

Total No. of Questions : 12]

SEAT No. :

P1796

[Total No. of Pages : 4

[5059] - 46

B.E. (Mechanical)

ADVANCED AIR CONDITIONING AND REFRIGERATION

(2008Pattern) (Elective - III)

Time :3 Hours]

[Max. Marks :100

Instructions to the candidates:-

- 1) Figures to the right indicate full marks.
- 2) Assume suitable data if necessary.

**SECTION - I**

- Q1)** a) With neat diagram explain Multi compression transcritical cycle. [6]
- b) A Freon 22 condensing units is specified to give 40 TR capacity for air-conditioning under standard operating conditions of 60°C condensing and 5°C evaporating temperature. What would be its capacity in TR for food freezing for which the evaporator temperature is -35°C? Also obtain the capacity of air- conditioner for condensing temperature of 40°C. [12]

Ts (°C)	$h_f$ (kJ/kg)	$h_g$ (kJ/kg)	$S_f$ (kJ/kg)	$S_g$ (kJ/kg)	$v$ (m <sup>3</sup> /kg)
-35	158.76	390.85	-	1.8140	0.1655
5	194.4	407.15	-	1.7645	0.04035
40	249.7	415.95	1.1666	1.6995	0.0151
60	276	416.49	1.2504	1.6721	0.0090

OR

- Q2)** a) Explain actual vapour compression cycle using p-h and T-s diagram. [10]
- b) Explain ejector-expansion transcritical refrigeration cycle. [8]
- Q.3)** a) Discuss the various methods of capacity controls of reciprocating compressor. [6]
- b) Discuss the design procedure of shell and tube condenser [10]

P.T.O.

OR

- Q4)** a) What is Pumped circulation system? Explain with neat schematic. [6]  
 b) Discuss the procedure for obtaining the length of capillary tube. [10]

- Q5)** a) Explain the construction working of pilot-operated solenoid valve [6]  
 b) Discuss the main characteristics of filter. [6]  
 c) Explain the followings;  
 i) Motor over current protection ii) adjustable speed drives [4]

OR

- Q6)** a) Draw & explain electric circuit for oil pressure failure control. [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) Explain the purpose and scope of ECBC. [8]  
 b) Discuss the time lag and decrement method. [10]

OR

- Q8)** a) Draw and discuss modified ASHRAE comfort chart. [8]  
 b) Write a short note on:  
 i) "Choice of Supply Design Conditions" [6]  
 ii) Sol-air temperature [4]

- Q9)** a) Explain the design features of "Air-conditioning of Multiplexes" [8]  
 b) Draw and explain air-to-air heat pump circuit [8]

OR

- Q10)** a) What is Clean Room? Discuss the requirements of clean room. [6]  
 b) Discuss in brief 'HVAC design criteria for hospital'. [6]  
 c) State applications of heat pump. [4]

- Q. 11)**a) Draw circuit of Liquefaction process of helium. List the functions of its components. [8]
- b) Discuss various applications of cryogenics [8]

OR

- Q.12)**a) What is FOM? Discuss the analysis of Claude cycle with neat sketch.[8]
- b) Discuss various properties of cryogenic fluids. [8]

# Psychrometric Chart

