TED (21) -3021
(Revision- 2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE – APRIL - 2024

STRENGTH OF MATERIALS

[Maximum Marks : 75] [Time : 3 hours]

PART–A

I. Answer **all** the following questions in one word or sentence. Each question carries 1 mark.

(9x1=9 marks)

		Module Outcome	Cognitive level
1	The resistance force per unit area to deformation is called…….	M1.01	R
2	The ratio of lateral strain to linear strain is……	M1.02	R
3	A horizontal structural member that is subjected to a load that tends to bend it is called…….	M2.01	R
4	Beam which is fixed from one end and free at the other end is……	M2.01	U
5	The layer which is neither compressed nor stretched in a beam subjected to bending moment is…….	M3.01	U
6	The load, at which the column just buckles is called…….	M3.05	U
7	Every cross-section of a power transmitting shaft is subjected to ……stress.	M4.01	U
8	The ratio of mean coil diameter to diameter of spring wire is…….	M4.02	U
9	An example of thin cylinder is…….	M4.03	R

PART B

II. Answer **any Eight** questions from the following. Each question carries 3 marks.

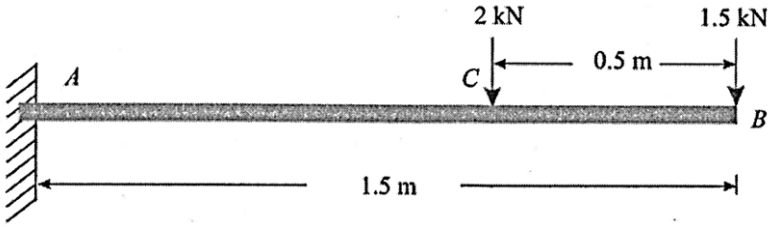
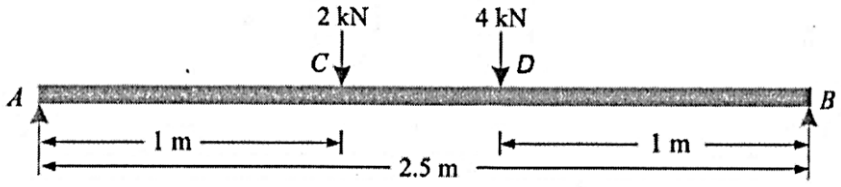
(8x3=24 marks)

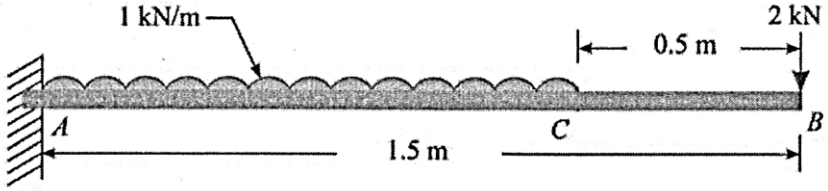
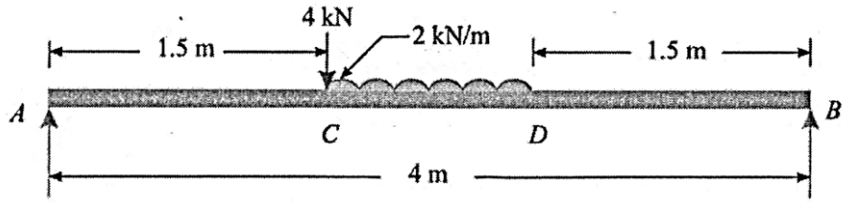
		Module Outcome	Cognitive level
1	Describe the properties (a) Brittleness, (b) Stiffness (c) Toughness	M1.01	R
2	Explain Hooke's law and modulus of elasticity.	M1.02	U
3	Describe shear force.	M2.02	R
4	Explain cantilever beam and fixed beam with diagram.	M2.01	U
5	Explain Euler's formula for column and terms.	M3.05	U
6	Explain the assumptions in the theory of simple bending.	M3.02	U
7	Describe the types of helical springs.	M4.02	R
8	Explain the failure of thin cylindrical shell due to internal pressure.	M4.03	U
9	Describe the types of loads.	M2.01	U
10	Explain volumetric strain and bulk modulus.	M1.02	U

PART C

Answer **all** questions from the following. Each question carries 7 marks.

(6x7=42marks)

		Module Outcome	Cognitive level
III	Draw the stress strain diagram of mild steel under tension and mark salient points and explain.	M1.02	U
	OR		
IV	A hollow cylinder 2 m long has an outside diameter of 50 mm and inside diameter of 30 mm. If the cylinder is carrying a load of 25 kN, find the stress in the cylinder. Also find the deformation of the cylinder, if the value of modulus of elasticity for the cylinder material is 100 GPa.	M1.05	A
V	Draw shear force and bending moment diagrams for a cantilever beam of span 1.5 m carrying point loads as shown below. 	M2.03	U
	OR		
VI	A simply supported beam AB of span 2.5 m is carrying two point loads as show below. Draw shear force and bending moment diagram for the beam. 	M2.03	U
VII	A steel rod 5 m long and 40 mm diameter is used as a column, with one end fixed and the other end free. Determine crippling load by Euler's formula. Take E as 200 GPa.	M3.05	A
	OR		
VIII	A simply supported beam of span 3 m is subjected to a central load of 10 kN. Find the maximum slope and deflection of the beam. Take I = 12 x 10^6 mm^4 and E = 200 GPa.	M3.04	U
IX	A circular shaft of 50 mm diameter is required to transmit torque from one shaft to another. Find the safe torque, which the shaft can transmit, if the shear stress is not to exceed 40 MPa.	M4.01	U
	OR		
X	A close coiled helical spring is required to carry a load of 150 N. If the mean coil diameter is to be 8 times that of the wire, calculate these diameters. Take maximum shear stress as 100 MPa.	M4.02	U

XI	A cantilever beam of 1.5 m span is loaded as shown below. Draw the shear force and bending moment diagram.  	M2.03	U
	OR		
XII	A simply supported beam of 4 m span is carrying load as shown below. Draw shear force and bending moment diagram.  	M2.03	U
XIII	A circular shaft of 60 mm diameter is running at 150 rpm. If the shear stress not to exceed 50 MPa, find the power which can be transmitted by the shaft.	M4.01	U
	OR		
XIV	A steam boiler of 800 mm diameter is made up of 10 mm thick plates. If the boiler is subjected to an internal pressure of 2.5 MPa, find the circumferential and longitudinal stresses induced in the boiler plates.	M4.03	U

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