Question Paper Code: R22A21CE03

R22

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech. I Semester Regular Examinations, Jan/Feb–2024

STRENGTH OF MATERIAL - I

(CIVIL ENGINEERING)

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

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

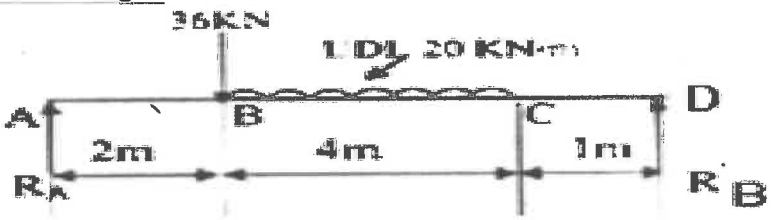
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	What is Limit of proportionality	CO1	L2	1M
2.	Define Elasticity and plasticity	CO1	L1	1M
3.	Define Point of contraflexure	CO2	L3	1M
4.	Draw S.F.D for cantilever Beam with point load at free end?	CO2	L3	1M
5.	Write the shear stress equations and explain the terms?	CO3	L2	1M
6.	Write section modulus formula for circular section?	CO3	L2	1M
7.	Distinguish between real beam and conjugate beam method?	CO4	L3	1M
8.	Write maximum deflection of fixed beam carrying UDL over a span.	CO4	L1	1M
9.	Define Mohr circle?	CO5	L1	1M
10.	Write about maximum principal strain theory?	CO5	L2	1M

Section B (Essay Questions)

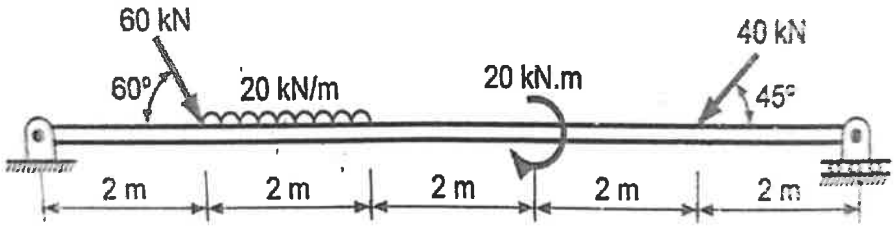
Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	A copper rod 50 mm in diameter is encased and rigidity attached at the end of steel tube which is 70 mm external diameter, thickness of metal being 6 mm. The composite section is then subjected to an axial pull of 200 KN. Find the stresses induced in each metal and extension on the length of 3 m. Take E (Steel) =200 MPa and E (copper) =1.1 X10^5 MPa	CO1	L2	10M
	OR			
B)	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	L1	10M
12. A)	Analysis the simply supported beam shown in figure and sketch the SF and BM diagram.	CO2	L1	10M

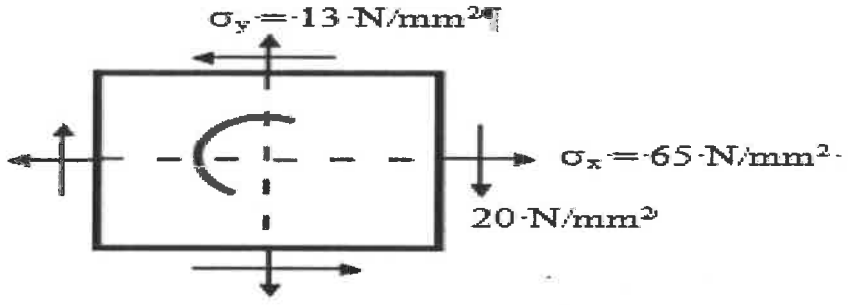


OR

B)	Draw shear force & bending moment diagram for the beam shown in fig. 3. & 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	L1	10M
14. A)	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
	OR			
B)	A simply supported beam of length 4 m carries a point load of 3 KN at a distance of 1 m from each end. If E=2 x 10^5 N/mm^2 and I = 10^8 mm^4 for the beam, then using conjugate beam method determine i) Slope at each end ii) Deflection at centre.	CO4	L1	10M
15. A)	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



	OR			
B)	The principal stresses at a point across two perpendicular planes are 85 MN/m2 (T) and 45 MN/m2. Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 300 with the major principal plane.	CO5	L2	10M