



C09-M-606A

3784

BOARD DIPLOMA EXAMINATION, (C-09)

APRIL/MAY—2015

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 any four applications of refrigeration.
2. A refrigeration plant working on reversed Carnot cycle between temperature limits of 30 °C and –5 °C has a capacity of 10 tons. Determine power input to the plant.
3. Describe the effects of subcooling on the performance of vapour compression refrigeration system.
4. Explain the purpose of (a) analyser and (b) rectifier in vapour absorption refrigeration.
5. Compare vapour compression refrigeration system and vapour absorption refrigeration system (any three points).
6. What is the purpose of agitator in ice plant?
7. Draw a neat sketch of sealed-type drier and label the parts.

8. How refrigerants are basically classified? Mention two examples for each.
9. Define air-conditioning and mention the factors that effect human comfort.
10. Define WBT and DPT.

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 diagram of reversed Carnot refrigeration cycle and derive the equation for COP and also mention why this cycle is not practically possible.
12. An ammonia refrigerator produces 30 tonnes of ice at 0 °C in a day. The cycle works between temperature limits of 25 °C and –15 °C. The vapour is dry saturated at the end of compression. Find COP and power required to drive the compressor.

The properties of refrigerant are :

Temperature (°C)	Enthalpy (kJ/kg)		Entropy (kJ/kg) K	
	Liquid	Vapour	Liquid	Vapour
–15	–54.7	1310	–0.2142	5.0778
25	100.4	1324	0.3486	4.5024

13. Explain the working principle of Electrolux refrigeration system with a neat sketch.
14. Explain the working of ice plant with a neat sketch.

- 15.** (a) Explain the evaporative condenser with a neat sketch.
(b) Draw a neat sketch of flooded-type evaporator and explain its working.
- 16.** Explain the window air conditioner with the help of a neat sketch.
- 17.** (a) Explain the propeller fan with a neat sketch.
(b) Explain electrostatic filter with a neat sketch.
- 18.** The air at 35 °C DBT and 25 °C WBT is passed through a cooling coil at the rate of 280m³/min. The air leaves the cooling coil at 26.5 °C DBT and 50% relative humidity. Find—
(a) capacity of cooling coil in TR;
(b) WBT of leaving air
(c) moisture removed per minute;
