

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE –SEMESTER IV - EXAMINATION -SUMMER 2015**

**Subject Code:143603****Date: 01/06/2015****Subject Name: Introduction to Glass and Ceramic Technology-II****Time: 10.30am-01.00pm****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) 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**
- Q.2** (a) Define a ferroelectric material. Describe the ferroelectric polymorphs of Barium Titanate in detail. **02+05**  
 (b) What are the various polymorphs of silica? What is Flint? Explain the formation of silica network. **02+02+03**
- OR**
- (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+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) 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**

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