17612

21718

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

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

(6) Use of Psychrometric chart is permissible.

Marks

1. Attempt any FIVE : **5 × 4 = 20**

(a) Define terms : (i) COP, (ii) EER with their formula.

(b) Classify the refrigerants.

(c) Differentiate between air cooled and water cooled condenser.

(d) Draw P-V & T-S diagram of Bell-Coleman refrigeration cycle with all processes.

(e) Give important properties of insulating material.

(f) State industrial applications of refrigeration system.

(g) Draw with labelled sketch thermostatic expansion valve.

2. Attempt any TWO : **2 × 8 = 16**

(a) Explain with neat sketch Electrolux Refrigeration System.

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

(c) A refrigeration system works on vapour compression cycle. Enthalpies at various points are given below.

Compressor inlet – 1460 kJ/kg.

Compressor outlet – 1796 kJ/kg.

Inlet to expansion valve – 322 kJ/kg.

Calculate :

(i) COP and

(ii) Power required for 1 kg of refrigerant circulated per min.

The refrigerant is superheated by 15 °C before it enters the compressor and subcooled by 3 °C before expansion. Sketch the cycle on p-h & T-S diagram.

3. Attempt any FOUR : **4 × 4 = 16**

(a) Explain steam jet refrigeration system with neat sketch.

(b) Draw the flow diagram of simple air craft cooling system.

(c) Write the classification of compressor.

(d) Define air-conditioning & state the purpose of air-conditioning.

(e) Enlist the factors affecting on human comfort.

(f) Differentiate between central and unitary air-conditioning system.

4. Attempt any FOUR : **4 × 4 = 16**

(a) Explain with neat sketch flooded type evaporator.

(b) Explain the concept of green house effect & global warming.

(c) Define : (i) DBT

(ii) DPT

(iii) Relative humidity

(iv) Dew point depression

(d) State industrial application of air-conditioning system.

(e) Draw (i) Evaporative cooling & (ii) Heating & Humidification process on psychrometric chart.

(f) Give classification of chillers.

5. Attempt any TWO : **2 × 8 = 16**

(a) Classify the different types of ducts and explain any one with neat sketch.

(b) What are the different types of heat loads to be taken into account to calculate the heat load of Auditorium of your institute ?

(c) With the help of psychrometric chart, find the properties of air at 24 °C DBT & 40% RH.

(i) DPT, (ii) WBT, (iii) Specific Volume of air, (iv) Enthalpy of air, (v) Specific humidity of air.

Draw a simple psychrometric chart showing all above properties.

6. Attempt any FOUR : **4 × 4 = 16**

(a) State the methods of improving COP of VCRS system & draw it on p-h & T-S diagram.

(b) Explain any one type of humidifier.

(c) Write the components of Automobile A/c System with their function.

(d) Draw with labelled sketch Li-Br absorption system.

(e) Differentiate between heat pump & refrigerator.

(f) State the working principle of Capillary tube. State its two advantages.
