17612

11819

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8) Use of Psychometric chart is permitted.

Marks

1. (A) Attempt any THREE of the following : **12**

(a) Differentiate between Refrigerator & heat pump.

(b) What are the various types of compressor used in Refrigerator & Air conditioning system ? What is Hermetic compressor ?

(c) Define :

(i) Dry Bulb Temperature

(ii) Wet Bulb Temperature

(iii) Dew Point Temperature

(iv) Specific Humidity

(d) Sketch and explain extended plenum duct system of air distribution system.

(B) Attempt any ONE of the following : **6**

(a) Draw a neat diagram of practical vapour absorption system and explain its working.

(b) Explain the working of House Hold Refrigerator.

2. Attempt any TWO of the following : **16**

(a) A refrigeration system using R-12 refrigerant works on vapour compression cycle. Temperature in condenser and evaporator are 37 °C & – 18 °C respectively. Enthalpy of R-12 after isentropic compression is 595.4 kJ/kg. If refrigerant circulated is at a rate of 100 kg/hr. Determine (i) Capacity of the plant in tones of refrigeration (ii) Power required by the compressor (iii) COP (iv) Show the process on P-H chart.

Properties of R-12 are :

T(°C)	P (Bar)	V (m^3/kg)	H_f (kJ/kg)	H_g (kJ/kg)
–18	1.6627	0.1030	402.28	565
37	9.0726	0.0203	455	589

(b) (i) Differentiate between Dry expansion evaporator and flooded type evaporator (any four point)

(ii) Explain with neat sketch flooded type evaporator.

(c) Discuss briefly the different types of heat loads which have to be taken into account in order to estimate the total heat load of a large restaurant for air conditioning.

3. Attempt any FOUR of the following : **16**

(a) Describe with neat sketch how solar energy can be used to run a refrigerator.

(b) Differentiate between vapour absorption refrigeration system and vapour compression refrigeration system.

(c) What is function of condenser in refrigeration system ? Enlist different types of condenser.

(d) Explain adiabatic mixing of air streams.

(e) Explain with neat sketch summer air conditioning system.

4. (A) Attempt any THREE of the following : **12**

(a) Explain the process of "Humidification by air washing" with neat sketch.

(b) What are the factors affecting comfort air conditioning ?

(c) Explain the factors to be consider for selecting insulating materials used in air conditioning field.

(d) Draw neat labelled sketch of Ice plant.

(B) Attempt any ONE of the following : **6**

(a) Explain the concept of green house effect and ozone depletion.

(b) Explain with neat sketch year round air conditioning system.

5. Attempt any TWO of the following : **16**

(a) Explain Bell Coleman Air refrigeration cycle with P-V diagram and state the COP of the refrigerator.

(b) Explain with neat sketch vapour compression cycle. Draw P-H and T-S diagram for VCC with superheated compression.

P.T.O.

(c) A surrounding air having DBT 38 °C and RH 60% is converted to conditioned air having DBT 26 °C and WBT 24 °C. Plot the process on psychrometry chart and find out following properties of conditioned air :

(i) RH

(ii) Enthalpy

(iii) Apparatus dew point temperature

(iv) By-pass factor of cooling coil.

6. Attempt any FOUR of the following : **16**

(a) Explain the following :

(i) 1 Ton of Refrigeration

(ii) EER

(b) Explain working of Electrolux refrigeration system with neat sketch.

(c) Explain Wobble plate type car A.C. system of compressor.

(d) Explain by pass factor of heating and cooling coil.

(e) Give classification of duct used in air conditioning system.