Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3171921 Date:20-01-2023

Subject Name:Metal forming analysis

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.**

Q.1	**(a)**	What do you understand by spring back in press working?	**03**
	(b)	How is contact length affected by elastic deformation of rolls?	**04**
	(c)	Briefly explain Forming limit curve with a neat sketch.	**07**
Q.2	**(a)**	Draw different types of rolling mills used in rolling process.	**03**
	(b)	Discuss various rolling defects.	**04**
	(c)	Explain two dimensional Mohr's circle method for stress analysis.	**07**
		OR	
	(c)	What do you understand by anisotropy of sheet metal? How do you measure it?	**07**
Q.3	**(a)**	Explain compound and progressive dies.	**03**
	(b)	Sketch a cross section of a tungsten carbide wire drawing die and show its different portion and their geometry.	**04**
	(c)	Derive the formula for Rolling Load using Slab Method with usual notations.	**07**
		OR	
Q.3	**(a)**	Define following terms in rolling process (1) Absolute draught (2) Absolute spread(3) Absolute elongation.	**03**
	(b)	Define nesting and explain why it is used in sheet metal operation.	**04**
	(c)	State and prove Hencky's First theorem.	**07**
Q.4	**(a)**	Draw flow curves for 1) rigid- ideal plastic 2) rigid plastic 3) elastic plastic.	**03**
	(b)	How is impression die forging different from closed die forging?	**04**
	(c)	Determine the forging load at the start and completion of hot forging of a steel billet for the following data, Billet size Length =1.6 m Width = 0.6 m Thickness = 0.2 m Too bite =0.3 m Yield stress = 48 MPa at start = 140 MPa at completion of forging Reduction in forging = 50 %	**07**
		OR	
Q.4	**(a)**	Describe the method to determine blank size to manufacturing a cup.	**03**
	(b)	Discuss stress and strain in bending.	**04**
	(c)	What do you understand by shear on punch and die? Discuss the relative advantages of providing shear on punch and die.	**07**
Q.5	**(a)**	Define (i) dry drawing (ii) wet drawing (iii) tube drawing.	**03**
	(b)	Differentiate direct and indirect extrusion	**04**
	(c)	Explain Isotropic and Kinematic work hardening with neat sketches	**07**

OR

Q.5	**(a)**	What are slip lines?	**03**
	(b)	Why friction measurement is necessary in forming process?	**04**
	(c)	Explain upset forging process with neat sketch	**07**

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