

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3162512

Date:22-05-2024

Subject Name:Advance Metal Forming

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) Define: (i) Hot Forming, (ii) Strain Rate Sensitivity and (iii) Warm forming	03
	(b) Briefly explain the ductile material behavior in plastic region with neat sketch.	04
	(c) Give classification of forming processes and write advantages of metal forming processes.	07
Q.2	(a) Draw various components of stresses on an inclined plane with usual notations.	03
	(b) Briefly explain Mohr's circle for two-dimensional stress analysis with neat sketches.	04
	(c) Draw the graphical representation of yield criteria and briefly explain Tresca's and Von-mises' yield criteria.	07
	OR	
	(c) Explain isotropic and kinematic work-hardening with suitable examples.	07
Q.3	(a) Define: (i) Blanking, (ii) Springback and (iii) drawability with respect to sheet metal forming.	03
	(b) Write short note on: stretch and draw ratios in stamping.	04
	(c) Explain slip-line field theory used to solve the metal forming problems with neat sketches.	07
	OR	
Q.3	(a) Briefly explain the concept of anisotropy in sheet metal.	03
	(b) Write short note on: Forming limit diagram.	04
	(c) Briefly explain various formability tests to evaluate formability of sheet metals.	07
Q.4	(a) Explain plane strain condition used for metal forming analysis.	03
	(b) Give classification of forging machines.	04
	(c) Explain the analysis of compression of circular disc with slab method with neat sketches.	07
	OR	
Q.4	(a) Explain direct and indirect extrusion process with neat sketches.	03
	(b) Briefly explain the metal flow in forging process.	04
	(c) Explain the upper bound method for calculation of extrusion load with neat sketches.	07
Q.5	(a) Explain friction stir welding of sheets with neat sketches.	03
	(b) Explain defects in extrusion process.	04
	(c) Derive the equation for roll separating force in rolling process using the slab method.	07

OR

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| Q.5 | (a) Explain the hydroforming process with neat sketches. | 03 |
| | (b) Write applications and advantages of tailor welded blanks. | 04 |
| | (c) Give classification of rolling processes and explain rolling defects with neat sketches. | 07 |
