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C14-M-602

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BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2018

DME—SIXTH SEMESTER EXAMINATION

REFRIGERATION AND AIR CONDITIONING

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write different methods of refrigeration.
2. What is the purpose of flash chamber in the VCR system?
3. Write any three important refrigerant and absorbent pairs.
4. Distinguish between primary and secondary refrigerants.
5. What is expansion device? State its function.
6. Classify different types of air conditioning system,
7. Define (a) Wet bulb temperature, and (b) Dry bulb temperature.
8. What is the psychrometric chart? State the uses of psychrometric chart.

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9. Define the following :

(a) Conduction

(b) Convection

10. What is cooling tower? What is the need of cooling tower?

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) The answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. In a closed cycle Bell-Coleman refrigeration plant air is taken into the compressor at 1 bar pressure and -5°C and is compressed isentropically to 5 bar at which it is cooled to 15°C . It is then expanded to 1 bar and discharged into refrigerant chamber. If the law of expansion is $PV^{1.2} = C$ and law of compression is $PV^{1.4} = C$, find (a) the net work done on the air per kg of air, and (b) COP of the plant.

Take $C_p = 1.0035 \text{ kJ/k.g K}$, $\gamma = 1.4, R = 0.287 \text{ kJ/kg K}$

12. In a 15 TR ammonia refrigeration plant, the condensing temperature is 25°C and evaporating temperature is -10°C . The refrigerant is subcooled by 5°C before passing through throttle valve. The vapour entering the compressor is dry saturated. Find (a) COP, and (b) power required. The properties of ammonia are given in the table below:

Saturation Temperature °C	Enthalpy kJ/kg		Entropy kJ/kgK		Specific Heats kJ/kgK	
	Liquid (h_f)	Vapour (h_g)	Liquid (s_f)	Vapour (s_g)	Liquid	Vapour
25	536.35	1703.2	4.593	8.509	4.6057	2.805
-10	375.15	1660.35	4.016	8.994	—	—

13. Explain the working principle of lithium bromide vapour absorption system with a neat sketch.

14. (a) Write the differences between water-cooled and air-cooled condensers.
(b) Write short notes on
(i) Vane type compressor
(ii) Screw compressor
15. Describe briefly the working of water cooler with neat sketch.
16. Explain the following :
(a) Centrifugal dust collector
(b) Electronic air filter
17. What is the importance of mixing of air streams in air conditioning? Write the conditions of mixture.
18. Explain with the help of a neat sketch the summer air conditioning for hot and dry outdoor conditions.

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