



C09-M-606A

3784

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2014

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.

1. Define the term 'ton of refrigeration'. 3
2. What is ice refrigeration? 3
3. List out the basic components of vapour compression system. 3
4. Draw the flow diagram and corresponding *T-S* diagram of a vapour compression system. 3
5. State the advantages of lithium bromide absorption system. 3
6. Write the classification of refrigerant. 3
7. Draw the sketch of flooded-type evaporator. 3
8. What is the function of condenser? How do you classify the condenser? $1\frac{1}{2}+1\frac{1}{2}=3$

- * 9. Define air-conditioning. 3
10. Define the following terms : $1\frac{1}{2}+1\frac{1}{2}=3$
- (a) Wet-bulb temperature
- (b) Dry-bulb temperature

PART—B

$10 \times 5 = 50$

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.

(4) Use of psychrometric chart is permissible for the examination.

11. (a) Describe reversed Carnot cycle with *P-V* and *T-S* diagrams. 3+3=6

- (b) The capacity of a refrigerator is 600 tons when working between 5 °C and 20 °C. Find out the weight of ice produced within 24 hours when water is supplied at 10 °C and also find out the minimum power required. Assume latent heat of ice = 336 kJ/kg. 4

12. (a) State the purpose of flash chamber and accumulator in the vapour compression system. 2+2=4

- (b) A 5 ton Freon-12 refrigeration plant has evaporator temperature of 5 C. The condensation takes place at 32 °C and there is no undercooling. Vapour is dry and saturated when entering the compressor. Find (i) cop of the plant and (ii) mass flow rate of refrigerant. Take the following properties of F-12 : 3+3=6

Pressure Bar	Temperature (in °C)	Enthalpy (in kJ/kg)		Entropy of the vapour (in kJ/kg K)
		Liquid	Vapour	
7.85	32	130.5	264.5	1.542
2.61	05	—	249.3	1.557

- * **13.** Describe the principle of simple vapour absorption system with a neat sketch. State its limitations. 4+4+2=10
- 14.** (a) Explain the working of automatic expansion valve with a neat sketch. 3+2=5
- (b) Explain sealed-type drier with a neat sketch. 3+2=5
- 15.** Draw a neat sketch of water-cooler and explain its working. 5+5=10
- 16.** Describe any two types of axial fans with neat sketches. 5+5=10
- 17.** (a) Define psychrometry and relative humidity. 2+2=4
- (b) 150 cubic meter of air per minute is required to be cooled from 35 °C DB and 55% RH to 25 °C DB and 50% RH. Determine the capacity of the refrigerating machine. 6
- 18.** (a) Explain the working of summer air-conditioner with neat sketch. 5
- (b) Explain the working of forced draft-type mechanical cooling tower with a sketch. 5
