Question Paper Code: R22A21CE03

R22

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, June/July–2024

STRENGTH OF MATERIAL - I

(CIVIL ENGINEERING)

Time: 3 Hours **Max. Marks: 60**

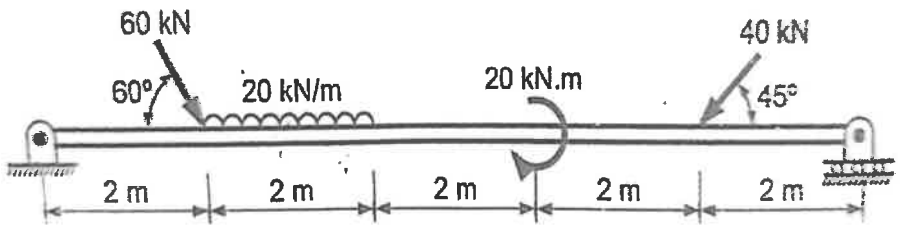
Section – A (Short Answer type questions) (10 Marks)

Answer All Questions		Course Outcome	B.T Level	Marks
1.	Define Stress and strain.	CO1	L1	1M
2.	Define poisson's ratio.	CO1	L1	1M
3.	Define Point of contraflexure.	CO2	L1	1M
4.	What are the sign conventions for shear force and bending moment in general?	CO2	L2	1M
5.	Write the shear stress equations and explain the terms?	CO3	L2	1M
6.	Write section modulus formula for triangular section?	CO3	L2	1M
7.	What is conjugate beam?	CO4	L1	1M
8.	Write maximum deflection of simply supported beam carrying point load at center.	CO4	L1	1M
9.	Define Mohr circle?	CO5	L1	1M
10.	Write about maximum principal strain theory?	CO5	L2	1M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	With the help of strain-stress curve for mild steel, explain the following terms. i) Limit of proportionality. ii) Yield point. iii) Ultimate stress. iv) Breaking point.	CO1	L2	10M
	OR			
B)	Determine the change in length, breath and thickness of steel bar 6 m long, 50 mm wide and 35 mm thick, when subjected to an axial pull of 150 KN in the direction of its length. Take E=200 Gpa and Poisson's ratio = 0.3.	CO1	L2	10M
12. A)	A simply supported beam 8 m long is carrying a uniformly distributed load of 4 kN/m over a length of 2 m from the right end and point load at centre. Draw shear force and bending moment diagrams for the beam and calculate the maximum bending moment on the beam.	CO2	L2	10M
	OR			
B)	Draw shear force & bending moment diagram for the beam shown in fig. & define point of contra-flexure.	CO2	L3	10M



13. A)	Obtain the shear stress distribution for a rectangular cross section 250×400 mm subjected to a shear force of 80 KN. Calculate the maximum and average shear stress.	CO3	L2	10M
	OR			
B)	Derive the bending equation from fundamentals M/I = f/y = E/R-3	CO3	L2	10M
14. A)	beam is simply supported at its ends over a span of 10 m and carries two concentrated loads of 150 KN and 80 KN at a distance of 4 m and 6 m respectively from the left support. Calculate i) Slope at the left support ii) Slope and deflection under the 150 KN load. Assume EI = 36 x 10^4 KN-m	CO4	L2	10M
	OR			
B)	Find the deflection at the free end of a cantilever of length 'L' subjected to UDL of intensity 'w' per unit length over its entire span. Use Double integration method.	CO4	L2	10M
15. A)	Mention the different theories of failure. Explain about any two.	CO5	L2	10M
	OR			
B)	A mild steel plate is stressed as shown in fig. 7 Before stressing, a circle of 300mm dia. Is drawn on the plate. Determine the lengths & directions of the major & minor axes of the ellipse into which the circle deforms after stressing. Poisson's ratio = 0.3, modulus of elasticity = 200 kN / mm2	CO5	L3	10M