Question Paper Code: R22A22CE03

R22

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, December – 2024

STRENGTH OF MATERIALS – II

(CIVIL ENGINEERING)

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

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

Answer All Questions

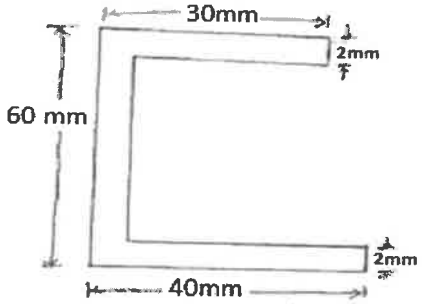
		Course Outcome	B.T Level	Marks
1.	Compare and contrast between torsion, bending and torque.	CO1	L2	1M
2.	Write the application of open coiled helical spring	CO1	L1	1M
3.	Define slenderness ratio.	CO2	L2	1M
4.	What are the types of column failure?	CO2	L1	1M
5.	Define the following terms: i) Direct load ii) Eccentric load	CO3	L2	1M
6.	Write the stresses in chimneys	CO3	L1	1M
7.	Write Lame's Equation	CO4	L1	1M
8.	What is Compound Cylinder	CO4	L1	1M
9.	What do you mean by shear centre	CO5	L2	1M
10.	What are the reasons for unsymmetrical bending.	CO5	L2	1M

Section B (Essay Questions)

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

11. A)	List the assumptions made in Theory of torsion. Derive the torsional equation	CO1	L3	10M
	OR			
B)	An open coil helical spring made up of 10 mm diameter wire and of mean diameter of 100 mm has 12 coils, angle of helix being 15°.Determine the axial deflection and the intensities of bending and shear stresses under an axial load of 500 N. Take C as 80 GPa and E as 200 GPa.	CO1	L3	10M
12. A)	A rectangular box of outer dimensions 300 mm × 200 mm of uniform thickness 10 mm is used as a column with both the ends fixed, if the unsupported length is 8 m, find the Euler's buckling load and Rankine's buckling load. Take E = 200 GP a and yield stress as 350 MPa.	CO2	L3	10M
	OR			
B)	Derive the Euler's formula for crippling load when both ends fixed.	CO2	L3	10M
13. A)	A masonry dam, 8m high,1.5m wide at the top an 4m wide at the base has its water face vertical and retains water to a depth of 6m. Find the maximum and minimum stress intensities at the base. The density 1000 kg/m^3 and that of masonry is 2240 kg/m^3.	CO3	L3	10M
	OR			
B)	A 10 m high masonry chimney wall of rectangular section 4 m x 1.5 m is subjected to a horizontal wind pressure of 1500 N/m^2 on the 4 m side. Find the maximum and minimum stress intensities induced on the base. Take unit weight of masonry as 22 kN/m^3	CO3	L3	10M

14. A)	A thin spherical shell is 1.5 m in diameter, with its wall of 1.3 cm thickness is filled with the fluid at atmospheric pressure. What intensity of pressure will be developed in it if 160 cm^3 more of fluid is pumped into it ? Also calculate the hoop stress at that pressure and increase in diameter. Take m = 10/3, E = 200 GN/m^2.	CO4	L3	10M
	OR			
B)	Derive the expression for stresses developed in a compound thick cylinder (Lame's theorem).	CO4	L3	10M
15. A)	Evaluate the principal moment of inertia of channel section shown.	CO5	L3	10M



OR

B)	Locate the shear centre of the cross section shown in Fig.	CO5	L3	10M