

**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
<b>Q.1</b>	<b>Short Questions</b>	<b>14</b>
	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	
<b>Q.2</b>	(a) What is meant by refractoriness of a material? Explain with examples.	<b>03</b>
	(b) Discuss the polymorphic transformation of silica. Differentiate between Conversion and Inversion reactions.	<b>04</b>
	(c) Describe the Island structure, Group structure, Ring structure, Sheet structure found in silicate materials.	<b>07</b>
	<b>OR</b>	
	(c) Explain classification of refractories based on porosity, acidity, mode of pressing.	<b>07</b>
<b>Q.3</b>	(a) Define normal and inverse spinel.	<b>03</b>
	(b) Describe the structure of chrome ore in detail.	<b>04</b>
	(c) Describe the chemical properties of chrome ore in detail.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Describe Magnetic materials in detail with Examples.	<b>03</b>
	(b) Describe photonic materials in detail with Examples.	<b>04</b>
	(c) Briefly discuss various branches of Material Science and Engineering.	<b>07</b>
<b>Q.4</b>	(a) What is natural magnesite?	<b>03</b>
	(b) Why does it have low hydration resistance? How can the hydration resistance of magnesite be improved?	<b>04</b>
	(c) What is Sea Water Magnesia? How is it synthesized?	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Determine the limiting magnetic field that will permit niobium to serve	<b>03</b>

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**

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