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B.Tech. Degree VI Semester Regular Examination in Marine Engineering June 2022

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

PART A(Answer *ALL* questions)

		(5 × 15 = 75)	Marks	BL	CO	PI
I.	(a) Sketch and describe a vapour compression system along with the p-H and T-S diagrams where superheating and sub-cooling of refrigerant is involved.	10	L2	1	1.4.1	
	(b) With regard to a vapour compression refrigeration system, determine the following with the help of a p-H diagram:					
	(i) Heat rejection					
	(ii) Refrigerating effect	5	L3	1	1.4.1	
	(iii) Coefficient of performance					
	(iv) Mass flow rate					
	(v) Compressor power					
OR						
II.	(a) Sketch and explain a simple vapour compression refrigeration system along with the p-H and T-S diagrams.	10	L2	1	1.4.1	
	(b) Demonstrate the uses of a flash chamber in a vapour compression refrigeration system.	5	L3	1	1.4.1	
III.	(a) List the factors affecting heat load calculation of a refrigeration system.	5	L1	2	1.4.1	
	(b) Sketch and explain a compound refrigeration system with multi-stage compression.	10	L2	2	1.4.1	
OR						
IV.	(a) Name the properties that influence the choice of a refrigerant	5	L1	2	1.4.1	
	(b) Explain how to calculate the total heat load of a particular refrigeration plant.	10	L2	2	1.4.1	

(P.T.O.)

V.	Write short notes on: (i) Maintenance of refrigeration system (ii) Trouble shooting of refrigeration system.	15	L2	3	1.4.1
OR					
VI.	Explain the various methods of capacity control used in refrigeration systems.	15	L2	3	1.4.1
VII.	Draw a psychrometric chart showing the various constant parameter lines. Explain the various psychrometric properties of moist air.	15	L2	4	1.4.1
OR					
VIII..	(a) Write short notes on: (i) Volumetric analysis of gas mixtures (ii) Gravimetric analysis of gas mixtures	6	L2	4	1.4.1
	(b) Sketch and explain the purpose and working of a cooling tower.	9	L2	4	1.4.1
IX.	Discuss the following: (i) Duct design and construction (ii) Types of fans used in air conditioning (iii) Zone control system of air conditioning.	15	L2	5	1.4.1
OR					
X.	Short notes on the following: (i) Engine room ventilation (ii) Battery room ventilation (iii) Double duct system of air conditioning.	15	L2	5	1.4.1

Blooms's Taxonomy Levels

L1 - 7%, L2 - 86%, L3 - 7%.
