

3609

B. Tech. (ME) PEC-II 7th Semester (G-Scheme)

Examination, November-2023

REFRIGERATION & AIR CONDITIONING

Paper- PEC-ME-401-G

Time allowed : 3 hours]

[Maximum marks : 75

Note: *Attempt any five Questions in total, at least one question from each section. Question no. 1 is compulsory. Each question carries equal marks (15 marks).*

1. Explain following:

(a) Cryogenics

(b) Ram effect

(c) Infiltration

(d) Superheating horn

(e) Sensible heat gain

(f) Duct friction

$6 \times 2.5 = 15$

Section-A

- 2. (a)** A domestic refrigerator set at 2°C handles a refrigeration load of 8000 kJ/day. The ambient temperature is 30°C . The COP of refrigerator is 0.15 times of maximum COP. Then find the daily electricity.

8

- (b) Discuss four thermodynamic properties of refrigerants. 7
3. (a) State limitations of reversed carnot cycle for use as refrigeration cycle. 8
- (b) Explain reduced ambient air refrigeration system with it's application. 7

Section-B

4. (a) Compare throttling vs isentropic expansion. 5
- (b) Describe single compressor and multiple expansion valve refrigeration system. 10
5. (a) Describe ammonia- water vapor absorption refrigeration system. 10
- (b) In a vapor absorption refrigeration system, the refrigeration temperature is -10°C . The generator is operated by solar heat here the temperature reached is 100°C . The temperature of the sink is 50°C ? What is the maximum possible COP of the system? 5

Section-C

6. (a) The degree of saturation of air at 30°C and 100kPa is 24%. The saturation pressure at 30°C is 4 kPa. Find relative humidity and specific humidity. 8

- (b) Describe cooling and dehumidification process with it's applications. 7

7. An air conditioned space is maintained at 27°C DBT and 50% RH when the outside conditions are 36°C DBT and 27°C WBT. If the space has a sensible heat gain of 18.6kW and air is supplied to the room at a condition of 9°C saturated. Calculate (a) mass and volume flow rates of air supplied to room, (b) latent heat gain of the space and (c) the cooling load of refrigeration plant if 15% of the total weight of air supplied to the space is fresh air and remaining is recirculated air. 15

Section-D

8. (a) Discuss role of humidity and temperature sensors in an air conditioner. 7
- (b) Explain winter air conditioning system with 30% fresh air and remaining is re-circulated air. 8
9. Compare the use of rotary and reciprocating compressor with their applications and performance curves. 15