Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (New) EXAMINATION – WINTER 2015

Subject Code:2142106 **Date:19/12/2015**

Subject Name: Plastic Deformation of Metals

Time: 02:30pm to 05:00pm **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)**	Draw Engineering & True stress strain curves. Why they are different? Typically which curve is referred to? Explain why?	**07**
	(b)	Explain the method of construction of Mohr's circle	**07**
Q.2	**(a)**	Explain yield point phenomenon in detail with neat sketch.	**07**
	(b)	What is fundamental difference between edge and screw dislocation?	**07**
		OR	
	(b)	Define the following term: 1. Slip 2. Twin 3. Sessile dislocation 4. Glissile dislocation 5. Kinks 6. Jogs 7. Staking faults.	**07**
Q.3	**(a)**	What are the various techniques to observe Dislocations? Explain any one in detail.	**07**
	(b)	Define solid solution. Explain Hume Rothery rule for solubility of solute atoms.	**07**
		OR	
Q.3	**(a)**	Explain with neat schematic –critical resolved shear stress for Slip.	**07**
	(b)	What is the role of Grain boundary in Dislocations Motions?	**07**
Q.4	**(a)**	Explain “Precipitation Hardening” or “Strengthening due to second phase particles” in detail.	**07**
	(b)	Discuss about the different Crystal Imperfection in Solids.	**07**
		OR	
Q.4	**(a)**	Explain “Strain aging in detail with neat sketch”	**07**
	(b)	What do you mean by cold working of material? Briefly discuss the structural changes during cold working and suggest suitable heat treatment process to restore the artificial properties	**07**
Q.5	**(a)**	Explain “Ductile-Brittle Transition Temperature” (DBTT).	**07**
	(b)	Derive the Griffith equation for brittle fracture.	**07**
		OR	
Q.5	**(a)**	Explain various Creep deformation mechanisms.	**07**
	(b)	What do you mean by Fatigue Fracture? Explain “Fatigue Test with the Help of S-N Diagram.	**07**