KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agrl. Engg.) 2021 Admission
V Semester Final Examination –January 2024

Fape.3105   **Refrigeration and Air Conditioning (2+1)**   **Marks: 50**
Time: 2 hours

I **Fill in the blanks**   (10x1=10)
1. One ton of refrigeration is equal to ………………..
2. The refrigerant used in water cooler is……………….
3. Compressor used in Window Air Conditioner is………..
4. Colour code for ammonia refrigerant cylinder is……………
5. The Coefficient of Performance (COP) for an air refrigeration system is……………….
   State True or False
6. In summer Air conditioning, the air is Cooled and humidified.
7. An Electrolux refrigerator is called Three fluid absorption system.
8. Sling psychrometer is used to measure relative humidity.
9. The difference between DBT and WBT is called dew point depression.
10. In psychrometric chart, specific humidity lines are horizontal.

II **Write short notes on ANY FIVE of the following**   (5x2=10)
1. State first law of thermodynamics.
2. Mention the advantages of super cooling and sub cooling process.
3. What are the uses of psychrometric chart?
4. Distinguish between summer and winter air conditioner.
5. Write about evaporative cooling.
6. Mention the components of evaporators used in refrigeration system.
7. Draw the PV and TS diagram of Carnot cycle

III **Answer ANY FIVE of the following**   (5x4=20)
1. A Carnot refrigerator has working temperature of -30° C and 35° C. If it operates with R12 as a working substance, calculate the work of isentropic compression and that of isentropic expansion, and refrigerating effect, heat rejected per kg of the refrigerant, and COP of the cycle.
2. Draw the layout of bell Coleman cycle and mention its processes.
3. Describe the effects of sub cooling in vapour compression refrigeration cycle.
4. Mention the components of mechanical refrigerator and write its uses.
5. 39.6cmm of a mixture of recirculated room air and outdoor air enter a cooling coil at 31° C DBT and 18.5° C WBT. The effective surface temperature of the coil is 4.4° C. The surface area of the coil is such as would give 12.5 kW of refrigeration with the given entering air state. Determine the dry and wet bulb temperatures of the air leaving the coil and the coil bypass factor.
6. The air handling unit of an air- conditioning plant supplies a total of 4500cmm of dry air which comprises by weight 20percent fresh air at 40° C DBT and 27° C WBT, and 80 per cent recirculated air at 25° C DBT and 50 per cent RH. The air leaves the cooling coil at 13° C saturated state. Calculate the total cooling load, and room heat gain.
7. A bend for a duct is 1500 mm wide and 250mm high. The center line radius to width ratio is unity. Determine the best position for the insertion of one splitter.

IV **Write an essay on ANY ONE of the following**   (1x10=10)
1. Explain briefly about Electrolux refrigerator.
2. Draw the schematic representation of simple vapour absorption system and explain.

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