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GIET UNIVERSITY, GUNUPUR – 765022
M. Tech (Second Semester Examinations) – October' 2021
MPETE2031 – ADVANCED REFRIGERATION ENGINEERING
 (Heat Power and Thermal Engineering)

Time: 2 hrs

Maximum: 50 Marks

(The figures in the right hand margin indicate marks)

PART – AQ.1. Answer **ALL** questions

(2 x 10 = 20)

- a. Define a tonne of refrigeration.
- b. What is role of hydrogen gas in three fluid refrigeration system?
- c. Differentiate between flooded type and dry type evaporators.
- d. What do you understand by evaporative cooling?
- e. Show that partial pressure of water vapour in moist air is directly proportional to humidity ratio?
- f. Define sensible heating and sensible cooling.
- g. When is dehumidification of air necessary and how it is achieved?
- h. Define Room Sensible Heat Factor.
- i. Describe unitary and central air conditioning system.
- j. Define ADP.

PART – B

(6 x 5 = 30 Marks)

Answer **ANY FIVE** questions

Marks

2. A two stage compression ammonia refrigeration system with water and flash intercooling and water sub-cooling, operates between overall pressure limits of 13.89 bar and 1.9 bar. The flash intercooler pressure is 4.97 bar. The temperature of refrigerant leaving the water intercooler and the water sub cooler is limited to 30°C. If the load is 10 TR. Find (6)
 - i. coefficient of performance of the system
 - ii. power required to drive each compressor and
 - iii. swept volume for each compressor, assume that the volumetric efficiency for both the compressors as 80%.
3. Derive an expression for optimal inter stage pressure of a two stage compression refrigeration system. (6)
4. Write short notes on: (6)
 - i. Magnetic refrigeration system
 - ii. Fouling factor
5. Explain the working of Claude liquefaction system with suitable sketch. (6)
6. The atmospheric air at 30° C dry bulb temperature and 75% relative humidity enters a cooling coil at the rate of 200m³/min. The coil dew point temperature is 14°C and the by-pass factor of the coil is 0.1. Determine: (6)
 - i. the temperature of air leaving the cooling coil
 - ii. the capacity of the cooling coil in tonnes of refrigeration and in kilowatt
 - iii. the amount of water vapour removed per minute and
 - iv. the sensible heat factor for the process.
7. An air conditioning plant is required to supply 60 m³ of air per minute at a DBT of 21°C and 55% RH. The outside air is at DBT of 28°C and 60% RH. Determine the mass of water drained and capacity of the cooling coil. Assume the air conditioning plant first to dehumidify and then to cool the air. (6)
8. Explain briefly the system control balancing in refrigeration plant. (6)

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