Code No: RT32037A | R13 | SET - 1

III B. Tech II Semester Supplementary Examinations, November - 2018

REFRIGERATION & AIR CONDITIONING

(Mechanical Engineering)

Time: 3 hours | Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What do you understand by the COP of an air refrigeration cycle? Give its formula.	[3M]
	b)	Under what circumstances the superheating of vapour before coming to compressor is more objectionable? Give the ways to prevent it.	[4M]
	c)	What are essential properties of a good refrigerant?	[3M]
	d)	Define and write the expression for entrainment efficiency in steam jet refrigeration system.	[4M]
	e)	What is the need of Ventilation?	[4M]
	f)	Draw the Schematic layout of Summer air conditioning Systems	[4M]

PART -B

2	a)	Draw the schematic of a boot-strap cycle of air refrigeration system, and show the cycle on T-s diagram.	[8M]
	b)	A cold storage plant is required to store *20* tonnes of fish. The fish is supplied at a temperature of *30°C*. The specific heat of fish above freezing point is *2.93 kJ/kg K*. The specific heat of fish below freezing point is *7.26 kJ/kg K*. The fish is stored in cold storage which is maintained at -8^0C. The freezing point of fish is -4^0C. The latent heat offish is *235 kJ/kg*. If the plant requires *75 kW* to drive it, find: i) The capacity of the plant, and ii) Time taken to achieve cooling. Assume actual C.O.P. of the plant as 0.3 of the Carnot C.O.P.	[8M]
3	a)	Draw the vapour compression refrigeration cycle on T-s diagram when the refrigerant is dry and saturated at the end of compression and find an expression for the C.O.P in terms of (i) Temperature and entropies; (ii)Enthalpy.	[9M]
	b)	How does the increase in condenser temperature affect COP? Also explain the influence of evaporator temperature on COP. Which of the two temperatures have more influence on COP?	[7M]
4	a)	List the different types of compressors? And explain each type usage in refrigeration systems giving proper reasons.	[8M]
	b)	With the help of a neat sketch, explain the working of an evaporative condenser.	[8M]
5	a)	State the advantages and disadvantages of Electrolux refrigerator over conventional refrigerators.	[7M]
	b)	Explain the working of Thermostatic Expansion valve with neat sketch. Write its advantages and disadvantages.	[9M]
6	a)	Define the term `` effective temperature `` and explain its importance in air conditioning system. Describe the factors which affect effective temperature.	[8M]
	b)	Explain in brief as to how the human body reacts to changes in temperature of environment. Also explain the effect of activities on the heat load calculation for comfort application.	[8M]
7	a)	With the help of a circuit diagram explain how a single air conditioning unit is used as an air-conditioner in summer and heat pump in winter.	[9M]
	b)	Explain about Grills and Registers along with their performance effects	[7M]

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