

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: VI (Old)	Term	: II	Academic Year	: 2017-18
Course No.	: APE 368	Title	: Refrigeration and Air Conditioning		
Credits	: 2 (1+1)	Time	: 09.00 to 11.00	Total Marks	: 40
Day & Date	: Thursday, 26.04.2018				

- Note :
1. Solve ANY EIGHT questions from SECTION "A".
 2. All questions from SECTION "B" are compulsory.
 3. All questions carry equal marks.
 4. Draw neat diagrams wherever necessary.

SECTION "A"

- Q.1 Explain air refrigeration system working on reversed Carnot cycle with the help of p-v and T-s diagram.
- Q.2 In ammonia vapour compression system, the pressure in evaporator is 2 bar. Ammonia at exit is 0.85 dry and at entry, its dryness fraction is 0.19. During compression, the work done per kg of ammonia is 150 kJ. Calculate the C.O.P and the volume of vapour entering the compressor per minute, if the rate of ammonia circulation is 4.5 kg/min. The latent heat and specific volume at 2 bar are 1325 kJ/kg and 0.54 m³/kg respectively.
- Q.3 Discuss in detail the working of simple vapour absorption refrigeration system.
- Q.4 A cold storage is to be maintained at -5⁰ C while surrounding temperature is 35⁰ C. The heat leakage from surroundings into cold storage is estimated to be 29 kW. The actual C.O.P. of refrigeration plant is one-third of an ideal plant working between same temperatures. Find power required to drive the plant.
- Q.5 Discuss the physiological hazard resulting from heat.
- Q.6 Derive following expression for air vapour mixture.
- $$\frac{0.622 \times P_v}{P_b - P_v}$$
- Q.7 Write short notes (Any Two) :
- a) Secondary refrigerant
 - b) Winter air conditioning system
 - c) Dry ice refrigeration
- Q.8 State different psychrometric processes involved in air conditioning. Explain in detail sensible cooling.
- Q.9 A sling psychrometer reads 30⁰C dry bulb temperature and 20⁰C wet bulb temperature. If barometer reading is 740 mm of Hg, calculate dew point temperature, relative humidity and specific humidity. Use steam table wherever necessary.
- Q.10 a) Give the classification of air conditioning system.
b) What are the desirable properties of ideal refrigerant?

(P.T.O.)

SECTION "B"

Q.11 Define the following terms.

- 1) Dew point temperature
- 2) Air stratification
- 3) Azeotrope
- 4) Wet bulb depression

Q.12 State True or False.

- 1) Condenser is the heart of refrigeration system.
- 2) Weight is amount of matter contained in given body.
- 3) Wet bulb temperature is the temperature of air recorded by thermometer, when the moisture (water vapour) present in it begins to condense.
- 4) The inorganic refrigerants are designated by adding 100 to molecular mass of compound.

