SNS College of Technology, Coimbatore-35
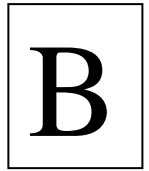**(Autonomous)**
B.E Internal Assessment Examination III
Academic Year 2022-2023(Odd)
III Semester
19CET203-Mechanics of Solids

B

Time: 1¹ᐟ² Hours   **Maximum Marks: 50**

Answer All Questions

	PART – A (5 X 2 = 10)		CO	Blooms
1.	When Macaulay's method is preferred?	2	CO3	R
2.	What is meant by deflection of beams?	2	CO3	R
3.	What is spring index (C)?	2	CO4	U
4.	Define Torsion?	2	CO4	U
5.	Differentiate thin cylinder & thick cylinder?	2	CO5	U
	PART – B (13+13+14 = 40 Marks)			

6.	A beam of length 6m is simply supported at its ends and carries two-point loads of 48 kN and 40 kN at a distance of 1m and 3m respectively from the left support. Find
	    i) Deflection under each load
	    ii) Maximum Deflection
	    iii) The point at which maximum deflection occurs
	 Given $E = 2 \times 10^5 N/mm^2$ and $I = 85 \times 10^6 mm^4$. Use Macaulay's Method.
		13	CO3	U

	(or)			
	(b) A hollow shaft having an internal diameter 30% of its external diameter, transmits 552.5 kW power at 100 rpm. Determine the external diameter of the shaft if the shear stress is not to exceed 70 N /mm² and the twist in a length of 3.5m should not exceed 1.4 degrees. Assume maximum torque = 1.25 mean torque and the modulus of rigidity = 9×10^4 N/mm²	13	CO4	U
7.	(a) A beam AB of span 6m is simply supported at its ends is subjected to a point load of 20kN at C at a distance of 2m from left end. Compute the deflection at the point C, slope at the points A, B and C. Take $I = 6 \times 10^8$ mm⁴ and E = 200GPa. Use Macaulay's Method.	13	CO3	R
	(or)			
	(b) A solid circular shaft transmits 75kW power at 200 rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed one degree in 2m length of shaft and shear stress is not exceed 50 N/mm². Assume the modulus of rigidity of the material of the shaft as 100 kN/mm².	13	CO4	R
8.	A cylindrical thin drum 80cm in diameter and 3m long has a shell thickness of 1cm. If the drum is subjected to an internal pressure of 2.5 N/mm², Determine (i)	14	CO5	U

Change in diameter (ii) Change in length and (iii) Change in volume $E=2\times10^5\text{N/mm}^2$ and Poisson's ratio=0.25.			
(or)			
The Stiffness of a close-coiled helical spring is 1.5 N/mm of compression under a maximum load of 80N. The maximum shearing stress produced in the wire of Spring is 135 N/mm^2 . The solid length of the spring (when the coils are touching) is given as 6 cm. Find i) Diameter of Wire ii) Mean diameter of the coils iii) Number of coils required Take C = 4.5 x10^4 N/mm^2	14	CO4	R