Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER – II • EXAMINATION – SUMMER 2017

Subject Code: 1722801 **Date:09/05/2017**

Subject Name: Mechanics of 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.**

Q.1	**(a)**	Explain the need of metal forming in manufacturing? State the various metals forming theory.	**07**
	(b)	Explain plastic stress strain relation according to prantl-reuss and levy-von-mises relations.	**07**
Q.2	**(a)**	Explain the concept of constitute relationship. State the general form of a constitutive equation and explain the importance of it.	**07**
	(b)	What is work hardening? How does it affect the mechanical properties?	**07**
		OR	
	(b)	Explain about Instability in Tension.	**07**
Q.3	**(a)**	Define Plane Strain. Show the relationship between α and β slip lines.	**07**
	(b)	Explain the concept of Super Plasticity.	**07**
		OR	
Q.3	**(a)**	Explain 3-dimensional Mohr's Stress Circle. How does Mohr's circle help in analysis of metal forming?	**07**
	(b)	Compare engineering strain and true strain.	**07**
Q.4	**(a)**	What is Formability? Give their testing method with neat sketches.	**07**
	(b)	Explain about Hills Anisotropic Plasticity Theory.	**07**
		OR	
Q.4	**(a)**	Prove $P = 2K - \sigma x$, by Slab Analysis for Sheet Drawing. Write the assumptions.	**07**
	(b)	Explain the pneumatic sheet bending process and their analysis.	**07**
Q.5	**(a)**	What is Baushinger effect? Explain localized necking in biaxial stretching.	**07**
	(b)	Explain the CAD/CAM applications in Extrusion, Forging and sheet metal Forming with suitable industrial product.	**07**
		OR	
Q.5	**(a)**	Explain the importance of upper bound & lower bound theory in forging.	**07**
	(b)	Describe basics of sheet metal forming. Explain Bending and Cold rolling theories in detail considering their criticalness in manufacturing.	**07**