Total No. of Questions : 12]

SEAT No. :

P2676

[Total No. of Pages : 4

[5154]-46

B.E. (Mechanical)

ADVANCED AIR CONDITIONING & REFRIGERATION

(2008 Course) (Semester - II) (Elective - III) (402049D)

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

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Figures to the right indicates full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Compare subcritical cycle with transcritical cycle of refrigeration. Explain working of refrigeration system with transcritical cycle. **[8]**

b) A R134a refrigeration system consists three evaporators of capacities 20TR, 30TR and 10TR with individual expansion valve and individual compressors. The evaporator operates at –10°C, 5°C and 10°C respectively. Vapours inlet to compressors are dry and saturated. Condenser operates at 40°C and there is no subcooling. Assuming iscentropic compression in compressor, find **[10]**

i) mass flow rate in each evaporator

ii) power required to drive compressors

iii) overall COP

OR

Q2) a) List various defrosting methods. Explain the followings in detail. **[10]**

i) Hot-gas defrosting

ii) Re-evaporator coil defrosting

b) With neat diagram explain pumped circulation system. **[8]**

P.T.O.

Q3) a) What do you mean by rating of compressors? Give the selection criteria of compressors for air conditioning system. **[8]**

b) Draw the neat schematic of evaporative condenser. Explain its working principle. **[8]**

OR

Q4) a) Explain the psychrometry involved in cooling tower design. Explain the types of cooling towers. **[8]**

b) What is mean by diabatic and adiabatic flow in capillary? Explain capillary selection procedure for refrigeration system. **[8]**

Q5) a) Explain construction and working of HP/LP cutouts. **[8]**

b) Why solenoid is used in refrigeration system? Construct the diagram for solenoid valve and describe its working principle. **[8]**

OR

Q6) a) List the advantages of various frequency drive over the other drives. Describe how frequency is controlled in VFD. **[8]**

b) Write short note on : IAQ controls. **[8]**

SECTION - II

Q7) a) Draw New ASHRAE comfort chart and explain its significance. **[8]**

b) With appropriate examples give the selection criteria for indoor and outdoor design conditions. **[10]**

OR

Q8) a) Describe the CLTD/CLF method of cooling load calculation in details. justify the calculations with simple examples. **[12]**

b) Explain ECBC codes. **[6]**

Q9) a) Describe design considerations for air conditioning system used for hospitals. **[8]**

b) Explain the working of heat pump with neat schematic. **[8]**

OR

Q10)a) State the procedure for evaluating the performance of heat pump. **[8]**

b) Explain the important features of air conditioning system for IT centers. **[8]**

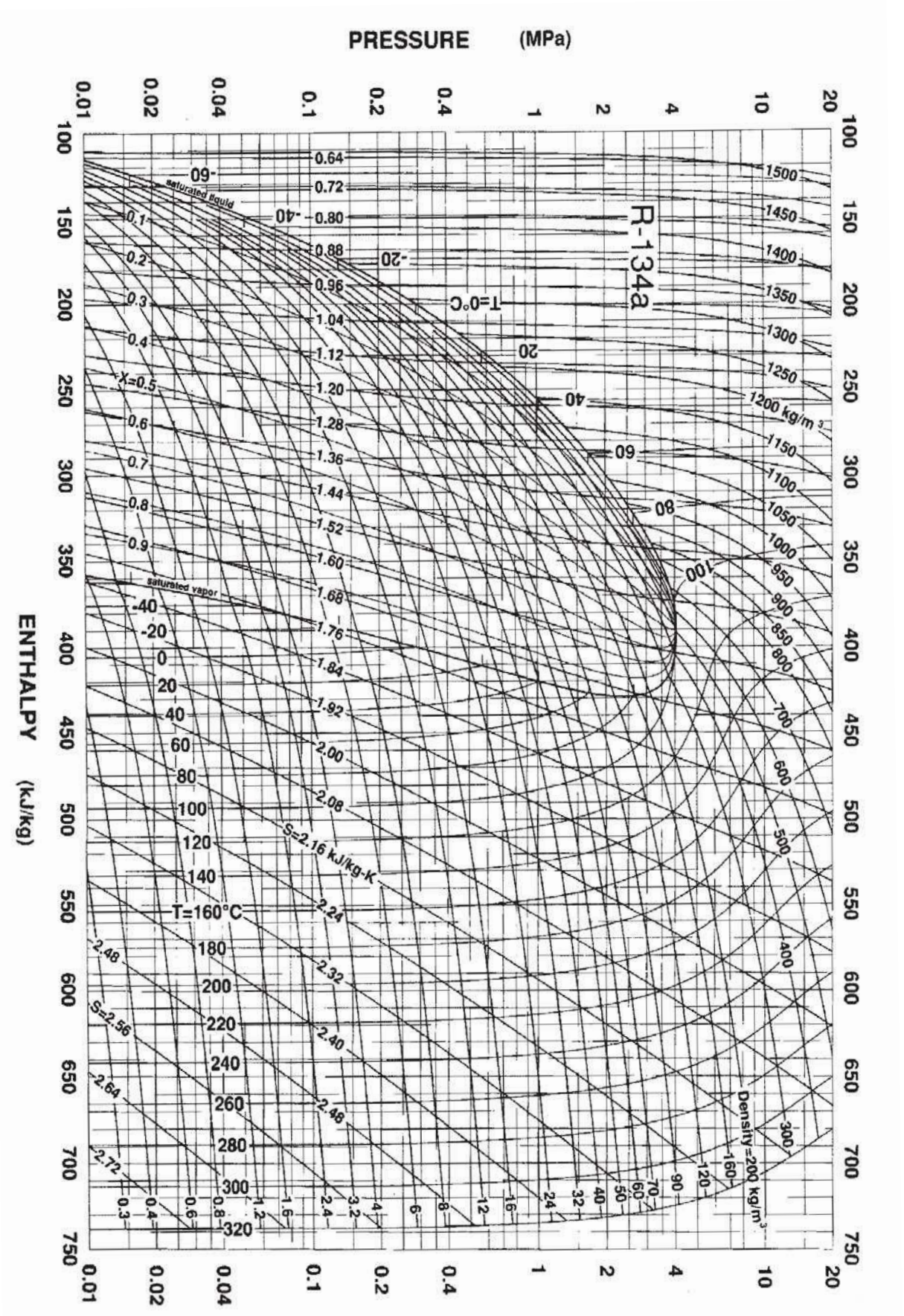
Q11)a) What are the limitations of VCS for production of low temperature? What is FOM? **[8]**

b) Explain the properties of cryogenics fluids in details. **[8]**

OR

Q12)a) Explain the system for production of liquid N_2. **[8]**

b) Write short note on : Insulating materials. **[8]**


PRESSURE (MPa)
ENTHALPY (kJ/kg)
R-134a
saturated liquid
saturated vapor
X=0.5
T=0°C
T=160°C
S=2.16 kJ/kg-K
S=2.56
Density=200 kg/m³
1200 kg/m³