

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B. Tech. Dairy Technology 2019-20

Semester	: III (V Dean)	Academic Year	: 2019-2020
Course No.	: DE-308	Course Title	: Refrigeration and air conditioning
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Saturday, 11.01.2020	Time	: 15.00 to 17.00 Hrs.

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

- i) Vertical lines on pressure-enthalpy chart show constant
 - a) Pressure lines
 - b) Temperature lines
 - c) Enthalpy lines
 - d) Entropy lines
- ii) During heating and humidification process, dry bulb temperature
 - a) Remains constant
 - b) Increases
 - c) Decreases
 - d) No effect
- iii) The coefficient of performance of a vapour compression refrigeration system is
 - a) Less than 1
 - b) More than 1
 - c) Equal to 1
 - d) Depends on make
- iv) In refrigeration system, the refrigerant rejects the heat in
 - a) Condenser
 - b) Evaporator
 - c) Expansion valve
 - d) Compressor
- v) As the suction pressure decreases, the work to be done by compressor
 - a) Decreases
 - b) None of these
 - c) Does not change
 - d) Increases

B) Define the following. (05)

- i) Refrigerant
- ii) Dehumidification
- iii) Dew point temperature
- iv) One ton of refrigeration
- v) Relative humidity

Q. 2 A) Do as directed. (05)

- i) Cooling by dissolution of salt in water cannot be used at commercial scale, why?
- ii) Explain the term Secondary Refrigerant.
- iii) Why compressor is not required in vapour absorption refrigeration system?
- iv) Why we feel uncomfortable in high humidity?
- v) State the major problem associated with vapour compression refrigeration system.

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) A refrigerant should have high boiling point.
 - ii) The vapor pressure of refrigerant should be higher than the atmospheric pressure.
 - iii) Evaporative cooling of air using water is an adiabatic process.
 - iv) The component of vapour compression refrigeration system where the actual cooling takes place is known as condenser.
 - v) One ton of refrigeration corresponds to 100 kcal/min.

SECTION –‘B’

- Q. 3. A) Differentiate between heat engine, refrigerator and heat pump. (05)
B) Enlist the various types of multi stage compression refrigeration systems and explain two stage compression with liquid intercooler with neat diagram. (05)
- Q. 4. A) Explain the working of Vapour compression refrigeration system with the help of a neat sketch. Mention the advantages of vapour compression refrigeration system over air refrigeration system. (05)
B) Explain working of vapour absorption refrigeration system with neat sketch. (05)
- Q. 5. A) A machine is operating between the temperature limits of 308 and 263 K. (03)
Calculate the coefficient of performance of the machine if it is operated as :-
1. Refrigerator,
2. Heat Engine
3. Heat Pump
B) What are the advantages of multistage compression? (03)
C) What are desirable characteristics of ideal refrigerant? Explain how refrigerants are designated. (04)
- Q. 6. A) Define Air-conditioning. Explain different components of air conditioning system with neat diagram. (03)
B) What is mean by ‘Bypass Factor’ of cooling coil? (03)
C) Calculate the capacity of refrigeration system required to meet the demand of 100 kg per hour ice producing plant. Water at 30°C is used for producing the ice. Assume the specific heat and latent heat of fusion of water as 4.186 kJ/kg-°C and 335 kJ/kg. (04)
- Q. 7. Enlist the various Psychrometric processes and explain any four with neat diagrams. (10)
