

G. S. Mandal's  
 Maharashtra Institute of Technology, Aurangabad  
 (An Autonomous Institute)  
 END SEMESTER EXAMINATION  
First Year M.Tech(ME) -April/May 2022

Course Code : MTM102

Course Name : Machine Stress Analysis

Duration : 2 Hrs

Max. Marks : 50

Date : 07/04/2022

**Instructions :**

- i) All questions are compulsory
- ii) Assume suitable data wherever necessary and clearly state it
- iii) Figures to the right indicate full marks

Q. 1 Solve/Answer any five (Marks: 10)

Questions	Marks	CO	BL
a) Explain the true stress and true strain in brief.	2	1	2
b) State Castigliano's first and second theorem of strain deflection.	2	2	1
c) Explain kelvin fluid flow analogy.	2	3	2
d) Enlist the different optical and electrical strain gauges with its applications.	2	4	1
e) Write the shear centre equation for channel section.	2	5	1
f) State the expression for deflection of body in point contact.	2	6	1

Q. 2 Figure 1 shows simply supported beam of span L with rectangular load, starting from zero at one end and increasing to  $wL$  at another end. Find central deflection.

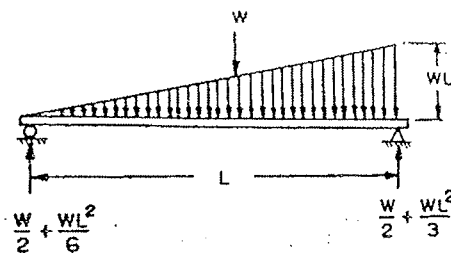


Fig. 1

Q. 3 Determine the angular displacement and shearing stress in a thin walled tube of diameter  $D$  rolled from a G.I. sheet thickness  $\delta$ , if

- a) The edge of the sheet are free.
- b) The edge of the sheet are riveted.

In above example if a rivet pitch of 5 cm is used and  $D = 10$  cm,  $\delta = 2$  mm,  $T = 10$  kg-m, find the shear force on each rivet and the suitable diameter of the rivets, if permissible shear stress in rivets is  $785 \text{ kg/cm}^2$ .

Q. 4	Differentiate self-temperature compensation and compensating dummy gauge	8	4	3
	(OR)			
Q. 4	What are the methods are available for computing the strain rosette data's?	8	4	3
Q. 5	Derive the equation of Shear centre for channel section.	8	5	4
Q. 6	Derive expression for deflection of bodies in point contact	8	6	4
	(OR)			
Q. 6	Explain in brief method of computing contact stresses.	8	6	3