2109230032

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2024

REFRIGERATION AND AIR-CONDITIONING

[Maximum Marks : 75]   [Time : 3 hours]

PART–A

I. Answer **all** the following questions in one word or sentence. Each question carries 1 mark.

(9x1=9 marks)

		Module Outcome	Cognitive level
1	Solid carbon dioxide is also known as………………	M1.02	R
2	A refrigerator working on reverse carnot cycle has a COP of 2. Find the COP if it is operated as heat pump between same temperature limits.	M1.04	U
3	Name the component added to refrigeration system which traps liquid refrigerant leaving evaporator before entering compressor.	M2.01	U
4	Write any two examples for primary refrigerant.	M2.04	R
5	In vapor absorption refrigeration system, strong solution of ammonia is formed in…………..	M2.01	U
6	Name the refrigeration system having two or more V.C. refrigeration system in series.	M3.06	U
7	List any two applications of cryogenic refrigeration.	M3.06	R
8	Define 'sensible heat factor'.	M4.01	U
9	For measuring dry bulb and wet bulb temperature,……..is used.	M4.01	R

PART B

II. Answer **any Eight** questions from the following. Each question carries 3 marks.

(8x3=24 marks)

		Module Outcome	Cognitive level
1	Define C.O.P. of a refrigerating cycle. Also write the expression of finding COP of Bell-Coleman cycle.	M1.02	U
2	List the basic components of vapor compression refrigeration system.	M2.01	R
3	Name the refrigerant having zero Ozone depletion potential. List the features of same.	M2.04	R
4	Briefly explain the effect of superheating on C.O.P. of refrigeration cycle.	M2.02	U
5	List the advantages of cryogenic refrigeration.	M3.06	R
6	List any three psychrometric process and indicate it on psychrometric chart.	M4.01	R
7	List any three factors affecting human comfort.	M4.03	R
8	Briefly explain the classification of air-conditioning systems.	M4.05	U
9	Define the term HVAC.	M4.07	U
10	List any four sources of heat loss considered for the calculation of cooling load.	M4.06	R

PART C

Answer **all** questions from the following. Each question carries 7 marks.

(6x7=42marks)

		Module Outcome	Cognitive level
III	Certain machine works on a reversed carnot cycle between the temperature limits of -10℃ and 27℃. Find the COP when working as refrigerator and heat pump.	M1.04	A
	OR		
IV	500 Kg air is circulated per hour in a refrigeration system. The air is drawn from the cold chamber at temperature 8℃ and 1 bar and then compressed isentropically to 5 bar. It is cooled at this pressure to 28℃ and then lead to expander, where it expands to atmospheric pressure and is discharged to cold chamber. Calculate heat extracted from the cold chamber per hour and C.O.P of the system. Take Cp of air =1.003 kJ/kg.K; adiabatic index = 1.4.	M1.04	A
V	With flow diagram, explain the components of vapor compression system.	M2.02	U
	OR		
VI	List the advantages and disadvantages of vapor compression system over air refrigeration system.	M2.03	U
VII	Compare between air cooled condenser and water cooled condenser.	M3.02	U
	OR		
VIII	Explain the working of thermostatic expansion valve with diagram.	M3.04	U
IX	Explain the liquefaction of hydrogen.	M3.06	U
	OR		
X	With a neat diagram, explain the working of flooded evaporator.	M3.02	U
XI	With the help of a neat sketch, explain the air-conditioning system useful for summer season.	M4.05	U
	OR		
XII	Briefly explain any four sources of heat gain taken to consideration during cooling load calculation.	M4.06	U
XIII	Atmospheric air at 15℃ DBT and 30% Relative humidity passes through a furnace and through a humidifier, in such a way that the final DBT is 32℃ and 40% Relative humidity. Determine heat and moisture added to air.	M4.02	A
	OR		
XIV	100 kg of air at 15℃ DBT and 75% relative humidity is heated until it's temperature is 25℃. Find (i) Relative humidity of heated air (ii) Wet bulb temperature of heated air (iii) Heat added to air.	M4.02	A

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