Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2143903 **Date: 06/06/2017**

Subject Name: Elements of Material Science

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	How to determine the composition of the alloy by atom (%) and weight (%)?	
	2	Write the Stoichiometric formula of YBCO	
	3	Define Stress and Strain?	
	4	Define elastic deformation. Give the suitable equation if any.	
	5	Define reorientation time.	
	6	Define relaxation frequency.	
	7	Define refractive index of the material.	
	8	Define reflectivity of the material.	
	9	Write full form of OLED.	
	10	Define Diamagnetism.	
	11	Define Ferromagnetism.	
	12	Give the application of Polymer OLED Materials.	
	13	Give the definition of Magnetoresistance.	
	14	Define GMR.	
Q.2	**(a)**	Write short on Piezoelectricity and their applications.	**03**
	(b)	Explain the mechanism of ferroelectricity in BaTiO3.	**04**
	(c)	Write a short note on Superconductivity.	**07**
		OR	
	(c)	Write a short note on GMR and its applications.	**07**
Q.3	**(a)**	Explain the role of oxygen composition in YBCO superconductor.	**03**
	(b)	Explain Time dependent deformation.	**04**
	(c)	Write down a short note on CMR materials.	**07**
		OR	
Q.3	**(a)**	Define fracture? Discuss its various types.	**03**
	(b)	Discuss crystal structure of YBCO superconductor.	**04**
	(c)	Write a short note on Polymer-based OLED.	**07**
Q.4	**(a)**	Write a short note on thermal conductivity.	**03**
	(b)	Explain metallic conductivity and derive its expression regarding Mobility.	**04**
	(c)	Describe thermal expansion in terms of Potential energy versus Interatomic distance plot.	**07**
		OR	
Q.4	**(a)**	Discuss in detail Photoluminescence.	**03**
	(b)	Write Short note on Photoconductivity.	**04**
	(c)	Explain extrinsic semiconductivity in detail by band gap model and derive its expression regarding the mobility of	**07**

charges.

Q.5	**(a)**	Write a short note on Ferromagnetism.	**03**
	(b)	Write a short note on magnetic bubbles and their applications.	**04**
	(c)	Explain intrinsic semiconductivity in detail by band gap model and derive its expression regarding the mobility of charges.	**07**

OR

Q.5	**(a)**	What is Yielding?	**03**
	(b)	What is fatigue? Describe the experiment of fatigue testing in detail.	**04**
	(c)	Explain the absorption of light by necessary energy level diagrams.	**07**

****