



C09-M-606A

3784

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2016

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. Define the following :

(a) Refrigeration

(b) COP

2. What are the differences between open-air refrigerator system and closed-air refrigerator system?

3. What is the purpose of flash chamber and accumulator in the vapour compression system?

4. What are the advantages and limitations of lithium bromide absorption system?

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5. Describe the effect of sub-cooling and suction pressure of refrigerant on COP of vapour compression refrigerator system.
6. What is the function of capillary tube? What are the advantages and limitations of capillary tube?
7. How do you classify compressors used in VCR?
8. Define refrigerant. List out common refrigerants used in industry.
9. Explain chemical dehumidification process. Show the process on psychometric process.
10. Define air-conditioning.

PART—B

10×5=50

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

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

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

11. Draw *P-V* and *T-S* diagrams of a reversed Carnot cycle and obtain an expression for its COP.
12. In a 15 TR ammonia refrigeration plant, the condensing temperature is 25 °C and evaporating temperature -10 °C. The refrigerant ammonia is sub-cooled by 5 °C before passing through the throttle valve. The vapour leaving the evaporator is 0.97 dry. Find (a) COP and (b) power required. The properties of ammonia are :

<i>Temperature, °C</i>	<i>Enthalpy, kJ/kg</i>		<i>Entropy kJ/kgK</i>		<i>Specific heats kJ/kg °C</i>	
	<i>Liquid</i>	<i>Vapour</i>	<i>Liquid</i>	<i>Vapour</i>	<i>Liquid</i>	<i>Vapour</i>
25	536.35	1703.2	4.593	8.509	4.6057	2.805
-10	375.15	1669.65	4.016	8.994	—	—

- 13.** (a) What are the differences between two-fluid and three-fluid vapour absorption system? 6
- (b) In a vapour absorption refrigerator system the temperatures of generator, condenser and evaporator are 87 °C, 37 °C and -13 °C. Find the COP. 4
- 14.** (a) What are the differences between water-cooled and air-cooled condensers? 5
- (b) Explain the working of flooded type evaporator with a neat sketch. 5
- 15.** Draw a neat sketch of an ice plant layout and explain how ice is produced.
- 16.** Describe various types of axial fans with neat sketches.
- 17.** 40 m³/min of a stream of moist air at 15 °C DBT and 13 °C WBT is mixed with 10 m³/min of second stream at 25 °C DBT and 18 °C WBT. Determine DBT and WBT of the mixture. Find also the enthalpy and humidity ratio of the mixture.
- 18.** Explain the working of window type air-conditioner with a neat sketch.

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