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

Term-End Examination

☐☐☐7☐ **June, 2018**

BME-032 : REFRIGERATION AND AIR-CONDITIONING

Time : 2 hours   *Maximum Marks : 70*

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

1. (a) Explain the terms Refrigeration and Air-conditioning.

    (b) What is Refrigeration effect ?

    (c) 100 kg of ice at − 10°C is placed in a system to cool some vegetables. 24 hrs later the ice has melted into water at 8°C. What is the rate of cooling in kJ/hr ? Determine the refrigeration effect in TR. Assume

    $C_{p \, (ice)}$ = 1·94 kJ/kg °C,

    $C_{p \, (water)}$ = 4·187 kJ/kg °C.

    Latent heat of ice at 0°C = 335 kJ/kg.   *6+2+6*

2. (a) Discuss the temperature limitations of reversed Carnot cycle.

(b) Carnot heat pump cycle absorbs heat at 270 K and rejects heat at 300 K. Determine the COP of this heat pump cycle. If the cycle is absorbing 1800 kJ/min heat at 270 K, find the work required in kW.   7+7

3. (a) Explain the working principle of vapour compression refrigeration system with neat sketch. Draw P-h diagram.

(b) Explain the working principle of centrifugal compressor used in the refrigeration system with a neat sketch.   7+7

4. (a) Explain the working principle of vapour absorption system with a neat sketch.

(b) What is the function of a condenser in RAC ? Explain with a neat sketch the function of evaporative condenser.   7+7

5. (a) Give the classification of refrigerants. What are primary and secondary refrigerants ?

(b) Discuss the effect of condenser pressure on vapour compression refrigeration system with P-h and T-s diagrams.   7+7

6. (a) A psychrometer reads DBT 30°C and WBT 24°C. Using psychrometric chart, determine the following :

(i) Specific humidity

(ii) Relative humidity

(iii) Dew point temperature

(b) What are the factors to be considered for comfort air conditioning ? Discuss briefly. 7+7

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

(a) Food Storage Conditions and Distribution

(b) Thermostatic Expansion Valve

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