



C14-M-602

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**BOARD DIPLOMA EXAMINATION, (C-14)**  
**MARCH/APRIL—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. Define ton of refrigeration.
2. State the advantages of vapour compression refrigeration system over air refrigeration system.
3. What are the differences between two-fluid and three-fluid systems?
4. Write the properties of ideal refrigerant.
5. List out different compressors used in refrigeration system.
6. Write the classification of air conditioning systems.
7. Define the terms (a) psychrometry and (b) relative humidity.

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8. Define degree of saturation<sup>\*</sup> and write down its formula in terms of pressure.
9. What are meant by BPF and SHF?
10. State the classification of cooling towers.

**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.  
(4) Use of Psychrometric chart is permitted.  
(5) Assume standard values.

11. In an open-type refrigerator system 550 kg of air is circulated per hour. The air is drawn from the cold chamber at 3 °C at atmospheric pressure and compressed isentropically to 5 bar absolute. It is then cooled to 20 °C at the same pressure. Air is then led to expander where it is expanded isentropically down to atmospheric pressure and is discharged to cold chamber. Find (a) heat extracted from cold chamber, (b) heat rejected to cooling water per hour and (c) COP of the system.

\* 12. A refrigerant plant operates on quasi-vapour compression cycle. The refrigerant is ammonia and saturation temperature in the condenser and evaporator are 35 °C and -10 °C respectively. The vapor enters the condenser as saturated vapor and there is no undercooling in condenser. Calculate (a) COP and (b) mass flow rate required to produce 10 kW of refrigeration. Assume at 35 °C,  $h_3 = 216.7$  kJ/kg,  $h_2 = 1339.2$  kJ/kg at -10 °C,  $h_1 = 1158.5$  kJ/kg.

13. With a neat sketch, explain solar powered absorption refrigeration system.

14. (a) Write down the differences between air-cooled and water-cooled condenser.  
(b) Explain evaporative condenser with neat sketch. 4+6=10
15. Explain working of domestic refrigerator with neat sketch.
16. Describe various types of axial fans used in air conditioning systems with neat sketch.
17. (a) List out various psychrometric processes and show on psychrometric chart.  
(b) Describe humidification and dehumidification processes with the help of psychrometric chart. 4+6=10
18. Explain year-round air conditioning and central air conditioning. 5+5=10

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