Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER– I• EXAMINATION – WINTER 2014

Subject Code: 2711001 **Date: 07/01/2015**

Subject Name: Cryogenic Fundamentals

Time:2:30 to 5:00 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)**	Enlist various measurement systems used in cryogenic engineering.	**07**
	(b)	Give brief overview of Cryogenic insulation used in cryogenic equipment.	**07**
Q.2	**(a)**	Enlist various physical properties of Helium 4 cryogen. Also draw the phase diagram for it.	**07**
	(b)	Write note on Multi Layer Insulation.	**07**
		OR	
	(b)	What is Cryogenics? Write note on ñApplications of Cryogenics.ò	**07**
Q.3	**(a)**	Explain the following phenomenon of superconductivity (1) Meissner effect (2) Critical current (3) Critical flux density.	**07**
	(b)	Explain capacitance level probe. Derive an expression for liquid level Lf and its sensitivity. Discuss about the parameters affecting the sensitivity.	**07**
		OR	
Q.3	**(a)**	Explain the applications of cryogenics in blood preservations and biocell preservation.	**07**
	(b)	Why safety is necessary at Cryogenic temperature? Explain in brief Safety measures in Cryogenic industries.	**07**
Q.4	**(a)**	With a neat sketch explain the method of fluid quality measurement	**07**
	(b)	Describe the methodology to measure the liquid level in 10 m3 LN2 horizontal stationary storage tank with fixed electric resistance liquid level gauge.	**07**
		OR	
Q.4	**(a)**	Explain in detail about Metallic resistance thermometers.	**07**

(b) Write short note on : **07**

1. Super conducting motor 2. Blood and Bio cell preservation

Q.5 **(a)** Why hydrogen finds its place in nuclear rockets? With a neat diagram explain the working of chemical propulsion space engine. **07**

(b) Describe the mechanism of insulation in case of each of the following and state the modes of heat transfer against which they are not effectives (i) Opacified powder (ii) evacuated powder and fibrous insulation. (iii) expanded foam insulations. Give their specifications **07**

OR

Q.5 **(a)** Describe about flammability hazards associated with oxygen. **07**

(b) Explain the use of cryogenics in eye surgery. **07**

****