



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Engg.) 2016 Admission
III Semester Final Examination-January-2018

Fden.2103

Refrigeration and Cold Storage (1+1)

Marks: 50
Time: 2 hours
(10x1=10)

I Fill in the blanks:

- 1 Refrigerating effect increases with-----suction pressure
- 2 Compression ratio should be _____ for better COP
- 3 Thermocol can be used as _____
- 4 NH₃ is used for _____ type of load conditions in VCR.
- 5 Automatic expansion valve is _____ type expansion device.

State True or False

- 6 Throttling is constant enthalpy process.
- 7 Cooling towers are used in evaporators.
- 8 NH₃ is a non toxic refrigerant.
- 9 Plate freezers are highly effective.
- 10 In air blast freezing, the velocity of air varies from 30 to 120 m/min.

II Write Short notes on ANY FIVE of the following (5x2=10)

- 1 Write down the effects of condensing pressure on COP.
- 2 Where does the high side float valve fit in?
- 3 Write any two inorganic refrigerants?
- 4 What do you mean by Freezing point depression?
- 5 Define the term Freezing?
- 6 Define thermodynamic second law (Kelvin Planck and clausius statement) and prove their equivalence
- 7 Write a short note on plate heat exchangers as evaporators.

III Answer ANY FIVE of the following (5x4=20)

- 1 Discuss designation of types of refrigerants with example
- 2 Discuss on Flake ice making machine and its working principle.
- 3 List out the types of freezers and explain the working principle of blast freezer.
- 4 What do you mean by thawing of frozen fish? Explain any two methods of thawing.
- 5 Explain steam jet refrigeration systems
- 6 With neat sketch explain VCR
- 7 Draw the processes in psychometric chart for Cooling and dehumidification

IV Write an essay on ANY ONE of the following (1x10=10)

- 1 Following data refers to a 20 TR ice plant using ammonia as refrigerant: The temperature of water entering and leaving the condenser are 20⁰ C and 27⁰ C and temperature of the brine in the condenser is -15⁰ C. Before entering the expansion valve, ammonia is cooled to 20⁰ C and the ammonia enters the compressor dry saturated. Calculate for one tonne of refrigeration the power expended, the amount of cooling water in the condenser and the coefficient of performance of the plant.

Saturation temperature	Enthalpy(kJ/kg)		Entropy (kJ/kg K)		Specific heat (kJ/kg K)	
	liquid	vapour	liquid	vapour	liquid	vapour
-15 ⁰ C	112.34	1426.54	0.4572	5.5490	4.396	2.303
25 ⁰ C	298.90	1465.84	1.1242	5.0391	4.606	2.805

- 2 Briefly discuss on classifications and types of refrigerant compressors
