Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEMESTER III–EXAMINATION – WINTER 2015

Subject code: 2731002 **Date: 04/12/2015**

Subject Name: Advanced Cryocoolers

Time: 2:30 PM 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)**	Define Cryocooler. Explain Miniature Stirling Cryocooler. Write its application.	**07**
	(b)	Classify Cryocoolers. Write their contribution in the field of Cryogenics. State main parameters to be considered while designing Cryocoolers.	**07**
Q.2	**(a)**	Explain in brief Multi staging in Pulse tube cooler.	**07**
	(b)	Describe Sorption compressor and Electrochemical Compressor used for Cryocoolers.	**07**
		OR	
	(b)	Write note on 'New Regenerator materials'. State Desirable characteristics of Regenerator matrix.	**07**
Q.3	**(a)**	Explain New Development in Dilution Refrigerator. State its merits.	**07**
	(b)	State Concept of Magnetic Refrigeration. Write Desirable Application of Magnetic Refrigerator.	**07**
		OR	
Q.3	**(a)**	State Applications of G M cooler in Medical field. Write various applications of PTR.	**07**
	(b)	Write note on: **1**. Cryocooler reliability and **2**.Linear Compressor Cryocooler	**07**
Q.4	**(a)**	Describe Mass flow rate and Cooling capacity of J-T Cryocooler briefly.	**07**
	(b)	Compare Stirling cycle with Carnot cycle. Explain Loss analysis of Stirling cycle briefly.	**07**
		OR	
Q.4	**(a)**	Explain in brief Modern trends in Throttle cooler operating with mixed gas.	**06**
	(b)	Write Short note on : 1) Rotary valve used in PTR 2) Effects of Valve timing on performance of PTR	**08**
Q.5	**(a)**	Write note on 'Heat exchangers used in Cryocoolers.'	**07**
	(b)	Explain G M type Pulse tube Cryocooler.	**07**
		OR	
Q.5	**(a)**	Explain in brief 'Comparative overview of Advanced Cryocoolers'.	**07**
	(b)	Draw schematic sketch of G M Cryocooler. Explain stepwise procedure to design Two- stage G M Cryocooler."	**07**

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