

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**School of University Polytechnic**

Diploma in Mechanical Engineering

Mid Term Examination - May 2024

Duration : 90 Minutes

Max Marks : 50

**Sem IV - N1DL403B - Mechanics of Solid**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Discuss about thermal stresses. K2 (2)
- 2) Define poisson ratio. K1 (3)
- 3) Discuss the relationship between Elastic Constants. K2 (4)
- 4) Differentiate Elasticity and plasticity. K2 (6)
- 5) Obtain the relation of longitudinal and hoop stress for thin cylinder. K3 (6)
- 6) A body is subjected to direct stresses in two mutually perpendicular directions accompanied by a simple shear stress. Draw the Mohr's circle of stresses and explain how you will obtain the principal stresses and principal planes. K3 (9)
- 7) An alloy bar of 1m length has a square section throughout which tapers from one end of 10mmx10mm to other end of 20x20mm. Find the change in length due to an axial load of 30kN. Take  $E=120\text{GPa}$ . K4 (8)
- 8) A thin spherical shell 1.5 m diameter, with its wall of 1.25 cm thickness is filled with the fluid at atmospheric pressure. What intensity of pressure will be developed in it if 160 cm<sup>3</sup> more fluid is pumped into it? Also calculate the hoop stress at that pressure and increase in diameter. Take:  $E= 200 \text{ GN/m}^2$  ;  $m=10/3$  K4 (12)

**OR**

A simply supported beam of span length 6m and 75mm diameter carries a uniformly distributed load of 1.5 kN/m. Compute the maximum value of bending moment. K4 (12)