

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR

Semester : 3rd (V Dean)

Academic Year : 2023-2024

Credits : 2+1=3

Total Marks : 50

Note : 1) All questions from **Section 'A'** are compulsory.

2) Solve **Any Three** questions from **Section 'B'**.

3) Draw neat and well labeled diagram wherever necessary.

SECTION –‘A’

- Q. 1 A) Define the following. (05)

- i) Relative humidity
- ii) Wet bulb depression
- iii) Refrigeration
- iv) Humidification of air
- v) Sensible heat factor

- B) Expand the following. (05)

- i) COP
- ii) ASHRAE
- iii) CFC
- iv) RH
- v) BPF

- Q. 2 A) State whether True or False. If false, rewrite the statement after making necessary corrections in the underlined word(s). (05)

- i) The refrigerant should have high specific volume.
- ii) Summer air conditioning requires air to be cooled and dehumidified.
- iii) Constant entropy process is also called as isentropic process.
- iv) The vapour refrigerant entering the compressor is compressed to low pressure and temperature.
- v) The refrigerant number for ammonia is R-717.

- B) Choose the most appropriate answer from the options given below. (05)

- i) As the pressure of refrigerant at evaporator increases, the boiling point of the refrigerant
 - a) Increases
 - b) Decreases
 - c) Remains same
 - d) None of these
- ii) What is the name of expansion valve in which the valve opening varies depending on the super heat at the end of evaporator
 - a) Mechanical expansion valve
 - b) Capillary tube
 - c) Thermostatic expansion valve
 - d) Steam trap
- iii) The vertical lines uniformly spaced and drawn parallel to Y-axis on the psychometric chart are called as
 - a) Dry bulb temperature lines
 - b) Humidity ratio lines
 - c) Wet bulb temperature line
 - d) Specific volume lines

(P.T.O.)

- iv) The compression of superheated vapour in VCRS is termed as
a) Isochoric compression b) Dry compression
c) Wet compression d) Isentropic compression
- v) The sub cooling of refrigerant takes place between
a) Compressor and condenser b) Expansion valve and evaporator
c) Evaporator and compressor d) Condenser and expansion valve

SECTION –‘B’

- Q. 3 A) Explain the working of vapour compression refrigeration system with compound compression using p-h diagram. (05)
B) State the factors affecting COP of vapour compression refrigeration system. (05)
- Q. 4 A) Describe the working of an evaporative condenser. (05)
B) Air is humidified from 46°C DBT and 10% RH by adiabatic humidification to 50% RH. Find the change in specific volume of air and specific humidity of air. (05)
- Q. 5 A) Discuss vapour absorption refrigeration system with neat sketch. (03)
B) What are desirable properties of a good refrigerant? (03)
C) A 5 TR vapour compression refrigeration system using R-134 works between -10°C and 39°C. There is no superheating of refrigerant after evaporation but the liquid refrigerant is subcooled by 6°C. Calculate: (i) mass flow rate of refrigerant (04)
(ii) volumetric displacement of compressor, if its volumetric efficiency is 0.85.
- Q. 6 A) Write short notes on the types of refrigeration compressors. (03)
B) What are advantages of psychometric chart? (03)
C) Explain the following psychometric processes. (04)
i) Cooling and dehumidification.
ii) Heating and humidification.
iii) Cooling and humidification.
- Q. 7 Enlist different cooling loads considered during cold storage design. Explain them one by one with relevant equations used to calculate it. (10)
