No. of Printed Pages : 3

BME-032

DIPLOMA IN MECHANICAL ENGINEERING (DME) / ADVANCED LEVEL CERTIFICATE COURSE IN MECHANICAL ENGINEERING (DMEVI / ACMEVI)

Term-End Examination

00257 **December, 2017**

BME-032 : REFRIGERATION AND AIR-CONDITIONING

Time : 2 hours *Maximum Marks : 70*

Note : *Answer **five** questions in all. Assume missing data suitably, if any. Use of scientific calculator is permitted.*

1. (a) What is a ton of refrigeration ? Explain refrigeration effect and COP of a refrigeration system.

   (b) A refrigerator system produces 30 kg/hr of ice at 0°C from water at 27°C and it consumes 1 kW of energy to produce ice. Find the

   (i) Refrigeration effect in TR, and

   (ii) COP.

   Take specific heat at constant pressure (C_p) of water as 4·19 kJ/kg °C and latent heat of solidification of water at 0°C as 335 kJ/kg. 7+7

2. (a) Explain with neat sketches, the difference between refrigeration and a heat pump system.

(b) A Carnot refrigeration cycle absorbs heat at 260 K and rejects heat at 300 K. Determine the COP of this refrigeration cycle. If the cycle is absorbing 1200 kJ/min at 260 K, find the work required in kW. 7+7

3. (a) Explain the difference between vapour compression refrigeration systems and vapour absorption systems.

(b) Explain the working principle of a reciprocating compressor with pV diagram. 7+7

4. (a) What is the function of a condenser in a refrigeration system ? Explain the functions of shell and tube condensers.

(b) List any four refrigerants. What are the desirable properties of refrigerants ? 7+7

5. (a) Draw the P-h and T-s diagrams of a vapour compression cycle and discuss the effect of decreasing evaporator pressure on COP.

(b) Explain cascade refrigeration system with neat sketch. 7+7

6. (a) Define the following :

(i) Specific humidity

(ii) Dew point temperature

(iii) Relative humidity

(iv) Degree of saturation

(b) Explain comfort air-conditioning. 7+7

7. Write short notes on the following : 7+7

(a) Food Preservation

(b) Freezers