Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 1722801 **Date: 02-12-2014**

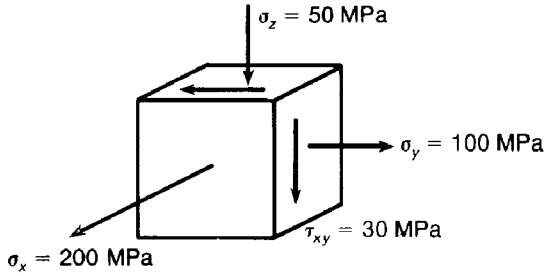
Subject Name: Mechanics of Metal Forming

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full mark.**

Q.1	**(a)**	Explain different characteristics of engineering strain and true strain.	**07**
	(b)	What is super plasticity & Strain rate?	**07**
Q.2	**(a)**	Explain importance of metal forming in manufacturing? State the names of various metal forming theory.	**07**
	(b)	Discuss about von-mises yield condition.	**07**
		OR	
	(b)	Stress analysis of a space craft structural member gives the state of stress shown below. If the part is made from 7075-T6 aluminum alloy with yield strength $\mathring{u}_0$ = 500 MPa, will it exhibit yielding? If not, what is the safety factor?	**07**



Q.3	**(a)**	Derive the relationship between yield strength in Shear and Yield strength in tension according to Trescaôs hypothesis.	**07**
	(b)	Explain in detail about Strain Hardening effect.	**07**
		OR	
Q.3	**(a)**	What is the importance of Mohrôs circle in analysis of metal forming?	**07**
	(b)	Explain about Instability in Tension.	**07**
Q.4	**(a)**	Explain in detail about Baushinger effect.	**07**
	(b)	Explain about importance of Upper bound and Lower bound theorem in forging.	**07**
		OR	
Q.4	**(a)**	Prove P=2K- $\mathring{u}_x$, By Slab Analysis for Sheet Drawing. Write the assumptions.	**07**
	(b)	Define Incremental Plastic Strain	**07**
Q.5	**(a)**	List out CAD/CAM application in Extrusion, Forging and Sheet Metal Forming.	**07**
	(b)	What is the important of Bulge Test? Explain it.	**07**
		OR	
Q.5	**(a)**	Explain about Hills Anisotropic Plasticity Theory.	**07**
	(b)	Discuss various extrusion processes with applications.	**07**

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