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Roll No .....

ME-803-GS

B.E. VIII Semester

Examination, December 2020

Grading System (GS)

Refrigeration and Air Conditioning

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. Explain Electrolux refrigeration system. How the system is operated to obtain different pressure in the cycle without a pump?

2. a) A cold storage plant is required to store 15 tonnes of Fish. The Fish is supplied at a temperature of 30°C. The specific heat of Fish above freezing point is 2.93 kJ/kg.K and that of below freezing point is 1.26 kJ/kgK. The fish is stored in cold storage which is maintained at –8°C. The freezing point of Fish is –4°C. The latent heat of fish is 235 kJ/kg. If the plant requires 80kW to drive it calculate the COP of the plant.
   b) Explain the working of reversed brayton refrigeration cycle. Derive the expression for COP of this cycle.

3. A refrigeration system operates on the reverse Carnot Cycle. The higher temperature of the refrigeration in the system is 35°C and the lower temperature is –15°C. The capacity is to be 12 tonnes. Neglecting all losses determine
   i) C.O.P
   ii) Heat rejected from the system
   iii) Power required

4. The operating temperature of a single stage vapour absorption refrigeration system are
   Generator = 90°C
   Condenser and absorber = 40°C
   Evaporator = 0°C
   The system has a refrigeration capacity of 100kW and the heat input to the system is 160kW. The solution pump work is negligible.
   i) Find the COP of the system and the total heat rejection rate from the system.
   ii) An inventor claims that by improving the design of all the components of the system he could reduce the heat input to the system to 80kW, while keeping the refrigeration capacity and operating temperatures same as before. Examine the validity of the claim.

5. a) Explain the working of Electrolux system.
   b) What do you understand by Eco-friendly refrigerant? Name two ecofriendly refrigerants and state their properties.

6. a) Define the following terms:
      i) Dry air ii) Moist air
      iii) Saturated air iv) Degree of saturation
      v) Humidity vi) Wet bulb temperature
   b) Prove that the partial pressure of water vapour in the atmospheric air remains constant as long as specific humidity remains constant.

7. Differentiate between RSH and GSH. Explain the procedure of drawing GSHF line on a psychrometric chart.

8. Write short notes on any two:
   a) Steam jet refrigeration
   b) Nomenclature of refrigerant
   c) Advantages of multi pressure system
   d) Comfort conditions

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