B.TECH.DEGREE EXAMINATION

Eighth Semester

Branch: Aeronautical Engineering

Cryogenics (AN 010 805 G03)

Time: 3 hours maximum: 100 marks

Part A

Answer all questions

Each question carries three marks

1. Explain any one application of cryogenics
2. Discuss the mechanical properties of materials at cryogenic temperatures.
3. Define the term Gas liquefaction.
4. Write short note on adiabatic demagnetization
5. What is Cryo pumping

(3x5 = 15 Marks)

Part B

Answer all questions

Each question carries five marks

6. What are the applications of Superconductivity.
7. Differentiate superconductivity and superfluidity
8. Explain the difference between ortho-hydrogen and para-hydrogen.
9. What do you mean by magnetic refrigeration system.
10. Explain cryogenic insulation and its types.

(5x5 = 25 Marks)

Part C

Answer all questions

Each question carries 12 marks

11. Explain the term cryogenics and its development in the field of space technology.

OR

12. Discuss the applications of cryogenics in biology and medicine.

13. What are the properties of the following cryogenic fluids

(i) Hydrogen (ii) Helium 3 (iii) Helium 4

OR

14. (i) What are the electrical and magnetic properties of cryogenic materials

(ii) Determine the thermal conductivity of air at 250K (450 ° R) and 101.3kpa (14.7psia) if the mean free path of air at this condition is 49 nm (1.93×10^{-6} in.) ,the gas constant for air is 287 J/kg-K ,the specific heat ratio is 1:40 , and the specific heat at constant volume is 716.5 J/kg-K (0.174 Btu/lb_m-°R).

15. Explain the production of low temperatures using Joule-Thomson effect.

OR

16. Explain about the working of a precooled Linde-Hampson system with suitable diagram for neon and hydrogen.

17. With the help of schematic and T-S diagram, explain Philips Refrigerator. Also explain briefly the importance of refrigerator effectiveness.

OR

18. Explain about the refrigeration system working on adiabatic demagnetization method.

19. Briefly explain about the basic design parameters of cryogenic fluid storage vessels.

OR

20. Briefly explain about the cryogenic fluid transfer system.

(12x 5 = 60Marks)