Seat No.: \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY** ME - SEMESTER-II EXAMINATION – SUMMER 2015

Subject Code: 2721002 Date: 28/05/2013			
Subject Name: Cryogenic plants and EquipmentsTime: 02:30 PM to 05:00 PMTotal Marks: 70Instructions:Total Marks: 70			
Instr	1. 2. 3.	Attempt all questions. Figures to the right indicate full marks. Make suitable assumptions wherever necessary and mention it clearly in your solution	on.
Q.1	(a) (b)	Classify Dewars. Explain Dewar vessel with a neat sketch. Which method is used for theoretical plate calculation? Explain it.	07 07
Q.2	<b>(a)</b>	Explain with the help of neat sketches Xenon and Krypton purification systems.	07
	(b)	Explain Fabrication and joining techniques used in Cryogenic plants. OR	07
	(b)	What is Cryostat? Explain Cryostat with their constructional features.	07
Q.3	(a)	Design the inner vessel shell and heads for $110 \text{ m}^3$ liquid nitrogen vessel. The inside diameter of the shell and heads is 3.05m. Hemispherical heads are to be used. The design internal pressure is 800 kPa and 10% ullage volume is to be considered. Also design the stiffening rings which are placed at = $80^\circ$ . Take material for inner vessel is 304 SS.	07
	(b)	Write comparison between Linde double column system and Linde-Frankl	07
		OR	
Q.3	<b>(a)</b>	Write note on : (1) Design of transfer line (2) Cryogenic valves	08
	(b)	What is the role of Heat exchangers in the Cryogenic systems? Enlist various types of configurations used in the design of Cryogenic heat exchangers.	06
Q.4	(a) (b)	Write note on õCryogenic Regenerator and its Design methodology.ö Explain the thermodynamically ideal gas separation system. Explain in brief Argon separation system.	07 07
<b>.</b>		OR	
Q.4	(a)	Write note on Helium separation system and its Purification. State helium isotopes.	08
	(b)	Enlist Air separation and Purification systems. Draw only neat sketch of any one system.	06
Q.5	(a) (b)	Write brief Overview of Philips $LN_2$ plant and Liquid oxygen plant. Describe the following typical butt weld preparations for 16 mm thick S.S.316L material with neat sketches : (i) Single $\div V\phi$ (ii) Double $\div U\phi$	10 04

Q.5 (a) Which are the main components generally used in Cryogenic Plants? Enlist 09 various instruments used in the Cryogenic plants. State Safety measures and Hazard management in Cryogenic plants.

(b) Write note on *i*Linde multiple tube type heat exchangerø

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