GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER- VII EXAMINATION-SUMMER 2023
Subject Code: 2171913   **Date: 27/06/2023**
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.

			MARKS
Q.1	**(a)**	State general advantages of metal forming processes	**03**
	(b)	State difference between hot forming and cold forming process.	**04**
	(c)	Explain friction board drop hammer forging process.	**07**
Q.2	**(a)**	Why lubricants use in extrusion process?	**03**
	(b)	How do you explain strain hardening effect?	**04**
	(c)	Explain two-dimensional Mohr's circle for stress Analysis	**07**
		OR	
	(c)	Prove Hencky's first theorem for slip lines with usual notations.	**07**
Q.3	**(a)**	A steel plate 20 mm thick is to be rolled to 14 mm in a four high mill having roll diameter 480 mm. determine Angle of bite and coefficient of friction.	**03**
	(b)	Sate difference between direct and indirect extrusion process.	**04**
	(c)	What is pilot? Sketch and describe various types of pilots.	**07**
		OR	
Q.3	**(a)**	Explain ironing process.	**03**
	(b)	Define angle of bite in rolling mill and also discuss its effect on rolling process.	**04**
	(c)	Derive the formula of rolling load using slab method with usual notations.	**07**
Q.4	**(a)**	Define (1) Absolute draught (2) relative draught (3) Absolute spread in rolling process.	**03**
	(b)	Define rolling process and also explain various rolling mill use in rolling process.	**04**
	(c)	What is shear on punch and die? Explain the relative advantages of providing shear on punch and die.	**07**
		OR	
Q.4	**(a)**	What is drawability? Also list factors affecting to drawability.	**03**
	(b)	A steel washer of 36 mm outer diameter and 20 mm inside diameter is to be made from 1.2 mm thick sheet in one operation. If shear stress is 400 N/mm2 and percentage penetration is 20 % determine. (1) Maximum punch force necessary to blank and punch the washer if both punches operate at the same time. (2) Percentage reduction in punch force if 0.5 mm double shear ground on a tool.	**04**
	(c)	Explain impression die forging with neat sketch.	**07**
Q.5	**(a)**	What do you understand by spring back effect in bending process.	**03**
	(b)	Define (1) Maximum force (2) Maximum stroke length (3) Shut height (4) Bolster plate.	**04**

(c) Explain deep drawing process and forces in circular cup drawing with neat sketch. **07**

OR

Q.5 (a) Define (1) Perforating (2) Notching (3) slitting in press. **03**
(b) Discuss forming limit diagram with neat sketch. **04**
(c) Explain with neat sketch construction and working of progressive die. **07**

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