



Reg. No. :

Name :



**Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)**

**Branch : Mechanical Engineering
08.805.13 : CRYOGENIC ENGINEERING (MPU)**

Time : 3 Hours

Max. Marks : 100

- Instructions :**
- 1) Answer **all** questions in Part A each carries 4 marks.
 - 2) Answer **one full** question from **each** module in Part B each carries 20 marks.
 - 3) Use of approved charts and tables are **permitted**.

PART – A

1. What is cryogenics ? What is its difference from refrigeration ?
2. What is Joule-Thompson coefficient ? What is the value of Joule-Thompson coefficient for an ideal gas ?
3. Write a brief note on cryogenic preservation of blood.
4. What is ortho-para conversion with respect to hydrogen ?
5. Explain the applications of cryogenics in space technology.
6. Define Type-I and Type-II superconductors.
7. What is ductile brittle transition of metals at low temperature ?
8. Explain super fluidity.
9. What is second sound that occurs in liquid helium II ?
10. What is ideal refrigeration system ?

**PART – B****Module – I**

11. a) Describe in detail the variation of mechanical properties of materials at cryogenic temperatures.
b) Briefly explain the applications of superconductivity.

OR

12. a) Describe in detail the variation of electrical properties of materials at cryogenic temperatures.
b) Briefly explain the application of cryogenics in food processing.

Module – II

13. a) Sketch and explain the working of a Linde dual pressure gas liquefaction system.
b) With neat sketches explain the different types of compressors and expanders used for cryogenic applications.

OR

14. a) Determine the ideal work requirement for the liquefaction of Nitrogen beginning at 101.3 kpa and 300 K. Also determine the heat rejected per unit mass in the ideal isothermal compressor.
b) Explain the claudé system for hydrogen gas liquefaction.

Module – III

15. a) Discuss the different types of insulations for cryogenic storage vessel.
b) Describe the two-phase flow in cryogenic transfer lines.

OR

16. a) Explain the working of a cryogenic Stirling cycle refrigeration system.
b) Describe in detail the piping arrangement for cryogenic-fluid storage vessel.
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