SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR
(AUTONOMOUS)
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QUESTION BANK

Subject with Code : R&C((20ME3118) **Course & Specialization**: M.Tech – Th. Engg

Year & Sem: I & II-Sem **Regulation:** R20

UNIT-I

1.	(a)	What are Cryogenic and its necessity in the recent era?	L2	C01	5M
	(b)	Give the applications of Cryogenics in different fields.	L3	C01	5M
2.		A Carnot refrigerator using R12 as working fluid operates between 40ºC and -30ºC.e Determine the work of compression and cooling effect produced by the cycle.	L4	C01	5M
3.	(a)	Discuss the effects of evaporator and condenser temperatures on Carnot COP.	L2	C01	5M
	(b)	Derive the equation for Carnot COP.	L3	C01	10M
4.		Discuss the standard vapour compression refrigeration system comparing with Carnot cycle and derive the cycle efficiency.	L2	C01	10M
5.		An ideal refrigeration cycle operates with R134a as the working fluid. The temperature of refrigerant in the condenser and evaporator are 40ºC and -20ºC respectively. The mass flow rate of refrigerant is 0.1 kg/s. Determine the cooling capacity and COP of the plant.	L4	C01	10M
6.		Explain actual Vapour Compression Refrigeration System.	L2	C01	10M
7.	(a)	Describe the comparison between a VCRS cycle with and with out sub cooling.	L2	C01	5M
	(b)	Describe the effect of superheat on specific refrigeration effect and work of compression.	L2	C01	5M
8.	(a)	Explain the working of two stage cascade refrigeration system with neat diagram.	L2	C01	5M
	(b)	With a neat sketch explain the working of Multistage compression with inter cooling.	L2	C01	5M
9.		Explain about Multiple evaporators at the same temperature with single compressor and expansion valve.	L2	C01	10M
10.	(a)	What are the advantages and disadvantages of the Joule-Thomson Process?	L1	C01	10M
	(b)	The temperature limits of an ammonia refrigeration system are 25˚ C and -10 ˚ C. If the gas is dry at the end of compression, calculate the coefficient of performance of the cycle assuming no under cooling of the liquid ammonia. Use the following table for properties of ammonia.			

Temperature ◦ C	Liquid Heat (kj /kg)	Latent Heat (kj/kg)	Liquid Entropy (kj / kg K)

25	298.9	1166.94	1.1242
-10	135.37	1297.68	0.5443

UNIT-II

1.		Explain with the help of a sketch, the principle of operation of a single stage, single acting reciprocating compressor	L3	C02	10M
2.	(a)	Draw and explain P-V and T-S diagrams of a reciprocating compressor	L3	C02	5M
	(b)	Derive an expression for Power required to drive a single stage reciprocating compressor	L2	CO2	5M
3.		Derive an expression for work done by a reciprocating compressor with clearance volume	L4	C02	10M
4.		Derive an expression for Volumetric efficiency of a Reciprocating compressor	L3	C02	10M
5.	(a)	Explain the working of Two stage reciprocating compressor with Inter cooler	L3	C02	5M
	(b)	List out the advantages of multi-stage compressor	L1	CO2	5M
6.		Explain in detail about various Types of inter cooling used in two stage Reciprocating Compressor.	L2	C02	10M
7.		Derive an expression for the work done of a two stage Reciprocating Compressor with inter cooling.	L2	C02	10M
8.		Draw the Performance characteristics of refrigerant Reciprocating Compressor.	L2	C02	10M
9.		Discuss the working of screw compressor with a neat sketch and also mention its merits and demerits	L3	C02	10M
10.	(a)	Differentiate between screw compressor and scroll compressor	L3	C02	5M
	(b)	Write about characteristics of scroll compressor	L1	CO2	5M

