

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV EXAMINATION – SUMMER 2025****Subject Code:3142108****Date:08-05-2025****Subject Name:Mechanical Properties of Materials****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Draw stress strain diagram for ductile materials	03
	(b) Define 1. Ductility 2. Elasticity 3. Plasticity 4. Maleability	04
	(c) State the important details revealed from stress strain diagram of ductile materials.	07
Q.2	(a) State the application of Mohr's circle	03
	(b) write in brief about Tresca yield criteria.	04
	(c) Draw $\begin{bmatrix} 2 & 2 & -1 \end{bmatrix}$ $\begin{bmatrix} 1 & -1 & 2 \end{bmatrix}$, $\begin{bmatrix} 1 & 0 & 3 \end{bmatrix}$ $\begin{bmatrix} -1 & 3 & -2 \end{bmatrix}$	07
	OR	
	(c) List different strengthening mechanism and discuss in detail about any two mechanism	07
Q.3	(a) Distinguish between slip and twin mechanism of plastic deformation of metals.	03
	(b) Differentiate between Edge dislocation and screw dislocation	04
	(c) Explain Critical Resolved shear stress and its dependence on temperature.	07
	OR	
Q.3	(a) Justify-FCC crystal metals are more ductile.	03
	(b) Define 1.creep.2 fatigue. 3 Wear 4 hardness	04
	(c) Explain dislocation density and its effect on various mechanical properties.	07
Q.4	(a) Distinguish between shear stress and Critical resolved shear stress.	03
	(b) what recovery and recrystallization?	04
	(c) Explain mechanical twins and give reasons HCP metals deform by twinning.	07
Q.4	(a) Justify the statement -Whatever may be applied stress, slip always occur by shear stress.	03
	(b) Justify-Tungsten filaments used in electric bulbs are single crystal.	04
	(c) Explain slip by dislocation movement.	07
	OR	
Q.5	(a) what is creep? State the importance of creep resistance in engineering materials	03
	(b) Describe the procedure of Brinell hardness testing.	04
	(c) Describe the mechanism of ductile fracture in materials.	07
	OR	
Q.5	(a) Justify-Fatigue failure are intergranular.	03
	(b) Draw S.N Curve. what information are revealed from S.N.Curve?	04
	(c) Explain thermal fatigue with help of example	07
