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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2025

REFRIGERATION AND AIR-CONDITIONING

[Maximum marks: 75] [Time: 3 Hours]

PART A

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

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	Define the COP of a refrigeration system.	M1.01	R
2	Name any refrigerant absorbent pair used in vapour absorption systems.	M2.01	R
3	State the function of analyser in a practical vapour absorption refrigeration system using ammonia refrigerant.	M2.01	R
4	List any two environmental impacts due to the wrong selection of refrigerants.	M2.04	R
5	List any two examples of primary and secondary refrigerants.	M2.04	R
6	State the function of the refrigerant compressor.	M3.01	R
7	Define dew point temperature.	M4.01	R
8	Define humidity ratio.	M4.01	R
9	Sketch heating and humidification process on a typical simple psychrometric chart.	M4.01	R

PART B

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

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	Explain ice refrigeration.	M1.02	U
2	Draw the T-S diagram of a vapour compression refrigeration cycle with subcooling and having saturated vapour at the end of compression.	M2.01	R
3	List any three methods of improving COP of a simple saturation cycle.	M2.02	R
4	List the desirable properties of an ideal refrigerant.	M2.04	R
5	List different compressors used in refrigeration systems.	M3.01	R
6	Explain bypass factor of a heating coil.	M4.01	U
7	List the factors affecting human comfort.	M4.03	R
8	Define effective temperature.	M4.03	R
9	Differentiate Unitary and Central air conditioning systems.	M4.04	U
10	Define sensible heat factor.	M4.06	R

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III.	Derive an expression for COP of Reversed Carnot cycle with simple line diagram, p-v and T-s diagram.	M1.02	U
	OR		
IV.	A Carnot refrigeration cycle absorbs heat at -15^{0}C and rejects it at 35^{0}C. The capacity of the system is 12 tonnes. Calculate the COP of the cycle and heat rejected from the system per hour.	M1.04	U
V.	Explain the working of a simple vapour absorption system with flow diagram.	M2.01	U
	OR		
VI.	List the advantages and disadvantages of Vapour compression system over air refrigeration system.	M2.03	U
VII.	Explain the working of a roller and vane type refrigeration compressor with a neat figure.	M3.01	U
	OR		
VIII.	Explain the working of an Automatic expansion valve with a neat figure.	M3.04	U
IX.	Explain Two stage cascade refrigeration system with schematic diagram.	M3.06	U
	OR		
X.	Explain the working of a domestic refrigerator with the help of layout showing all major components.	M3.05	U
XI.	Atmospheric air with dry bulb temperature of 28^{0}C and a wet bulb temperature of 17^{0}C is cooled to 15^{0}C without changing its moisture content. Determine the final relative humidity and final wet bulb temperature.	M4.02	A
	OR		
XII.	Explain the summer air conditioning system with a sketch.	M4.05	U
XIII.	A small office hall of 25 persons capacity is provided with summer air conditioning system with the following data: Outside condition: 34^{0}C DBT and 28^{0}C WBT Inside conditions: 24^{0}C DBT and 50%RH Volume of air supplied: 0.4 m^3/min/person Sensible heat load in the room: 125600kJ/h Latent heat load in room: 42000kJ/h Find sensible heat factor of the plant.	M4.06	A
	OR		
XIV.	List the various sources of heat gains in cooling load estimation.	M4.06	U

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