UNIT-III

1.	(a)	Classify the condensers and discuss about air cooled condensers.	L2	C03	5M
	(b)	Explain the function of water cooled condensers.	L2	CO3	5M
2.		With neat sketch explain evaporative condenser function.	L2	CO3	10M
3.	(a)	What is Heat Rejection Rate? Explain the condenser heat rejection ratio (HRR) in terms of COP	L2	CO3	5M
	(b)	Discuss about log mean temperature difference in a condenser.	L3	CO3	5M
4.		Derive the overall heat transfer coefficient for design of a condenser.	L3	CO3	10M
5.		What is the concept of Wilson's plot and how it is useful to design the condensers and evaporators?	L2	CO3	10M

6.	(a)	Differentiate air cooled condensers and water cooled condensers	L2	CO4	5M
	(b)	How can you classify the evaporators and explain the working of an evaporator	L3	CO4	5M
7.	(a)	Explain the working of bare tube coil evaporator with neat diagram.	L4	CO4	5M
	(b)	With a neat diagram Explain the working of shell and coil evaporator.	L2	CO4	5M
8.	(a)	Define the term refrigerant. How it is classified?	L1	CO4	5M
	(b)	List out the properties needed for the selection of refrigerants.	L1	CO4	5M
9.		Elucidate the desirable properties of an ideal refrigerant.	L2	CO4	5M
10.	(a)	Explain the process of Refrigerant nomenclature with an example	L3	CO4	5M
	(b)	List out various Refrigeration Applications.	L1	CO4	5M

UNIT-IV

1.	(a)	What are the desired properties of an ideal insulating material	L1	CO5	5M
	(b)	List the advantages of Providing Insulation	L1	CO5	5M
2.	(a)	Explain different types of Insulating Materials Used in Refrigeration system	L2	CO5	5M
	(b)	Write a short notes on Economical Thickness of Insulation	L2	CO5	5M
3.		Write short notes on different types of insulation used in cryogenics	L2	CO5	10M
4.	(a)	Distinguish between various insulations used in cryogenics	L2	CO5	5M
	(b)	What is super insulation? Discuss	L2	CO5	5M
5		With a neat sketch explain a cryogenic liquid storage Dewar vessel	L2	CO5	10M
6.	(a)	Discuss the process of Gas separation system.	L3	CO5	5M
	(b)	How to tackle thermal contraction problem in cryogenic transfer lines	L1	CO5	5M
7.	(a)	Explain various methods of draining a cryogenic vessel	L2	CO5	5M
	(b)	With neat diagram explain the working of Vacuum insulated Bayonet joint.	L2	CO5	5M
8.		Describe the working of air separation system with a neat sketch and also mention its applications	L2	CO5	10M
9.		Elucidate the properties of Low temperature Engineering Materials.	L2	CO5	10M
10.	(a)	Write a short notes on Adiabatic magnetization and Adiabatic demagnetization	L2	CO5	5M
	(b)	How to handle the Cryogenic Liquids?	L1	CO5	5M

UNIT-V

1.		Describe the process of liquification of gases.	L2	CO6	10M
2.		Sketch and explain the working of Linde system.	L3	CO6	10M
3.		Explain the working of Dual Pressure Linde system with neat diagram.	L2	CO6	10M
4.		Discuss the different types of liquefaction methods and explain any one method.	L1	CO6	5M
5.		Describe the method adopted for Liquefaction of Hydrogen	L3	CO6	10M
6.		With the help of a neat sketch discuss about the Liquefaction of Helium	L2	CO6	10M
7.		Derive an expression for COP of Linde System for Liquefaction of Gases	L3	CO6	10M
8.	(a)	List out applications of cryogenics temperatures in the major domains.	L3	CO6	5M
	(b)	What are the major properties of cryogenic fluids required for using in gas separation	L1	CO6	5M
9.	(a)	Differentiate between super fluidity and super conductivity	L2	CO6	5M
	(b)	Discuss the arrangement used for producing low temperatures by adiabatic demagnetization of a paramagnetic salt.	L2	CO6	5M
10	(a)	What is super fluidity? Explain its properties	L1	CO6	5M
	(b)	What are Thermal Properties of Materials?	L1	CO6	5M

Prepared By: **Dr S Sunil Kumar Reddy.**