

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 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 'one' mark.**

**(9 x 1 = 9 Marks)**

		Module Outcome	Cognitive level
1.	Air refrigerator cycle is used in-----	M1.02	R
2.	Define the term Refrigeration.	M1.01	R
3.	The value of COP in vapour compression cycle is usually-----	M2.01	R
4.	In a refrigeration cycle, the flow of refrigerant is controlled by-----	M2.02	R
5.	The pressure at the outlet of a refrigerant compressor is called-----	M3.01	R
6.	The forced convection air cooled condensers are used in-----	M3.02	R
7.	During the process of sensible heating of air, the wet-bulb temperature would be:	M4.01	R
8.	The vertical and uniformly spaced lines on a psychrometric chart indicate-----	M4.02	R
9.	In winter air conditioning, the air is-----	M4.05	R

**PART-B**

**II. Answer any 'eight' questions from the following. Each question carries 'three' marks.**

**(8 x 3 = 24 Marks)**

		Module Outcome	Cognitive level
1.	What are the merits of air refrigeration system?	M1.03	R
2.	Explain primary refrigerants with examples.	M2.04	U
3.	Explain the various methods to improve the COP of a vapour compression system.	M2.02	U
4.	What are the various refrigerant leakage detection systems?	M2.02	R
5.	Discuss various applications of cryogenics.	M3.06	U
6.	Explain the classification of compressors in refrigeration system.	M3.01	U
7.	Define: i) Dry bulb temperature ii) Wet bulb temperature iii) Dew point temperature	M4.01	R
8.	Explain Dalton's law of partial pressures .	M4.02	U
9.	What is the concept of HVAC?	M4.07	R
10.	What are the factors affecting human comfort?	M4.06	R

### PART-C

Answer 'all' questions from the following. Each question carries 'seven' marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Explain the working of a Reversed Carnot cycle of refrigeration with P-V and T- S Diagrams.  <b>OR</b>	M1.02	U
IV.	1.5kW per tonne of refrigeration is required to maintain the temperature of -40°C in the refrigerator. If the refrigeration cycle works on Carnot cycle, determine the COP of the cycle.	M1.04	U
V.	With a neat sketch, explain the working principle of vapour compression refrigeration system.  <b>OR</b>	M2.02	U
VI.	Explain the desirable properties of refrigerants.	M2.04	U
VII.	Explain the advantages and applications of cryogenic refrigeration.  <b>OR</b>	M3.06	U
VIII.	Describe thermostatic expansion valve with neat sketch.	M3.04	U
IX.	Explain the working of water-cooled condenser with neat sketch.  <b>OR</b>	M3.02	U
X.	Explain the working of rotary compressor with neat sketch.	M3.01	U
XI.	Compare winter air conditioning system with summer air conditioning system.  <b>OR</b>	M4.05	U
XII.	The temperature of air entering an adiabatic saturator is 42°C and that of the air leaving is 30°C. Compute the humidity ratio and relative humidity of the entering air.	M4.01	A
XIII.	Explain year-round air-conditioning system with sketch.  <b>OR</b>	M4.05	U
XIV.	Moist air, saturated at 10°C, flows over a heating coil at the rate of 5000 m <sup>3</sup> /h. Air leaves the coil at 40°C. Plot the process on a psychrometric chart and determine the following: (a) WBT of air. (b) The sensible heat transferred in kW.	M4.02	A

\*\*\*\*\*