Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2015

Subject Code: 2142106 **Date: 26/05/2015**

Subject Name: Plastic Deformation of Metals

Time: 10:30am-1.00pm **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)**	Explain briefly elastic and plastic deformation and Differentiate between plastic deformation by slip and twinning	**07**
	(b)	Draw Engineering & True stress strain curves. Why they are different? Typically which curve is referred to? Explain why?	**07**
Q.2	**(a)**	What is Yielding? Explain the Yield Criteria.	**07**
	(b)	Define Dislocation. What are sources of dislocations? Difference between edge & Screw dislocations	**07**
		OR	
	(b)	Explain the method of construction of Mohr's circle.	**07**
Q.3	**(a)**	Define the following: a) Slip b) Climb c) Jog d) Kink e) Dislocation f) Slip plane	**07**
	(b)	What are fundamental principles which govern the strengthening mechanism in metals and alloys?	**07**
		OR	
Q.3	**(a)**	Derive formula for critical resolved shear stress? Explain its importance in Plastic deformation.	**07**
	(b)	What is Hall-Petch Equation? Which relationship is explained between Strength & Microstructural feature?	**07**
Q.4	**(a)**	Explain the following with reference to dislocations: a Slip system b. Burger's vector c. Properties of dislocations	**07**
	(b)	Discuss about the different Crystal Imperfection in Solids.	**07**
		OR	
Q.4	**(a)**	What is Strain Hardening effect? What is the effect of it on the mechanical properties of steels?	**07**
	(b)	Explain about the Multiplication of dislocations-Frank Reed source	**07**
Q.5	**(a)**	Explain the Ductile & Brittle fracture behavior of metals & explain Ductile to Brittle Transition Phenomena.	**07**
	(b)	Explain the Griffith theory of brittle fracture.	**07**
		OR	
Q.5	**(a)**	Why Annealing is required after Cold working of Steels. Explain with suitable example.	**07**
	(b)	What is Equi-cohesive Temperature? Explain in respect of Creep Fractures.	**07**