Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 2130507 **Date:26/12/2014**

Subject Name: Material Science and Technology

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 marks.**

Q.1	**(a)**	Define 'space lattice' and discuss different types of unit cells with neat sketch.	**07**
	(b)	Classify crystalline solids based on type of bond and discuss any two.	**07**
Q.2	**(a)**	Discuss polymorphism and enantiotropy with suitable example.	**07**
	(b)	Cu has a FCC structure and atomic radius of 127.8 pm. Calculate the lattice constant of the unit cell and density. Atomic weight of Cu is 63. 546	**07**
		OR	
	(b)	Molybdenum has a BCC structure and a density of 10,200 kg/m^3.Calculate its atomic radius and packing factor. Atomic weight of Mo is 95.94.	**07**
Q.3	**(a)**	Discuss phase equilibrium diagram and cooling curves for Cu-Ni solid solution alloys.	**07**
	(b)	Give composition of carbon steel and discuss any two heat treatment of carbon steel in detail.	**07**
		OR	
Q.3	**(a)**	Name various defects observed in solids and discuss any one in detail.	**07**
	(b)	Discuss iron-carbon equilibrium diagram with neat sketch.	**07**
Q.4	**(a)**	What is dislocation ? Discuss briefly types of dislocation.	**07**
	(b)	Discuss time-temperature- transformations diagram for alloys.	**07**
		OR	
Q.4	**(a)**	Discuss plasticity and drying of clay products.	**07**
	(b)	What is refractory? Discuss silica-alumina phase equilibrium diagram in detail.	**07**
Q.5	**(a)**	What is composition of Portland cement? Discuss setting and hardening of Portland cement.	**07**
	(b)	Discuss in brief 'Nano catalysts'.	**07**
		OR	
Q.5	**(a)**	Write short note on recent development in Nano materials.	**07**
	(b)	Give composition of commercial glasses. Discuss types of glasses with their application.	**07**

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