Total No. of Questions : 12]

SEAT No. :

P1959

[Total No. of Pages : 3

[4859] - 51
B.E. (Mechanical) (Semester - II)
CRYOGENICS ENGINEERING
(2008 Pattern) (Open Elective)

Time :3 Hours] *[Max. Marks :100*

Instructions to the candidates:-

1) ***Answer any three questions from each section.***
2) ***Answer for the two sections should be written in separate answer book.***
3) ***Neat diagrams should be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of pocket calculator & different gas charts as applicable is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Unit - I

Q1) a) Define Cryogenics and discuss how it is different from refrigeration. State important applications of Cryogenics. **[6]**

b) Write a short note on History of Cryogenics. **[6]**

c) What are permanent gases? State boiling points for the gases viz. Helium, Hydrogen, Nitrogen, Oxygen. **[6]**

OR

Q2) a) Explain with neat sketch Super-fluidity phenomena observed in case of liquid Helium. **[6]**

b) Explain effect of Cryogenic temperature on Thermal properties of material. **[6]**

c) Explain the effect of Cryogenic temperature on mechanical strength of materials. **[6]**

Unit - II

Q3) a) Explain ideal liquefaction system and different parameters used to define the system performance. **[6]**

P.T.O.

b) Draw Simple Linde Hampson system and label all the components. **[4]**

c) Explain inversion curve with neat diagram. What is maximum inversion temperature? **[6]**

OR

Q4) a) Why Pre cooling is necessary in case of Precooled Linde Hampson system? **[6]**

b) Compare Isenthalpic and Isentropic expansion methods employed for cooling. **[6]**

c) Discuss how Cryogenic liquefaction system is different from Cryogenic refrigeration system. **[4]**

Unit - III

Q5) a) State importance of regenerator effectiveness in Stirling cycle refrigerator. **[8]**

b) Explain with neat sketch Philips Refrigerator. **[8]**

OR

Q6) a) What are the different techniques employed for separating of gases. **[8]**

b) Explain Gifford McMahon Refrigerator with neat sketch. **[8]**

SECTION - II

Unit - IV

Q7) a) State various insulations used in Cryogenics in increasing order of performance explain any one. **[6]**

b) Explain with neat sketch principle of rectification column. **[10]**

OR

Q8) a) Explain the theoretical plate calculations using McCabe-Thiele technique. **[8]**

b) Compare Cryogenic separation with other gas separating methods. **[8]**

Unit - V

Q9) a) Discuss various methods used to drain liquid from Dewar vessel. **[6]**

b) Explain construction of Dewar vessel with neat sketch stating function of each component. **[12]**

OR

Q10)a) Discuss the role of Vacuum in Cryogenic. **[6]**

b) What are the different safety devices installed on a Dewar Vessel. **[12]**

Unit - VI

Q11)a) Explain the Meissner effect and state its applications. **[6]**

b) What are the different present day applications of Cryogenics in the medical field. **[6]**

c) What are different applications of Cryogenics in the field of Space Technology. **[4]**

OR

Q12)a) Explain any two of following present day applications of Cryogenics in the field **[10]**

i) Food preservation.

ii) High Energy Physics.

iii) Gas industry.

b) Explain the Cryogenics principle used in recycling of automobiles tyres. **[6]**