Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER IV (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2741001 **Date:04/05/2016**

Subject Name: APPIED SUPERCONDUCTIVITY

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.**

Q.1	**(a)**	With the help of M-H curves compare Type-I and Type-II Superconductors	**07**
	(b)	Explain working of a magnetic separator using superconducting magnets	**07**
Q.2	**(a)**	Explain with figure the magnetic behaviour of a superconductor inferred by Meissner and Ochsenfeld.	**07**
	(b)	Discuss About Gibbs free energy difference between the normal and the superconducting phases per unit volume using necessary diagram.	**07**
		OR	
	(b)	Draw the detailed schematic structure of the following cuprates. (a) $Ca_{0.85}Sr_{0.15}CuO_2$ (b) $LaSrCaCu_2O6$	**07**
Q.3	**(a)**	Explain following terms with relevant theories (a) BCS Gap (b) BCS ground state.	**07**
	(b)	Write the function of a Bolometer. Describe basic Principle and Operation of the bolometer.	**07**
		OR	
Q.3	**(a)**	Describe the important issues to design a good Superconducting Magnets.	**07**
	(b)	Describe with figure the working of Laser Ablation system for preparation of superconducting films.	**07**
Q.4	**(a)**	Describe the properties of oxycarbonates and oxyhalides cuprates along with their stoichiometry.	**07**
	(b)	Explain briefly about following terms related to superconductors. (1) Supercurrents (2) Perfect Diamegnetism	**07**
		OR	
Q.4	**(a)**	Differentiate between low temperature superconductors and high temperature superconductors.	**07**
	(b)	State the equation for classical Lorentz Force. From it derive the condition for correct flux quantization.	**07**
Q.5	**(a)**	Describe the construction and working of a typical SQUID system for sensing external magnetic field.	**07**
	(b)	Describe possible application of superconductivity at present in scientific domains.	**07**
		OR	
Q.5	**(a)**	Write the function of a Bolometer. Describe basic Principle and Operation of the bolometer.	**07**
	(b)	Describe Josephon effect and Tunneling with neat figures.	**07**

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