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KAMALA INSTITUTE OF TECHNOLOGY & SCIENCE, SINGAPUR
23ME28PC302

II.B. Tech. I. Semester Supplementary Examinations, June- 2025

MECHANICS OF SOLIDS

(ME)

Time: 3 Hours

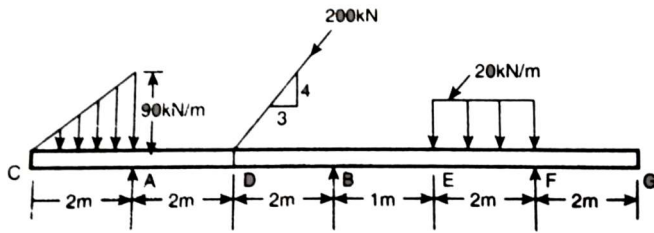
Max. Marks: 60

Note: Question paper consists of Part-A & Part-B.

i) **Part-A** for 10M, ii) **Part-B** for 50marks

- **Part A** is compulsory, consists of 10 sub questions from all units carrying equal marks.
- **Part-B** consists of **10 questions** (numbered from 2 to 11) carrying **10marks** each. From each unit there are 2 questions and the students should answer one of them. Hence the student should answer **5 questions** from **Part-B**.

PART-A		(10Marks)	
Q. No	Questions	Marks	BTL
1.a)	Define the term shear strain	1	2
1.b)	Define Poisson's ratio	1	2
1.c)	Distinguish between roller support and the hinged support.	1	2
1.d)	Define point of contra flexure.	1	2
1.e)	Define section modulus	1	2
1.f)	Define Pure Bending	1	2
1.g)	Explain the terms principal stresses	1	2
1.h)	What are the axial stresses and compound stresses?	1	2
1.i)	List the any two assumptions made in the analysis of thin cylinders.	1	2
1.j)	Define Polar Section Modulus	1	2
PART-B		(50Marks)	
Q.No.	Questions	Marks	BTL
2. a)	Draw stress-strain curve for Ductile and brittle materials.	5M	2
b)	A straight bar 500mm long is 25 mm diameter for 400 mm length and 20 mm diameter for the remaining length. If the bar is subjected to an axial pull of 25 KN, find the extension of the bar. Take E = 200 Gpa.	5M	3
OR			
3.	A bar of 35mm diameter is subjected to a pull of 45KN. The measured extension on gauge length of 250 mm is 0.09 mm and the change in diameter is 0.029mm. Calculate the value of Poisson's ratio and the three moduli.	10M	3
4.	A beam of length 12 m has overhanging of 3 m on left and right leaving the span between the supports of 6 m. It carries UDL of 8 KN/m over the entire length and a concentrated load of 10 KN at the right extreme end. Draw SF and BM diagrams and find the point of contra flexure point.	10M	3
OR			

5.	Construct the axial thrust, shear force and bending moment diagrams for the beam loaded as shown in figure	10M	3
			
6.	A beam AB supported at its ends has a span of 4 m carries a uniformly distributed load of 200 KN/m over the entire span. The cross section of the beam is a T-section, having flange width 125 mm, flange thickness 25 mm, web thickness 25 mm and overall depth 200 mm. Calculate the maximum shear stress in the beam. Also draw the shear stress distribution marking principal values.	10M	3
OR			
7. a)	How to find neutral axis of a beam and explain its importance?	5M	2
b)	A cantilever beam of cross-section 90 mm. width 120 mm deep carries a UDL of 12 KN/m. over the entire length and a concentrated load of 15 KN at the right end. Find the bending stress in the beam, when the length of beam is 10 m	5M	3
8.	Obtain an expression for the major and minor principal stresses on a plane, when the body is subjected to direct stresses in two mutually perpendicular directions accompanied by a shear stress.	10 M	3
OR			
9.	Explain in detail Various theories of Failure	10 M	2
10.	A shell of 4 m. long, 1 m. diameter is subjected to an internal pressure of 1 N/mm ² . If the thickness of shell is 10 mm; find the circumferential and longitudinal stresses. Take E = 200 Gpa. and poisson's ratio = 0.3.	10 M	3
OR			
11.	Explain Euler's Theory, Limitations of Euler's theory	10 M	3

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