R20 Regulation *Subject code: 3P3AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, July 2024

Strength of Materials-I

(CE)

Maximum Marks: 70 Date:25.07.2024 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A		
All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Define Poisson's ratio and what is its maximum value.	1	L1
2	Distinguish between Tensile stress and Compressive stress.	1	L1
3	Differentiate between a point load and a uniformly distributed load.	2	L1
4	Draw the SFD,BMD for a cantilever beam of length L subjected to udl W per unit length.	2	L1
5	Sketch the shear stress variation across the depth of the beam of circular cross section.	3	L1
6	What do you understand by terms 'Neutral axis and moment of resistance?	3	L1
7	Calculate slope and deflection of a cantilever beam of span 'L' subjected to load 'W' at free end, use moment area method.	4	L1
8	What is the Moment-Area theorem.	4	L1
9	Define the terms principal planes and principal stresses.	5	L1
10	List the various theories of failure.	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	Draw the stress strain diagram for mild steel and identity the significant points.(10M)	1	L2
	OR		
12	A steel rod of 20mm diameter passes centrally through a copper tube of 50mm external diameter and 40mm internal diameter. The tube is closed at each end by rigid plates of negligible thickness. The nuts are tightened lightly on the projecting parts of the rod. If the temperature of the assembly is raised by 50^0C, calculate the stresses developed in copper and steel. Take E for steel and copper as 200GN/m^{2}and100GN/m^2 and α for steel and copper as 12×10^{-6} per ^{0}C and 18×10^{-6} per ^{0}C (10M)	1	L2
13	A simply supported beam of length 8 m carries point loads of 6 KN and 8 KN at a distance of 2 m and 4 m from the left end. Draw the S.F. and B.M. diagrams for the beam. (10M)	2	L2

	OR		
14	Derive the relation between rate of loading, shear force and bending moment for simply supported beam point load at center. (10M)	2	L2
15	Prove that a rectangular section the maximum shear stress is 1.5 times the average shear stress. (10M)	3	L2
	OR		
16	Design the cross section for a beam acted upon by a bending moment of 80KN-m.if width of beam is 230 mm, calculate depth. Take stress f = 10Mpa. (10M)	3	L2
17	Derive the deflection equation for a simply supported beam of length L carrying a point load W at the centre. (10M)	4	L2
	OR		
18	Illustrate moment area method with an example. (10M)	4	L2
19	Discuss the concept of Mohr's stress and strain circles in two dimensions. (10M)	5	L2
	OR		
20	Discuss in detail various prominent theories of failures. (10M)	5	L2