

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:2162508****Date:26/11/2021****Subject Name: Metal Forming Technology****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) Explain elastic and plastic deformation of metal with suitable example.	03
	(b) Explain the concept of strain hardening and its effect on the mechanical properties of the material.	04
	(c) Differentiate between cold working and hot working of metals stating advantages and disadvantages.	07
Q.2	(a) Explain the need for annealing/stress relieving after cold working of steels.	03
	(b) Define following terms in context of rolling process: <ol style="list-style-type: none"> 1) backward slip, 2) forward slip, 3) angle of bite, 4) roll separating force. 	04
	(c) Explain two-high, three-high & four-high rolling mills with a neat sketch.	07
	OR	
(c) Explain various yield criteria in metal forming process and highlight their significance.	07	
Q.3	(a) Write a short note on swaging.	03
	(b) Discuss advantages and limitations of electro-hydraulic forming process.	04
	(c) List forging defects. Explain any two forging defects with their causes and remedies.	07
OR		
Q.3	(a) Describe the piercing method of making seamless tubes.	03
	(b) Explain any two rolling defects with their causes and remedies.	04
	(c) What is the importance of preform design in forging? Write general rules for close die design.	07
Q.4	(a) Name at least six components that are manufactured by extrusion processes.	03
	(b) Differentiate between slip and twinning mechanisms of plastic deformation.	04
	(c) Differentiate forward and backward extrusion with a neat sketch.	07
OR		
Q.4	(a) Classify extrusion with respect to different variables.	03
	(b) Explain drawing ratio and reduction.	04
	(c) What is the role of back tension and front tension in rolling? Explain with figure.	07

- Q.5** (a) Define drawability and explain the factors affecting the same. **03**
(b) Write short notes on: **04**
 1) Curling,
 2) Metal Spinning.
(c) Explain deep drawing process with neat sketch and mention the formula to calculate the max punch force required for operation. **07**

OR

- Q.5** (a) Explain springback and explain how the force required for bending is calculated. **03**
(b) Write short notes on: **04**
 1) Ironing,
 2) Spinning.
(c) Explain high-energy rate forming and high velocity forming processes. **07**
