R18 Regulation *Subject code:2P3AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, June 2026

STRENGTH OF MATERIALS-I

(CE)

Maximum Marks: 70 Date:16.06.2026 Duration: 3 hours

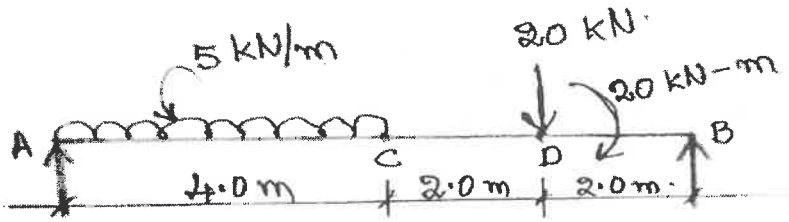
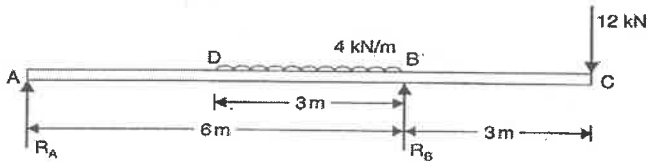
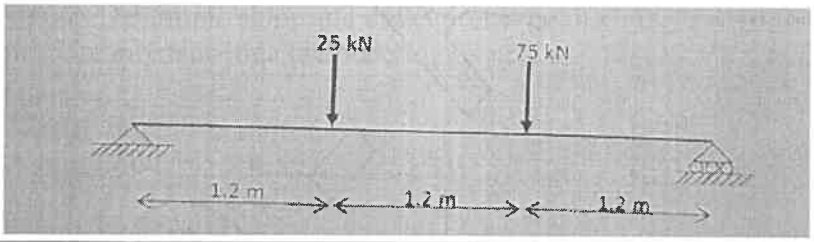
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	State Hooke's law.	2M	1	L1
2	Define stress.	2M	1	L1
3	What are the different types of beams?	2M	2	L1
4	Name the various types of load.	2M	2	L1
5	Define shear stress.	2M	3	L1
6	Write down the bending moment equation.	2M	3	L1
7	What do you mean by flexural rigidity?	2M	4	L1
8	Define the term slope.	2M	4	L1
9	What is meant by principal plane?	2M	5	L1
10	What do you mean by state of stress?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Discuss about the stress strain curve of a mild steel material.	10M	1	L2
	OR			
12	A compound tube consists of a steel tube 140mm internal diameter and 160mm external diameter and an outer brass tube 160mm internal diameter and 180mm external diameter. The two tubes are of the same length. The compound tube carries an axial load of 900kN. Find the stresses and the load carried by each tube and the amount it shortens. Length of each tube is 140mm. Take E for steel as $2x10^5 N/mm^2$ and for brass as $1x10^5 N/mm^2$.	10M	1	L2
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	Sketch the BMD and SFD for the simply supported beam shown in the following figure.	10M	2	L2

				
15	a) Write down the assumptions made in the theory of simple bending. b) Derive the flexure equation $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$.	5M 5M	3	L2
	OR			
16	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 x 10^5 N/mm^2 and I = 5 x 10^8 mm^4. Use moment–area method. 	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 x 10^5N/mm^2 and I = 85 x 10^6 mm^4.	10M	4	L2
	OR			
18	A simply supported beam is loaded as shown in the figure below. Find: a). the slope at the supports and b). the deflection at the point of action of loads and at the mid-span. Use Conjugate-beam method. 	10M	4	L2
19	The state of stress at a point in a loaded member is shown in the figure below. Using the Mohr's circle of stresses, determine: a). The plane of action and the magnitude of the principal stresses. b). The maximum shear stress and its plane of action. c). The stresses acting on a plane making 30^0 in clockwise direction with respect to X-axis.	10M	5	L2

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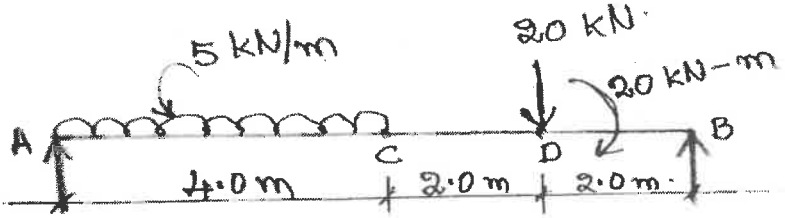
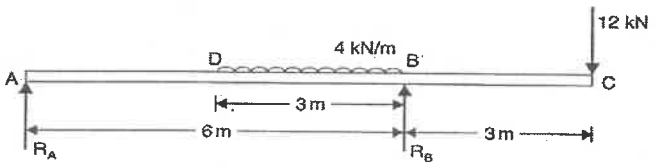
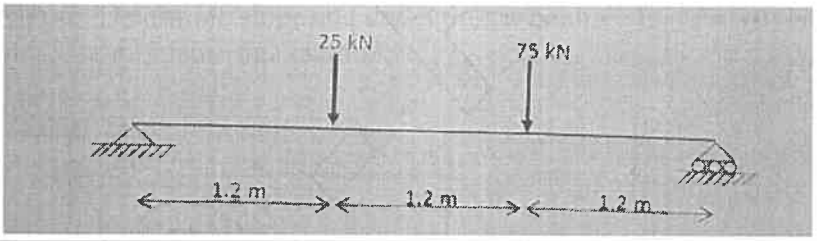
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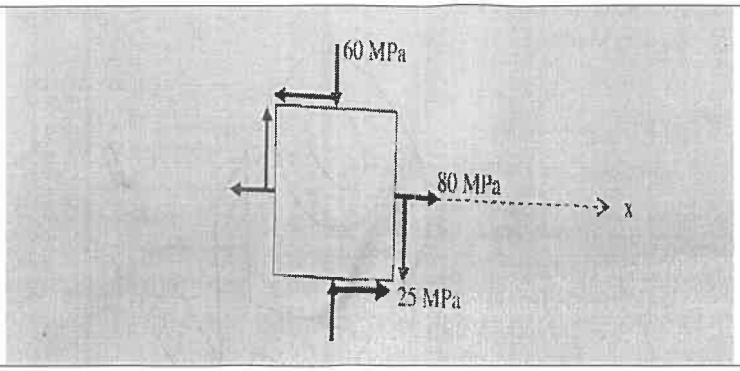
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	OR			
20	Draw the Mohr's circle for the state of pure shear.	10M	5	L2