C09–M–**606 A**

3784

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

DME—SIXTH SEMESTER EXAMINATION

REFRIGERATION AND AIR-CONDITIONING

Time : 3 hours]   [*Total Marks* : 80

PART—A

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

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

                    (3) Answers should be brief and straight to the point.

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

    1. Explain dry ice refrigeration method.

    2. Draw *P-V* and *T-S* diagram for Bell-Coleman cycle.   1½+1½=3

    3. What is the effect of suction pressure of refrigerant on performance of vapour-compression system?

    4. List out the basic components of vapour-compression refrigeration system and write their functions.   1½+1½=3

    5. Explain the desirable properties of refrigerant-absorbent pair.   1×3=3

    6. What are the differences between primary and secondary refrigerants?   1×3=3

    7. What is the function of drier in refrigeration system? List out different types of drier.   1½+1½=3

    8. What is the function of thermostat in domestic refrigerator?

    9. State the functions of *(a)* fan, and *(b)* duct in air-conditioning system.

                                                          1½+1½=3

   10. Represent heating and humidification process on psychro- metric chart.

PART—B

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. Derive the relation for coefficient of performance (COP) of reversed Carnot refrigeration cycle.

12. A refrigerant plant operates on quasivapour-compression cycle. The refrigerant is ammonia and saturation temperature in the condenser and evaporator are 35 °C and 10 °C respectively. The vapour enters the condenser as saturated vapour and there is no undercooling in the condenser. Calculate *(a)* coefficient of performance, and *(b)* mass flow rate required to produce 10 kW of refrigeration. [Assume, at 35 °C, h_{f_3} 216 7 kJ/kg, h_2 (H₂) 1339 2 kJ/kg and at 10 °C, h_1 1158 5 kJ/kg]

13. Explain ammonia-water vapour absorption refrigeration system with a line diagram.   5+5=10

14. Explain the working of thermostatic expansion valve with a neat sketch.
                                                                           5+5=10

15. Explain the working of watercooler with a neat sketch.   5+5=10

16. *(a)* Explain the working of electrostatic filter with a neat sketch.   2½+2½=5

    (b) Explain downward system of air distribution system in air-conditioning.   5

17. The atmospheric conditions of air are specified by dry-bulb temperature 30 °C, humidity ratio = 15 gm/kg of air. Determine *(a)* partial vapour pressure, and *(b)* relative humidity.   5+5=10

18. Explain summer air-conditioning system with a neat sketch.   5+5=10

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