Total No. of Questions : 12] SEAT No. :

P1945 [Total No. of Pages : 4

[5254]-46

B.E. (Mechanical)

ADVANCED AIR CONDITIONING & REFRIGERATION

(2008 Pattern) (Elective - III)

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

Instructions to the candidates:

1) ***Answer any 3 questions from Section I and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicates full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, Electronic pocket calculator, Steam tables and p - h chart is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the working of Ammonia - CO_2 cascade cycle with its presentation on p-h & T-S diagram. **[8]**

b) Find mass flow of refrigerant overall power input & COP of the refrigeration system as shown in Fig.1. **[10]**

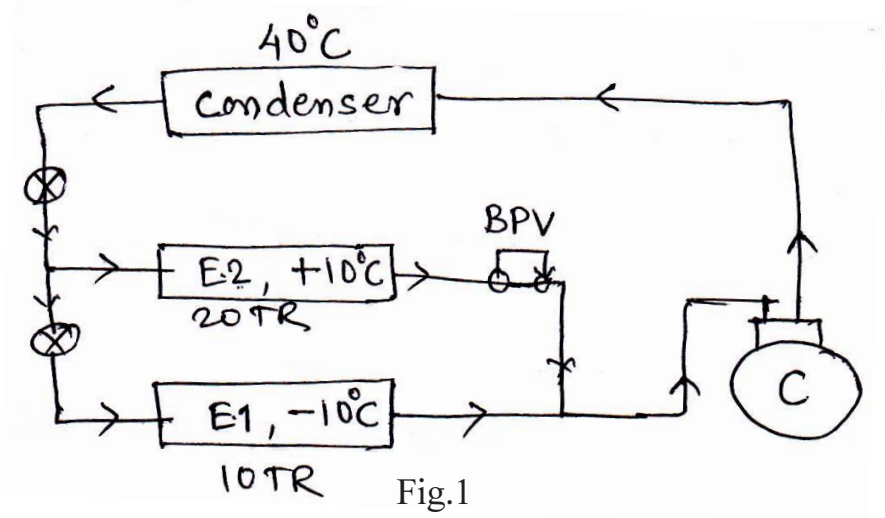


Fig.1

Refrigerant used - R134a

condenser subcooling - 10°C

Use R134 a chart.

P.T.O.

OR

Q2) a) Explain the following defrosting methods : **[8]**

i) Vapor defrosting

ii) Reverse cycle defrosting

b) Draw the schematic of pumped circulation system. Explain the working of same. Give its applications. **[10]**

Q3) a) Explain compressor characteristics curves. Discuss the various capacity control method of compressors. **[10]**

b) What is the selection criteria for cooling tower? Explain with suitable example. **[6]**

OR

Q4) a) With neat diagram, explain the working of low-side & high-side float valve as an expansion device. **[8]**

b) Explain rating & selection of **[8]**

i) Condenser &

ii) Evaporator

Q5) a) Compare variable frequency drive with constant speed drive. **[6]**

b) Write a short note on : IAQ controls. **[10]**

OR

Q6) a) Discuss various safety controls used in Refrigeration plant for cold storage. **[8]**

b) With neat diagrams explain : **[8]**

i) Solenoid valve

ii) Regulating valve

SECTION - II

Q7) With appropriate assumptions explain CLTD/CLF method of cooling load calculation. **[18]**

OR

Q8) a) Explain the star rating of split air conditioners in India. **[8]**

b) Explain ASHRAE comfort chart. List factors affecting human comfort. **[10]**

Q9) a) Describe the design considerations for. Air conditioning plant for Hospitals. **[8]**

b) Write down the steps for performance evaluation of heat pump. **[8]**

OR

Q10)a) Explain different types of heat pumps. Do thermodynamic analysis of heat pump. **[8]**

b) Describe the design considerations of AC plant for IT centres. **[8]**

Q11)a) With neat schematic explain simple Linde - Hampson cycle. Show cycle on T-S diagram. **[8]**

