Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2171913 **Date: 15/11/2018**

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.**

Q.1	**(a)**	Explain briefly Two Dimensional Mohr's stress circles.	**03**
	(b)	Give Classification of Metal Forming Processes and Explain any one in details.	**04**
	(c)	The stress state at a point is given by $T=\begin{pmatrix}5 & 3 & 2\\ 3 & 10 & 4\\ 2 & 4 & 6\end{pmatrix}$ Determine the normal and shear stress components on a plane which is equally inclined to the three axes. The stresses are in N/mm^2	**07**
Q.2	**(a)**	Define (i) Strain hardening, (ii) Strain rate.	**03**
	(b)	Give classification of Rolling Mills.	**04**
	(c)	Prove Hencky's first theorem for Slip Lines with usual notations.	**07**
		OR	
	(c)	Briefly explain the 2-Dimensional Graphical representation of Von Mises' and Tresca's yield criteria for plastic deformation.	**07**
Q.3	**(a)**	Explain briefly various Rolling defects.	**03**
	(b)	Define angle of bite and discuss its effect in rolling process.	**04**
	(c)	Derive the formula for Rolling Load using Slab Method with usual notations.	**07**
		OR	
Q.3	**(a)**	Briefly explain metal flow in compression of circular disc between two flat dies.	**03**
	(b)	Differentiate open die forging and closed die forging.	**04**
	(c)	Derive the equation for rate of work done due to deformation for compression of a strip in plane strain considering the first term of Upper Bound Theorem.	**07**
Q.4	**(a)**	Explain clearance in sheet metal operation.	**03**
	(b)	Differentiate between punching and blanking.	**04**
	(c)	Explain the analysis of Strip Drawing process with usual notations.	**07**
		OR	
Q.4	**(a)**	Explain wet drawing and dry drawing.	**03**
	(b)	Describe hydrodynamic lubrication in wire drawing with neat sketches.	**04**
	(c)	Explain deep drawing process and forces in circular cup drawing with neat sketches.	**07**
Q.5	**(a)**	Differentiate direct and indirect extrusion process.	**03**
	(b)	Explain spring back effect in bending process with a neat sketch.	**04**
	(c)	Explain (i) Forming Limit diagram and, (ii) Anistrophy in sheet metal	**07**
		OR	
Q.5	**(a)**	Briefly explain Forming limit curve with a neat sketch.	**03**
	(b)	Differentiate Hot working and Cold working of metals.	**04**
	(c)	Explain various operations performed on sheet-metal press machine.	**07**

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