

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-III Regular Examination January 2011

Subject code: 731002

Subject Name: Advanced Cryo Coolers

Date: 10 /01 /2011

Time: 02.30 pm – 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 comparison of different types of cryocoolers 07
(b) Describe different applications of cryocoolers 07
- Q.2** (a) Describe monolithic regenerator Technology for low temperature 07
(b) Explain loss analysis of stirling cycle 07
- OR**
- (b) Explain design and optimization of stirling cryocoolers 07
- Q.3** (a) Explain geometry of U-tube, inline and coaxial pulse tube Cryocooler. 07
Compare stirling type and G.M type pulse tube.
- (b) Explain valve timing effect on performance of 4 K pulse tube Cryocooler. 07
- OR**
- Q.3** (a) Write a short note on thermoacoustically driven pulse tube cryocooler 07
(b) Explain characteristics of double inlet pulse tube cryocooler 07
- Q.4** (a) Describe design optimization of mixed refrigerant throttle cooler 07
(b) Describe liquefaction of nitrogen using mixed refrigerant processes 07
- OR**
- Q.4** (a) Describe mixed refrigerant Joule Thomson Cryocooler with pre cooling stage 07
(b) Write a note on modern trends in throttle cooler operating with mixed gas 07
- Q.5** (a) Describe high frequency pulse tube cryocooler for space application 07
(b) Describe miniature cryocooler for space application 07
- OR**
- Q.5** (a) Describe development and utility of magnetic hydrogen liquefier 07
(b) Describe progress on microgravity dilution refrigerator 07
