



R18 Regulation

Subject code: 2P3AC

**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:23.07.2024 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	State Hooke's law.	1	L1
2	Define stress.	1	L1
3	What are the different types of beams?	2	L1
4	Name the various types of load.	2	L1
5	State the assumptions while deriving the general formula for shear stresses.	3	L1
6	What is meant by simple bending?	3	L1
7	What do you mean by flexural rigidity?	4	L1
8	Define the term slope.	4	L1
9	List the methods to find the stresses in oblique plane?	5	L1
10	Give the necessary condition for a pure state of shear.	5	L1

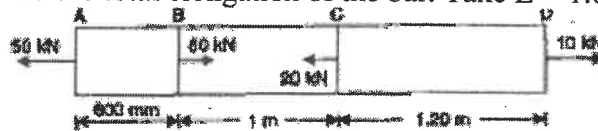
**Part-B**

Answer All the following questions. (5X10M=50Marks)

11 Explain in detail about the stress strain curve of a mild steel material [10M] 1 L2

OR

12 A brass bar, having cross sectional area of 1000 mm<sup>2</sup>, is subjected to axial forces as shown in figure. Find the total elongation of the bar. Take E = 1.05 x 10<sup>5</sup> N/mm<sup>2</sup>. 1 L2



[10M]

13 A cantilever beam of length 4m carries point loads of 1kN, 2kN and 3kN at 1, 2 and 4m from the fixed end. Draw the S.F and B.M diagrams for the cantilever. [10M] 2 L2

OR

14 A simply supported beam of length 8m carries point loads of 4kN and 6kN at a distance of 2m and 4m from the left end. Draw the S.F and B.M diagrams for the beam. [10M] 2 L2

15 Explain the theory of simple bending and write the assumptions. [10M] 3 L2

	OR		
16	Draw and explain the shear stress distribution across Rectangular, Circular and I beam sections. [10M]	3	L2
17	A beam of length 6m is simply supported at its ends and carries two point loads of 48kN and 40kN at a distance of 1m and 3m respectively from the left support. Find the deflection under each load, maximum deflection and the point at which the maximum deflection occurs. Take $E = 2 \times 10^5 \text{N/mm}^2$ and $I = 85 \times 10^6 \text{mm}^4$ [10M]	4	L2
	OR		
18	A beam ABC of length 9m has one support to the left end and the other support at a distance of 6m from the left end. The beam carries a point load of 12 kN at the right end and also carries a uniformly distributed load of 4kN/m over a length of 3m as shown in the figure. Determine slope and deflection at point C. $E = 2 \times 10^5 \text{N/mm}^2$ and $I = 5 \times 10^8 \text{mm}^4$ . Use moment–area method. [10M]	4	L2
19	The stresses at a point in a bar are $200\text{N/mm}^2$ (tensile) and $100\text{N/mm}^2$ (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at $60^\circ$ to the axis of major stress. Also determine the maximum intensity of shear stress in the material at that point. [10M]	5	L2
	OR		
20	Explain various theories of failures. [10M]	5	L2