R18 Regulation *Subject code: 2P3CE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

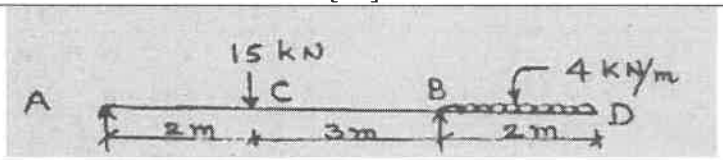
(Autonomous, Accredited by NAAC with 'A+' Grade)

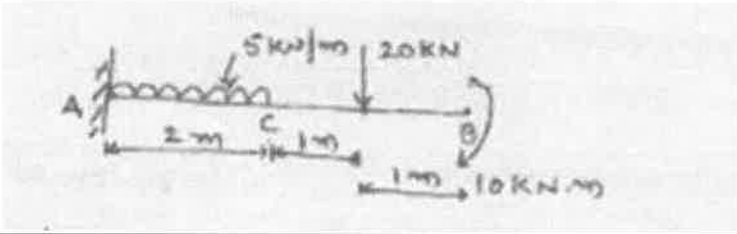
B.Tech III Semester Supplementary Examinations, July 2024

MECHANICS OF SOLIDS
(ME)

Maximum Marks: 70 Date:27.07.2024 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 lateral strain, longitudinal strain and poisons ratio.	1	L1
2	Explain the following terms(i) strain energy (ii) proof resilience	1	L1
3	Draw the shear stress diagram for I- section	2	L1
4	Define principal stresses and planes	2	L1
5	What are the assumptions in pure bending?	3	L1
6	What is section the modulus for rectangular section?	3	L1
7	What are the axial stresses and compound stresses?	4	L1
8	What is maximum principal stress theory?	4	L1
9	What is polar modulus?	5	L1
10	What is hoop-stress and volumetric strain in shells	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	Draw stress-strain curve for ductile material and silent futures. [10]	1	L2
	OR		
12	An axial pull of 40000Nis acting on a bar consisting of three sections of length 30 cm,25cm and 20cm and diameters 2cm,4cm and 5cm respectively.If the young's modulus=$2x10^5$ N/mm^2,determine (i) stress in each section and (ii) total extension of the bar. [10]	1	L2
13	 [10]	2	L2
	OR		
14	Draw SFD and BMD of the following beam shown in figure. [10]	2	L2

			
15	Derive the equation M/I = f/y = E/R. [10]	3	L2
	OR		
16	Distribution of shearing stress over rectangular section ? [10]	3	L2
17	A steel tube of 10 mm. bore with a wall thickness of 1 mm is 1 m. long is full of mercury in the tube. It is placed horizontally and supported at the ends. If the density of steel and mercury is 7.5 and 13.6, find the maximum stress in the tube. [10]	4	L2
	OR		
18	Draw "Mohr's stress circle" for principal stresses of 80 N/mm^2 tensile and 40 N/mm^2 compressive and find the resultant stresses on planes making 25^0 and 60^0 with the major principal plane. Find also normal and tangential stresses on these planes? [10]	4	L2
19	Derive the relation for a circular shaft when subjected to torsion as given below $T/J=\tau/R=C\Theta/L$. [10]	5	L2
	OR		
20	A thin cylindrical shell of 0.6m diameter and 0.9 m long is subjected to an internal pressure $1.2N/mm^2$. Thickness of cylinder wall is 15mm. Determine change in diameter, length and volume. Take E=200GPa and poisson's ratio=0.3. [10]	5	L2