Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:2130507 **Date:02/01/2016**

Subject Name: Material Science & Technology

Time: 2:30pm to 5:30pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Select Appropriate choice for following Questions. 14

1 A crystal structure shows an arrangement of_____.
(a) phases (b) microconstituents (c) atoms (d) none of above

2 Polymers have a lower density due to
(a) Larger moleculers masses
(b) Larger volume occupied by molecules
(c) Both a & b
(d) None of a & b

3 Thermal equilibrium diagrams are drawn by assuming _____ as constant
(a) pressure (b) temperature (c) composition (d) all of above

4 _____ is not a ceramic material.
(a) Glass (b) Bakelite (c) Clay (d) Aluminum oxide

5 With which of following polymerization is associated?
(a) copper (b) zinc (c) thermoplastic plastic (d) None of above

6 _____ can be easily drawn into wire
(a) Cast iron (b) Copper (c) Zinc (d) None of above

7 Out of following which is the amorphous material?
(a) Lead (b) Brass (c) Silver (d) Glass

8 Steel can be hardened quickly by _____process
(a) Carburizing (b) Cyaniding (c) Induction hardening (d) Nitriding

9 Relative amounts of phases in a region can be deduced using
(a) Phase rule (b) Lever rule (c) Either (d) None

10 Iron carbon alloys containing 1.7 to 4.3 % carbon are known as
(a) Eutectic cast irons
(b) Hypo- eutectic cast irons
(c) Hyper- eutectic cast irons
(d) None of above

11 What are considered as the building blocks for engineering materials?
(a) Atoms (b) Elements (c) Compounds (d) Matters

12 What is the lowest temperature diffusion hardening process and does not require a quench?
(a) Carburizing (b) Tempering (c) Nitriding (d) Heat Trating

13 Most commercial glasses consist of
(a) lime (b) soda (c) silica (d) all

14 The word 'ceramic' meant for _____.
(a) soft material (b) hard material (c) burnt material (d) dry material

Q.2	**(a)**	State important properties of copper due to which it extensively used as a engineering material.	**03**
	(b)	Define (1) carburizing (2) Nitriding (3) Flame hardening (4) Induction Hardening.	**04**
	(c)	Discuss plasticity and drying of clay products.	**07**
		OR	
	(c)	What is the significant of Liquidus, Solidus and solvus line in phase diagram?	**07**
Q.3	**(a)**	What is heat treatment of steel? What is its objective?	**03**
	(b)	State difference between space lattice and a crystal structure.	**04**
	(c)	Write short note on recent development in nano materials.	**07**
		OR	
Q.3	**(a)**	State various defects observed in solids.	**03**
	(b)	Write difference between crystalline solid & non cry-crystaline solid.	**04**
	(c)	Draw & explain cooling curve of (1) Pure metal and (2) An alloy of two metals which are completely soluble in liquid and solid phase.	**07**
Q.4	**(a)**	State composition of commercial glasses	**03**
	(b)	Discuss Amorphous polymers.	**04**
	(c)	Write short note on magnesium and its alloy.	**07**
		OR	
Q.4	**(a)**	Define (1) porosity (2) Thermal Expansion (3) Melting point	**03**
	(b)	State difference between edge and screw dislocation.	**04**
	(c)	Draw & explain TTT diagram for eutectoid steel.	**07**
Q.5	**(a)**	What is the composition of Portland cement?	**03**
	(b)	State Requirements of Good Refractory.	**04**
	(c)	Discuss iron-carbon equilibrium diagram with neat sketch	**07**
		OR	
Q.5	**(a)**	List various heat treatment processes as applied to steels.	**03**
	(b)	State difference types of unit cells & sketch their geometry.	**04**
	(c)	Discuss various types of ceramic material.	**07**

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