

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER-II • EXAMINATION – SUMMER - 2017

Subject Code: 2722110**Date: 30/05/ 2017****Subject Name: CRYOGENIC ENGINEERING****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) Discuss the variations of the following properties of material at cryogenic temperature. **07**
i) Ultimate strength and yield strength
ii) Fatigue strength
iii) Hardness
iv) ductility
(b) Explain the following phenomenon for He.II (1) Fountain effect (2) Second sound (3) Roll in film. **07**
- Q.2** (a) Give Brief Overview of Cryogenic Insulation used in Cryogenic Equipment. **07**
(b) Explain the following phenomenon of superconductivity **07**
(1) Meissner effect (2) Critical current (3) Critical flux density
- OR**
- (b) Compare the following insulations with their advantages and disadvantages. **07**
1. Expanded foam 2. Gas-filled powders and fibrous materials
3. Opacified powder.
- Q.3** (a) Explain the importance of refrigerator effectiveness for Phillips refrigerator. **07**
(b) With a neat Sketch explain the construction and working of chemical rocket engine. **07**
- OR**
- Q.3** (a) Describe Application of Cryogenics in food Preservation. **07**
(b) Explain the Gifford-Mc Mohan Cryocooler with neat sketch. Also explain its merits and Demerits. **07**
- Q.4** (a) Explain in brief Pulse tube refrigeration system. **07**
(b) Explain with neat sketch Joule Thomson refrigeration system. **07**
- OR**
- Q.4** (a) Write short note on Cryogenic Vessels. **07**
(b) Explain the thermodynamically ideal system for liquefaction of air and derive an expression for finding liquid yield. **07**
- Q.5** (a) With neat sketch explain precooled linde-Hampson Gas Liquefaction systems. **07**
(b) Explain claudet system for gas liquefaction system with neat sketch and T-S Diagram. **07**
- OR**
- Q.5** (a) Explain Superconducting motor and gyroscopes. **07**
(b) Explain Kapitza Liquefaction system with neat sketch. **07**
