Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2722801 **Date: 18/11/ 2016**

Subject Name: Mechanics of Metal Forming

Time: 2:30 pm to 5:00 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)	State the fundamental conditions for stress - strain relations in plastic deformation. Explain the normality rule related to plastic stress strain relation.	07
	(b)	Explain plastic stress strain relation according to prantl-reuss and levy-von-mises relations.	07
Q.2	(a)	Derive the relationship between yield strength in shear and yield strength in tension according to Von-Mises hypothesis.	07
	(b)	Give out the graphical 3 dimensional representation of yield criteria.	07
		OR	
	(b)	Derive the relationship between yield strength in shear and yield strength in tension according to Tresca's hypothesis.	07
Q.3	(a)	Explain the concept of constitute relationship. State the general form of a constitutive equation and explain the importance of it.	07
	(b)	Write down the Hancky Equation for variation of hydrostatic pressure. Explain the use of Hancky Equations with example.	07
		OR	
Q.3	(a)	What is Upper and lower bound theorem for a manufacturing process? Explain it in detail for Forging process.	07
	(b)	Discuss strain rate & its effects in slab analysis for sheet drawing.	07
Q.4	(a)	Explain bending in sheet metal forming. Show the various stresses in bending process.	07
	(b)	Prove $P=2K-\sigma x$, By Slab Analysis for Sheet Drawing.	07
		OR	
Q.4	(a)	What is Hill's anisotropic plasticity theory?	07
	(b)	What do you mean by plastic instability in tension test?	07
Q.5	(a)	How does Mohr's circle help in analysis of metal forming?	07
	(b)	Explain about Hills Anisotropic Plasticity Theory.	07
		OR	
Q.5	(a)	Explain various extrusion processes.	07
	(b)	Explain the importance of CAD/CAM application in extrusion, forging operations.	07

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