

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

**REFRIGERATION AND AIR CONDITIONING**

[Time : 3 hours

(Maximum marks : 100)

[Note :— Steam table and psychometric charts are permitted.]

**PART — A**

(Maximum marks : 10)

Marks

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

1. State the first law of thermodynamics.
2. Define the C.O.P of refrigerator.
3. List the commonly used refrigerant.
4. State Dalton's law of partial pressure.
5. Define the term HVAC system.

(5 × 2 = 10)

**PART — B**

(Maximum marks : 30)

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

1. Define : (a) Sensible heat (b) Latent heat (c) Critical temperature.
2. Write the advantages and disadvantages of Air refrigeration system.
3. List the desirable properties of refrigerant.
4. What is defrosting ? List different methods of defrosting.
5. Draw and explain the experimental set up of sling psychrometer.
6. Explain heating and humidification process with simple diagram and represent it on psychrometric chart.
7. List the factors affecting the human comfort.

(5 × 6 = 30)

## PART — C

(Maximum marks : 60)

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

## UNIT — I

- III (a) Explain the Carnot refrigeration cycle with p-v and T-s diagram. 8
- (b) The atmospheric air 1 bar and  $10^{\circ}\text{C}$  is drawn and is compressed to 5 bar. After the compression the air is cooled up to  $15^{\circ}\text{C}$  at constant temperature, before expanding back to a pressure of 1 bar.
- Determine : (i) theoretical COP, (ii) Net refrigerating effect, if it is working on Bell - coleman refrigeration cycle. Take  $C_p = 1.005\text{KJ/KgK}$  and  $C_v = 0.718\text{KJ/KgK}$ . 7

OR

- IV (a) Explain the working of a simple vapour compression refrigeration system with flow diagram. 8
- (b) A reversed Carnot refrigerator having capacity of 10TR when working between  $-10^{\circ}\text{C}$  and  $30^{\circ}\text{C}$  Neglecting all losses.
- Determine : (i) COP (ii) heat rejected from the system per hour (iii) power required. 7

## UNIT — II

- V (a) With the help of a diagram explain the working of refrigerating system for a domestic refrigerator. 8
- (b) Compare the vapour compression system with vapour absorption system. 7

OR

- VI (a) Explain the working of an Electrolux refrigerator with suitable sketch. 8
- (b) Distinguish between natural convection type and forced convection type evaporator. 7

## UNIT — III

- VII (a) With the help of psychrometric chart explain sensible cooling. 8
- (b) Humid air at  $30^{\circ}\text{C}$  DBT and  $21^{\circ}\text{C}$  WBT is cooled to  $20^{\circ}\text{C}$  without removal moisture. Find the RH and DPT in final state. What is the change in enthalpy ? 7

OR

- VIII (a) Define : (i) specific humidity (ii) relative humidity (iii) absolute humidity (iv) degree of saturation. 8
- (b) With the help of schematic diagram explain cascade refrigeration system. 7

## UNIT — IV

- IX (a) Explain the working of year round air conditioning with line diagram. 8
- (b) Define cooling load. Explain the components of cooling load. 7

OR

- X (a) Explain with sketch working of central Air conditioning system. 8
- (b) List the classification of air conditioning system on the basis of function, season, equipment arrangement. 7