Reg. No: _____

Name: _____

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION, MAY 2019
SECOND SEMESTER
Branch: MECHANICAL ENGINEERING (THERMAL ENGINEERING)

03ME 6072 ADVANCED REFRIGERATION & AIR CONDITIONING

Time: 3 Hours   **Max. Marks: 60**

PART A
Answer ALL questions

1. Write the working of vapour absorption refrigeration system

2. Explain working of reciprocating compressors

3. Write the variables which are involved in the estimation of load.

4. With a neat diagram, explain a cold storage plant.

(4 x 5 Marks =20 Marks)

PART B

5. An ammonia refrigerator produces 20 tonnes of ice per day from 0^0C. The condensation and evaporation take place at 20^0C and -20^0C respectively. Temperature of vapour after isentropic compression is 50^0C and there is no under cooling of the liquid. Actual COP is 70% of theoretical COP. Determine

   (i)   Rate of refrigerant circulation

   (ii)   Size of single acting compressor when running at 240 rpm assuming L=D and volumetric efficiency 80%

   Take specific volume of dry capour at -20^0C = 0.624 m^3/kg

   Cp of super heated vapour = 2.8 kJ/kg K

OR

6. Draw a neat diagram of Electrolux Refrigeration system, explain its working principle. What is the role of hydrogen in this system?

7. With the help of a neat sketch, explain the working of

(a)Vane Type Rotary Compressor

(b) Finned Tube Evaporator

(c) Plate and tube air condenser

OR

8. With the help of a neat sketch, explain the working of

(a)Screw Type Compressor

(b) Shell and Tube Condenser

(c) Thermostatic expansion valve

9. An air-conditioning plant is to be designed for a small office for winter conditions. Outdoor conditions 10 ^{0}C DBT and 8^{0}C WBT. Required indoor conditions 20^0 C DBT and 60% RH. Amount of air circulation is 0.3m^3/min/person. Seating capacity of the office is 50 person. Required condition is achieved first by heating and then by adiabatic humidifying .Find (i) Heating capacity of coil in kW and surface temperature , if the bypass factor of coil is 0.32 and (ii)capacity of the humidifier.

OR

10. What are the functions of ducts air-conditioning? Enumerate duct system and explain any one of them with a neat sketch.

11. Explain with a neat sketch the working of Central System of Air Conditioning. List its merits and demerits

OR

12. (a) Explain the working of a window type air conditioner

(b) How are air conditioning equipments classified?

(4 x 10 Marks =40 Marks)