Total No. of Questions : 12]

SEAT No. :

P3324

[Total No. of Pages :4

[4959]-47

B.E.(Mechanical)

D : ADVANCED AIR CONDITIONING AND REFRIGERATION

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

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

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Write a short note on HP/LP receivers. **[6]**

b) Explain following methods of defrosting **[12]**

i) Multiple evaporator systems.

ii) reverse cycle defrosting.

iii) re-evaporator coils.

iv) Reverse cycle defrosting using four way valve.

OR

Q2) a) Explain actual vapour compression cycle using p-h and T-s diagram. **[10]**

b) Explain ejector-expansion transcritical refrigeration cycle. **[8]**

Q3) a) Discuss the various methods of capacity controls of reciprocating compressor. **[6]**

P.T.O.

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

i) electronic expansion valve

ii) thermostatic expansion valve

OR

Q4) a) Explain Pumped circulation system. **[6]**

b) Explain the procedure of estimating length and pressure drop of capillary tube. **[10]**

Q5) a) Describe the methods of controlling IAQ. **[6]**

b) Discuss the main characteristics of filter. **[6]**

c) Explain the followings: **[4]**

i) Motor over current protection

ii) adjustable speed drives

OR

Q6) a) Explain the construction working of direct acting solenoid valve. **[8]**

b) List the pollutants & contaminants present in the air with source. **[4]**

c) Discuss the types of safety valves. **[4]**

SECTION - II

Q7) a) Write a short note on "Choice of Supply Design Conditions". **[6]**

b) A 25 cm thick wall is exposed to the periodic temperature and incident radiant variation on an hourly basis between 7am and 6pm is given in the table. Determine heat gain of the room per unit area of the wall. The outdoor maximum and minimum temperatures are 40°C and 22°C respectively. The outside and inside design temperature are 40 and 25°C respectively. **[12]**

What is the time of maximum heat gain from the wall?

Density of material, ρ = 2400 kg/m^3

Thermal conductivity, k = 1.5 W/mk

Outside wall coefficient h_o = 23 W/m^{2}K

Inside wall coefficient, h_i = 7 W/m^{2}K.

Time	7	8	9	10	11	12	1	2	3	4	5	6
	am	am	am	am	am	noon	pm	pm	pm	pm	pm	pm
Wall Mass (kg/m^2)	Equivalent Temperature Difference (ΔT_E) °C											
500	3.9	3.3	3.3	3.3	3.3	3.3	3.9	4.4	5.5	6.7	9.4	11.1
600	6.1	5.5	5.0	4.4	4.4	4.4	5.0	5.5	5.5	5.5	6.1	6.7

OR

Q8) a) Draw and discuss modified comfort chart. **[9]**

b) Explain the term "Decrement factor & time lag". **[9]**

Q9) a) Discuss supply air distribution of Data centre. **[8]**

b) Draw and explain air-to-liquid heat pump circuit. **[8]**

OR

Q10)a) Write a short note on "Celan Room". **[6]**

b) Discuss the factors which influence the load calculations of auditurium. **[6]**

c) State applications of heat pump. **[4]**

Q11) Write a short note on: **[16]**

a) Liquefaction of nitrogen.

b) Liquefaction of hydrogen.

c) Liquefaction of helium.

OR

Q12)a) Sketch and explain Claude cycle using T-s and p-h diagram. **[8]**

b) Discuss various properties of cryogenic fluids. **[8]**