Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE –SEMESTER III - EXAMINATION -SUMMER 2015

Subject Code:2143603 **Date: 01/06/2015**

Subject Name: Introduction to Glass and Ceramic Technology-II

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)**	What is meant by refractoriness of a material? What is meant by refractoriness Under Load of a material? What is the difference between refractoriness (PCE) and RUL? Explain with examples.	**02+02+03**
	(b)	Explain GOST classification of refractories with examples.	**07**
Q.2	**(a)**	Define a ferroelectric material. Describe the ferroelectric polymorphs of Barium Titanate in detail.	**02+05**
	(b)	Discuss a relaxator dielectric material with example. Define direct and inverse piezoelectric effect with examples. Write the equation that correlates piezoelectric ‘g’ and ‘d’ constant.	**02+03+02**
		OR	
	(b)	What are the various polymorphs of silica? What is Flint? Explain the formation of silica network.	**02+02+03**
Q.3	**(a)**	Write the functional classification of materials. Describe Magnetic materials in detail with Examples. Describe photonic materials in detail with Examples.	**01+03+03**
	(b)	Briefly discuss various branches of Material Science and Engineering.	**07**
		OR	
Q.3	**(a)**	Define whiteware bodies. Give its applications.	**03+04**
	(b)	State the classification of whiteware bodies. Name three common raw materials used in whiteware industries.	**05+02**
Q.4	**(a)**	Define porosity of a refractory body. How porosity of a refractory body is determined experimentally?	**01+06**
	(b)	Give classification based on a) degree of refractoriness b) size & shape c) method of manufacture d) degree of porosity.	**07**
		OR	
Q.4	**(a)**	What is natural magnesite? Why does it have low hydration resistance? How can the hydration resistance of magnesite be improved?	**02+02+03**
	(b)	What is Sea Water Magnesia? How is it synthesized?	**07**

Q.5	**(a)**	Define a superconductor material with examples of metallic and Ceramic superconductors. Explain Meissner effect. Determine the limiting magnetic field that will permit niobium to serve as a superconductor at liquid helium temperature (i.e. 4 K).H_0= 1970 oersted and T_c= 9.25K.	**02+02+03**
	(b)	How does BCS theory explain superconductivity in metals? Explain the term extrusion.	**03+04**

OR

Q.5	**(a)**	Define glass. Explain the plot of specific volume vs. Temperature	**02+05**
	(b)	Why annealing is required in glass making? state two reasons for application of borosilicate glass in laboratories. Why homogenization is required during glass melting?	**02+02+03**

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