b) Explain the insulating materials for low temperature applications. **[8]**

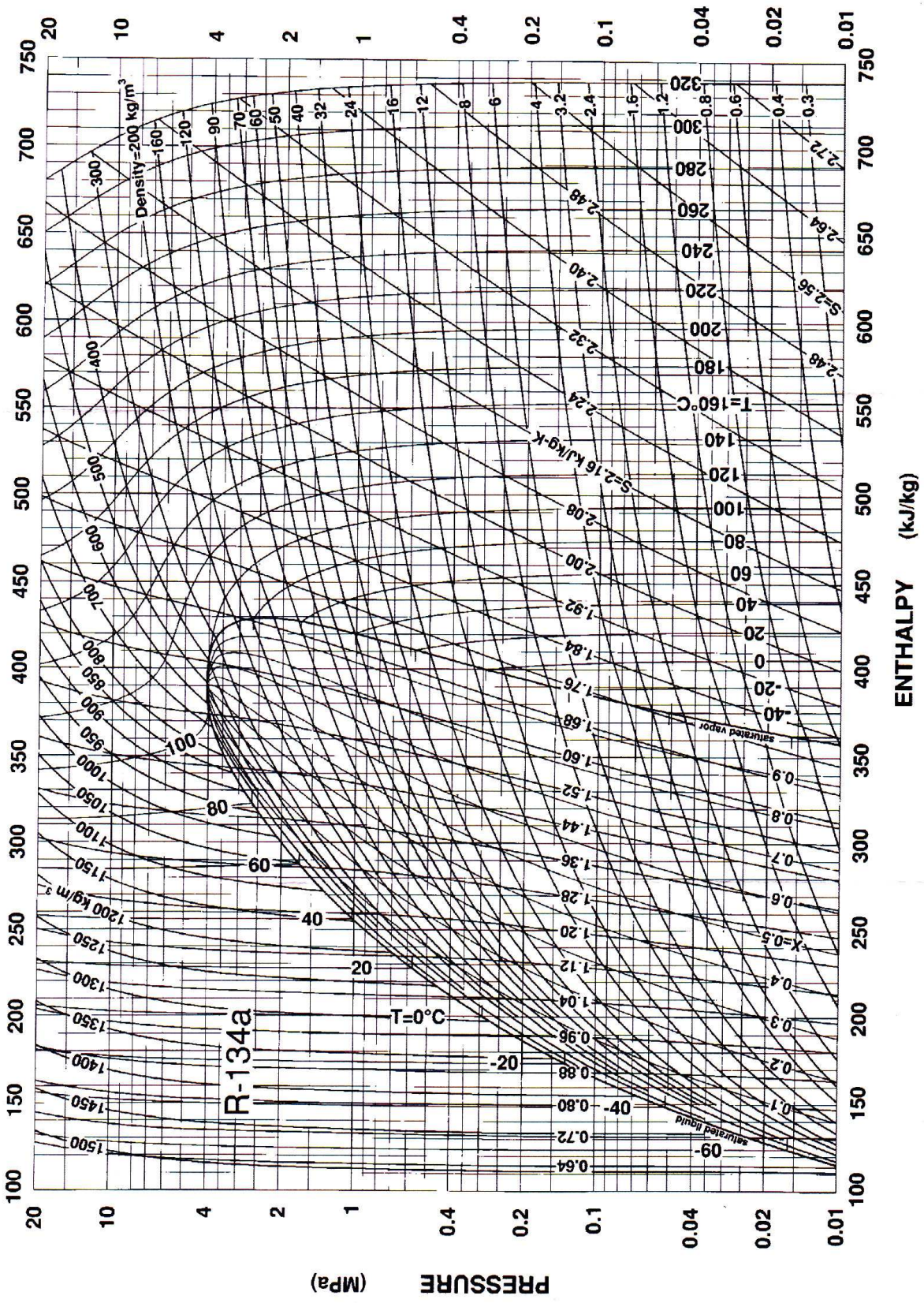
OR

Q12)a) Define figure of merit. Explain the production of low temperature using Joule - Thomson effect. **[8]**

b) Explain properties of following cryogenics fluids. **[8]**

i) Hydrogen

ii) Helium


R-134a
PRESSURE (MPa)
ENTHALPY (kJ/kg)
Density=200 kg/m3
T=160°C
T=0°C
S=2.56
S=2.48
S=2.16 kJ/kg-K
saturated vapor
saturated liquid
X=0.5