformly distributed load of 10 kN/m. The beam has a moment of inertia (I) of 5000 cm^4 and an elastic modulus (E) of 200 GPa. Calculate the end moments and rotations using the slope deflection method.	K5 CO5	(15)