

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV(New) EXAMINATION – SUMMER 2016

Subject Code:2143603**Date:03/06/2016****Subject Name:Introduction to Glass & Ceramic Technology-II****Time:10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

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

		MARKS
Q.1	Short Questions	14
	1 Give the formula of Kaolinite clay	
	2 Give the formula of Potash mica	
	3 Give the formula of Albite	
	4 Give the formula of Anorthite	
	5 Give the formula of Ortholase	
	6 Give the formula of lepidolite	
	7 Give the formula of paragonite	
	8 Give the formula of monticelite	
	9 Define porosity	
	10 Define creep	
	11 Define thermal shock resistance	
	12 Define slag corrosion resistance	
	13 What is talc?	
	14 Write three polymorphs of zirconia	
Q.2	(a) What is meant by refractoriness of a material? Explain with examples.	03
	(b) Discuss the polymorphic transformation of silica. Differentiate between Conversion and Inversion reactions.	04
	(c) Describe the Island structure, Group structure, Ring structure, Sheet structure found in silicate materials.	07
	OR	
	(c) Explain classification of refractories based on porosity, acidity, mode of pressing.	07
Q.3	(a) Define normal and inverse spinel.	03
	(b) Describe the structure of chrome ore in detail.	04
	(c) Describe the chemical properties of chrome ore in detail.	07
	OR	
Q.3	(a) Describe Magnetic materials in detail with Examples.	03
	(b) Describe photonic materials in detail with Examples.	04
	(c) Briefly discuss various branches of Material Science and Engineering.	07
Q.4	(a) What is natural magnesite?	03
	(b) Why does it have low hydration resistance? How can the hydration resistance of magnesite be improved?	04
	(c) What is Sea Water Magnesia? How is it synthesized?	07
	OR	
Q.4	(a) Determine the limiting magnetic field that will permit niobium to serve	03

as a superconductor at liquid helium temperature (i.e. 4 K). $H_0 = 1970$ oersted and $T_c = 9.25\text{K}$.

- (b) Define a superconductor material with examples of metallic and Ceramic superconductors. Explain Meissner effect. **04**
- (c) How does BCS theory explain superconductivity in metals? Explain the term extrusion. **07**
- Q.5** (a) Define glass. Explain the plot of specific volume vs. Temperature. **03**
- (b) Explain Stanworth theory of oxide glass formation. **04**
- (c) Why annealing is required in glass making? state two reasons for application of borosilicate glass in laboratories. Why homogenization is required during glass melting? **07**
- OR**
- Q.5** (a) What are the various polymorphs of silica? **03**
- (b) Write short notes on Vitreous silica and silica gel. **04**
- (c) What is Flint? Explain the formation of Kaolinite structure. **07**
