BT MRE-VI(R/S)-06-24-3256 Reg. No. | | | | | | | | |

C

B.Tech. Degree VI Semester Regular/Supplementary Examination in Marine Engineering June 2024

19-208-0604 MARINE REFRIGERATION AND AIR CONDITIONING

(*2019 Scheme*)

Time: 3 Hours Maximum Marks: 60

Course Outcome

On successful completion of the course, the students will be able to:

CO1: Understand the different refrigeration cycles and different refrigeration systems.
CO2: Gain knowledge regarding marine refrigeration plant with multiple compression and evaporation and different refrigerants.
CO3: Explain the different components and maintenance of marine refrigeration plant and the refrigeration of cargo hold.
CO4: Understand about the properties of gas mixtures and air and water vapour mixtures.
CO5: Gain knowledge on basic principles of air conditioning and heat load calculation of AC plant.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create

PI – Programme Indicators

(Answer *ALL* questions) (5 × 15 = 75)

			Marks	BL	CO	PI
I.	(a)	Write short notes on:-	9	L1	1	1.4.1
		(i) Reverse Carnot cycle?				
		(ii) Coefficient of performance of a refrigeration plant.				
		(iii) Refrigerating effect and Rating of a Refrigeration plant.				
	(b)	A reversed Carnot cycle refrigerator requires 1.3 kW per tons of refrigeration to maintain a region at low temperature of -38°C. Determine.	6	L2	1	1.1.2
		(i) COP of refrigerator				
		(ii) Higher temperature of the cycle				
		(iii) The heat delivered and COP, when this device is used as a heat pump?				
		OR				
II.	(a)	What is Cryogenic technology? Mention its applications in Marine Industry? What are the different insulators system used in Cryogenic System?	10	L2	1	1.4.1
	(b)	What are the differences between Vapour Compression Refrigeration system and Vapour Absorption Refrigeration system?	5	L1	1	1.4.1
III.	(a)	Explain the desirable properties of a Refrigerant used in a Vapour compression system?	10	L1	2	1.4.1
	(b)	Describe a Cascade refrigeration system with the help of a sketch?	5	L3	2	1.4.1
		OR				

(P.T.O.)

			Marks	BL	CO	PI
IV.	(a)	Sketch and explain a multi evaporator system at different temperatures with back pressure valves? What is the purpose of back pressure valves in the system?	9	L2	2	1.4.1
	(b)	Write short notes on. (i) Ozone depletion potential. (ii) Montreal protocol. (iii) Global warming potential.	6	L2	2	1.4.1
V.	(a)	How are the evaporators used in a refrigeration system are classified? Sketch and explain various types of Evaporators.	10	L2	3	1.4.1
	(b)	What are different alarms and trips provided in a Vapour compression refrigeration system?	5	L3	3	1.4.1
		OR				
VI.	(a)	Sketch and explain the different types of unloaders used in a Reciprocating compressor for a refrigeration system.	10	L3	3	1.4.1
	(b)	Write down the procedure for filling lubricating oil in a reciprocating compressor used in a marine refrigeration plant.	5	L2	3	1.4.1
VII.	(a)	(i) Define Dalton's Law of partial pressure. (ii) Define Amagat's law of partial volume.	6	L1	4	1.4.1
	(b)	Define Volumetric analysis and Gravimetric Analysis of gas mixtures. Explain the conversion of Volumetric Analysis to Gravimetric analysis.	9	L1	4	1.4.1
		OR				
VIII.	(a)	Define:- (i) Dry bulb temperature. (ii) Wet bulb temperature. (iii) Specific humidity. (iv) Relative Humidity. (v) Dewpoint temperature.	5	L1	4	1.4.1
	(b)	With the help of a sketch describe the working of a Shell and Tube Condenser used in a refrigeration system. Explain the procedure for leak test of the condenser.	10	L3	4	3.1.4
IX.	(a)	Draw a Psychrometric chart showing all the constant parameter lines.	6	L1	5	3.1.4
	(b)	Explain the factors to be considered while estimating the Capacity of Airconditioning plants.	9	L3	5	2.4.4
		OR				
X.	(a)	Explain the different types of centrifugal fans used in air conditioning systems with the help of sketches?	7	L2	5	1.4.1
	(b)	Sketch and explain a zoned system of Airconditioning plant.	8	L2	5	1.4.1

Bloom's Taxonomy Levels
L1-33.3%, L2-40.7%, L3-26%.

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