

KERALA AGRICULTURAL UNIVERSITY
B.Tech (Agrl. Engg) 2013 Admission
Vth Semester Final Examination- January-2016

Cat. No: Phpt.3104

Title: Refrigeration and Air Conditioning (2+1)

Marks: 50.00

Time: 2 hours

I Fill up the blanks

(10 x 1=10)

1. During sensible heating or cooling , the dry bulb temperature _____ in a Psychometric chart _____
2. R-22 refers to _____
3. The mixture of dry air and water vapour when the air has diffused maximum amount of water vapour into it is called _____
4. Moist air cooled condensers are designed to operate with a temperature difference of _____ °C
5. Most thermostatic expansion valve are set for a superheat of _____ °C
6. The triple point of CO₂ at 5.18 bar is _____
7. The evaporator generally used in home freezers ,ice cream cabinet etc is _____
8. One tone of refrigeration is equal to _____ kJ/min
9. Air conditioners work on _____ cycle and _____ cycle
10. Throttling process occurs at constant _____

II Write short notes on any FIVE questions

(5 x 2=10)

1. Dew point temperature
2. Room sensible heat factor
3. Free expansion
4. Throttling
5. Ton refrigeration
6. Isentropic Process
7. Bell Coleman cycle

III Write short essay on any FIVE questions

(5 x 4=20)

1. Carnot refrigerator requires 1.25 Kw per tones of the refrigeration to maintain a region at low temperature -35° C. Calculate
 - a) COP of Carnot refrigerator
 - b) Higher temperature of the cycle
 - c) The heat delivered and COP when this device is used as heat pump

2. Describe the working principle of commercial absorption vapour refrigeration system with the help of a neat and clean diagram
3. Draw a H-T and T-S diagram for simple compression vapour cycle for following cases
 - When the vapour is dry and saturated at the end of compression
 - When the vapour is super heated at the end of compression
4. Show the following Psychrometric process with help of Psychrometric chart
 1. Sensible heating and cooling
 2. Heating with humidification
 3. Cooling with dehumidification
 4. Drying
 5. Mixing of air streams
5. Name the refrigerant and their operating pressure for the following application
 1. Domestic refrigeration
 2. Cold storage
 3. Ice cream Plant
 4. Room Air conditioner
6. What are the desirable properties of an ideal refrigerant
7. What are the three methods for determination of duct size? Explain them

IV Write essay on any ONE

(1 x 10=10)

1. Describe in detail the working of
 1. Domestic Electrolux (Ammonia Hydrogen) Refrigerator
 2. Window air conditioner for summer cooling
2. 28 tonnes of ice from and at 0°C is produced per day in an ammonia refrigerator. The temperature range in the compressor is from 25°C to -15°C . The vapour is dry and saturated at the end of saturation and expansion valve is used. Assuming a coefficient of performance of 62 % of the theoretical, calculate the power required to drive the compressor

Temperature ($^{\circ}\text{C}$)	Enthalpy(KJkg^{-1})		Entropy of liquid ($\text{kJ kg}^{-1} \text{K}^{-1}$)	Entropy of vapour ($\text{kJ kg}^{-1} \text{K}^{-1}$)
	Liquid	Vapour		
25	100.04	1319.22	0.3473	4.4852
-15	-54.56	1304.99	-2.1338	5.0585

Take latent of ice is 360kJ kg^{-1}