

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B. TECH. (D.T.) DEGREE COURSE 2018-19

Semester : III (New Syllabus)	Academic Year : 2018-2019
Course No. : DE-307	Course Title : Refrigeration and Air Conditioning
Credits : 2+1 = 3	Total Marks : 50
Day & Date : Monday, 14/01/2019	Time : 15.00 to 17.00 Hrs.

- Note :**
- 1) All questions from **Section 'A'** are compulsory.
 - 2) Solve **Any Five** questions from **Section 'B'**.
 - 3) Draw neat and well labelled diagram wherever necessary.

SECTION – 'A'

Q. 1 A) Complete the sentence with suitable word/words. (05)

- i) A refrigerant vapor at temperature above the saturation temperature is called as vapour.
- ii) The correct sequence of thermodynamic processes in a vapor compression refrigeration system is
- iii) In LiBr-water refrigeration system is a refrigerant and is an absorbent.
- iv) Wet bulb temperature is obtained by following constant line on a psychometric chart.
- v) Use of flash chamber reduces the size of

B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)

- i) At a constant pressure, RH of air decreases with increase in temperature.
- ii) In ammonia refrigerating system, copper tubes are not used.
- iii) The main purpose of compressor is to maintain the temperature and pressure of refrigerant gas constant.
- iv) The process of cooling the refrigerant below the saturated liquid temperature is known as sub-cooling.
- v) Use of multi-compression increases the life of compressor.

Q. 2 A) Choose the most appropriate answer from the options given below. (05)

- i) The condition of refrigerant before entering the compressor should be
 - a) Saturated liquid
 - b) Wet vapour
 - c) Dry saturated liquid
 - d) Superheated vapour
- ii) Pick out the undesirable property for a good refrigerant
 - a) High Thermal conductivity
 - b) Low freezing point
 - c) Large latent heat of vaporization
 - d) High viscosity
- iii) In refrigeration system, flash chamber is placed
 - a) After evaporator
 - b) Between expansion valve and Evaporator
 - c) After condenser
 - d) Between evaporator and compressor
- iv) The pressure at the inlet of a refrigerant compressor is called as
 - a) Suction pressure
 - b) Discharge pressure
 - c) Critical pressure
 - d) Back pressure
- v) The temperature at which water vapour in air will just start to condense is
 - a) Saturation temperature
 - b) Dew point temperature
 - c) Wet bulb temperature
 - d) Dry bulb temperature

(P.T.O.)

B) State the functions of the following.

(05)

- i) Expansion valve
- ii) Receiver
- iii) Condenser
- iv) Flash chamber
- v) Cooling tower

SECTION - 'B'

- Q. 3. An ammonia refrigerating machine has working temperatures of 35°C in the condenser and -15°C in the evaporator. Calculate the following, if dry vapour enters compressor and leaves at 40°C . No sub-cooling occurs after condensation. (06)
- i) Mass flow of refrigerant
 - ii) The theoretical horsepower per ton of refrigeration
 - iii) The coefficient of performance.
- Q. 4 Give diagram of a vapor compression refrigeration system and describe specific functions of each component. (06)
- Q. 5 What are desirable properties of refrigerants? Describe them in brief. (06)
- Q. 6 Write short notes on the following. (02)
- a) Cooling tower. (02)
 - b) Accumulator (02)
 - c) Dual compressor (02)
- Q. 7 a) With interpretation on psychometric chart, describe adiabatic humidification of air. (03)
- b) Enlist the advantages of multistage vapour compression refrigeration system. (03)
- Q. 8 Discuss the effect of following on COP of VCR system. (02)
- a) Suction and Discharge pressures (02)
 - b) Super heating and sub cooling (02)
 - c) Multi-compression (02)
- Q. 9 a) Find the DPT of air having 40°C DBT and 60% RH using chart. (02)
- b) With a neat well labeled diagram, explain the working principle of ammonia vapour absorption system. (04)
