TED (15) – 6023

(REVISION — 2015)

Reg. No.....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

REFRIGERATION AND AIR CONDITIONING

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* :—1. Steam table psychrometric charts are permitted.

2. Missing data if any can be assumed suitably.]

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define sublimation.
2. List the principle components of a Vapour compression refrigeration system.
3. Define Joule - Thomson effect.
4. State air conditioning.
5. Define refrigerant. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Derive the expression for the C O P of Reversed Carnot Air Refrigeration Cycle.
2. List the desirable properties of an Ideal refrigerant.
3. Define :
   (i) Dry bulb temperature
   (ii) Wet bulb temperature
   (iii) Dew point temperature
4. Explain the working of a Winter air-conditioning system with neat sketch.
5. Name and the uses of principle parts of a Simple Vapour Absorption Refrigeration System.
6. Explain the working of a Bell-coleman air refrigeration cycle with P-V and T-S diagrams.
7. Classify and list out the air conditioning systems. (5×6 = 30)

PART — C

Marks

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Explain the working of a Simple Vapour Compression Refrigeration Cycle with schematic diagram. 9

(b) Draw the schematic diagram and P-h diagram of a Simple Saturation Cycle with accumulator. 6

OR

IV (a) The capacity of a refrigerator working on Reversed Carnot Cycle is 200 TR when working between -6°C and 25°C. Determine the mass of ice produced per day from water at 25° C. Also calculate the power required to drive the system. Assume the lattent heat of ice 335 KJ/Kg. 9

(b) List the advantages and disadvantages of Air Refrigeration. 6

UNIT — II

V (a) Explain the working of an Electrolux refrigeration system with flow diagram. 9

(b) Explain the working of a Capillary tube with a neat sketch. 6

OR

VI (a) Explain the working of an Automatic expansion valve with neat figure. 9

(b) Illustrate the working of a Pressure type water cooler with neat figure. 6

UNIT — III

VII (a) Atmospheric air having a volume of $300m^3$ at 30°C DBT and 25°C WBT is heated to 40° C DBT. Estimate :

(i) Quantity of heat added (ii) Final Relative Humidity (iii) WBT

Assume the pressure of air is 1.0132 bar. 9

(b) Explain sensible heat factor. 6

OR

VIII (a) The air enters a duct at 10°C and 80% RH at the rate of $150m^3$ per minute and is heated to 30°C without adding or removing moisture. The pressure remains constant at 1 atmosphere. Determine the relative humidity of air at exit from the duct and the rate of heat transfer. 9

(b) Derive the expression for the efficiency of a Heating coil. 6

UNIT — IV

IX (a) Explain with a neat sketch of a year round air conditioning system. 9

(b) List the sources of heat loads in an air conditioning system. 6

OR

X (a) Discuss the Heat gain through infiltration of air and show its expression with respect to volume of infiltration air. 9

(b) Explain Effective temperature. 6

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