Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY ME SEMESTER II EXAMINATION – SUMMER 2017

Subject Code: 2721002 Date: 26/05/2017 Subject Name: Cryogenic Plant and Equipment Time: 02:30 PM to 05:00 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) Explain the principal of rectification process for separation of gases in a 07 mixture. Show it on temperature – mole fraction diagram. Hence explain Murphy efficiency of a plate and its use. Write step by step method of McCabe-Thiele (graphical) used for 07 separation of binary mixture of gases. **Q.2** (a) Explain various draining methods used for dewar vessel. Describe in brief 07 with a neat sketch a practical self pressurization technique to transfer a cryogenic liquid form a supply vessel to a storage vessel. **(b)** Explain with a neat sketch Linde – Frankl gas separation system. **07** OR (b) Explain with a neat sketch Heylandt system of obtaining liquid nitrogen 07 and liquid oxygen. 0.3 Draw a neat sketch of a dewar vessel and label its elements. How does a 07 small dewar vessel meant for laboratory use differ from that for a field use with high storage capacity? Justify your answer. **(b)** With the help of neat diagram explain Argon recovery subsystem and any **07** one method of purification system. Describe in brief design of an effective suspension system of the inner 07 Q.3 (a) vessel with the outer vessel for vessels used for cryogenic liquid storage. (b) How is Helium obtained from natural gas? With the help of neat diagram **07** explain U.S Bureau of Mines Helium separation system. 07 **Q.4** Write a short note on vacuum insulated transfer lines. (a) Describe welding of aluminum and stainless steels used in fabrication of cryogenic equipments. OR 07 Write a short note on cryogenic valves. 0.4 (a) Explain briefly methods of forming transition joints. What precaution is 07 necessary while using such a joint? **Q.5** Explain with a neat sketch Linde Bronn system for separation of hydrogen **07** (a) from coke oven gas. **(b)** What is Cryostat? Explain Cryostat with their constructional features. **07** OR (a) Write a short note on testing of heat exchangers as per standards. 07 **Q.5**

Write brief Overview of Philips LN 2 plant.

07