Reg. No:…………….

Name:……………….

Eighth Semester B-Tech Degree Examination
13.805.8 Cryogenic Engineering (MPU)
(2013 Scheme)

Time 3 Hours   Max Marks: 100

Instruction: Use Of Thermodynamic Tables And Charts Permitted

PART-A
(Answer All Questions. Each question carries 2 marks)

1. Distinguish between Ortho and Para hydrogen.

2. Mention five applications of cryogenic engineering.

3. Describe superconductivity and superfluidity

4. Draw the T-S diagram for Simple Linde -Hampson system for gas liquefaction.

5. Explain the significance of maximum inversion temperature on the liquefaction of hydrogen
   gas.

6. How Joule-Thompson coefficient is related to gas liquefaction?

7. What are the liquefaction systems for Neon and Helium?

8. Explain super conductivity.

9. Define FOM for the refrigerator

10. What is adiabatic demagnetization? Explain briefly.

(10 x 2= 20 Marks)

PART-B
(Answer any one question from each Module. Each question carries 20 marks)

MODULE -1

11. a) Explain the various mechanical properties of materials at cryogenic temperatures.

    b) Describe the application of Cryogenics in the field of medicine and biology.

OR

12. a) Describe fountain effect and Rollin film effect of liquid Helium-II.

    b) Briefly explain the historical development of Cryogenics.

MODULE -1I

13. a) Consider a Linde – Hampson cycle with Nitrogen as working fluid. The system is operated between 1.013 bar (1 atm) and 101.3 bar (100 atm) at 300 K. Determine Liquid yield, Work per unit mass compressed, Work for unit mass liquefied.

   b) Explain the Cascade system for liquefaction of nitrogen

<p align="center">OR</p>

14. a) Explain the different loss which occurs in the different components of gas liquefaction systems.

   b) Explain the simple Linde-Hampson system for the liquefaction of nitrogen gas.

MODULE –III

15. a) With a neat sketch and T-S diagram, explain magnetic refrigeration system.

   b) Explain a system for Neon gas liquefaction.

<p align="center">OR</p>

16. a) With a suitable sketch and T-s diagram, explain the working of a Philips refrigerator.

   b) Explain the working of a dilution refrigeration system with neat sketch.

MODULE –IV

17. a) What is Cryopumping?   Explain the working of a Cryopump.

   b) Describe the two-phase flow in cryogenic transfer lines.

<p align="center">OR</p>

18. a) Compare the advantages and disadvantages of different types of insulations used in cryogenic systems.

   b) With the help of a neat sketch, explain a cryogenic liquid storage vessel.

<p align="right">(4x20 = 80 Marks)</p>

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