*4758*

C14–M–602

# 4758

## BOARD DIPLOMA EXAMINATION, (C–14)

## OCT/NOV—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.** Write different methods of refrigeration.

**2.** What is the purpose of flash chamber in the VCR system?

**3.** Write any three important refrigerant and absorbent pairs.

**4.** Distinguish between primary and secondary refrigerants.

**5.** What is expansion device? State its function.

**6.** Classify different types of air conditioning system,

**7.** Define (a) Wet bulb temperature, and (b) Dry bulb temperature.

**8.** What is the psychrometric chart? State the uses of psychrometric chart.

**9.** Define the following :

*(a)* Conduction

*(b)* Convection

**10.** What is cooling tower? What is the need of cooling tower?

## PART—B

10×5=50

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

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

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

**11.** In a closed cycle Bell-Coleman refrigeration plant air is taken into the compressor at 1 bar pressure and –5°C and is compressed isentropically to 5 bar at which it is cooled to 15°C. It is then expanded to 1 bar and discharged into refrigerant chamber. If the law of expansion is $PV^{1.2}$ $C$ and law of compression is $PV^{1.4}$ $C$, find (a) the net work done on the air per kg of air, and (b) COP of the plant.

Take $C_p$ 1.0035kJ / k.g K, 1.4, $R$ 0.287 kJ / kg K

**12.** In a 15 TR ammonia refrigeration plant, the condensing temperature is 25°C and evaporating temperature is –10°C. The refrigerant is subcooled by 5°C before passing through throttle valve. The vapour entering the compressor is dry saturated. Find (a) COP, and (b) power required. The properties of ammonia are given in the table below:

| Saturation Temperature °C | Enthalpy kJ/kg | | Entropy kJ/kgK | | Specific Heats kJ/kgK | |
|---|---|---|---|---|---|---|
| | Liquid ($h_f$) | Vapour ($h_g$) | Liquid ($s_f$) | Vapour ($s_g$) | Liquid | Vapour |
| 25 | 536.35 | 1703.2 | 4.593 | 8.509 | 4.6057 | 2.805 |
| –10 | 375.15 | 1660.35 | 4.016 | 8.994 | — | — |

**13.** Explain the working principle of lithium bromide vapour absorption system with a neat sketch.

**14.** *(a)* Write the differences between water-cooled and air-cooled condensers.

*(b)* Write short notes on

*(i)* Vane type compressor

*(ii)* Screw compressor

**15.** Describe briefly the working of water cooler with neat sketch.

**16.** Explain the following :

*(a)* Centrifugal dust collector

*(b)* Electronic air filter

**17.** What is the importance of mixing of air streams in air conditioning? Write the conditions of mixture.

**18.** Explain with the help of a neat sketch the summer air conditioning for hot and dry outdoor conditions.

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