

Code No: RT32037A

R13

SET - 1

III B. Tech II Semester Supplementary Examinations, November - 2018
REFRIGERATION & AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours

Maximum Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) What do you understand by the COP of an air refrigeration cycle? Give its formula. [3M]
b) Under what circumstances the superheating of vapour before coming to compressor is more objectionable? Give the ways to prevent it. [4M]
c) What are essential properties of a good refrigerant? [3M]
d) Define and write the expression for entrainment efficiency in steam jet refrigeration system. [4M]
e) What is the need of Ventilation? [4M]
f) Draw the Schematic layout of Summer air conditioning Systems [4M]

PART -B

- 2 a) Draw the schematic of a boot-strap cycle of air refrigeration system, and show the cycle on T-s diagram. [8M]
b) A cold storage plant is required to store 20 tonnes of fish. The fish is supplied at a temperature of 30°C. The specific heat of fish above freezing point is 2.93 kJ/kg K. The specific heat of fish below freezing point is 7.26 kJ/kg K. The fish is stored in cold storage which is maintained at -8°C. The freezing point of fish is -4°C. The latent heat of fish is 235 kJ/kg. If the plant requires 75 kW to drive it, find: i) The capacity of the plant, and ii) Time taken to achieve cooling. Assume actual C.O.P. of the plant as 0.3 of the Carnot C.O.P. [8M]
- 3 a) Draw the vapour compression refrigeration cycle on T-s diagram when the refrigerant is dry and saturated at the end of compression and find an expression for the C.O.P in terms of (i) Temperature and entropies; (ii) Enthalpy. [9M]
b) How does the increase in condenser temperature affect COP? Also explain the influence of evaporator temperature on COP. Which of the two temperatures have more influence on COP? [7M]
- 4 a) List the different types of compressors? And explain each type usage in refrigeration systems giving proper reasons. [8M]
b) With the help of a neat sketch, explain the working of an evaporative condenser. [8M]
- 5 a) State the advantages and disadvantages of Electrolux refrigerator over conventional refrigerators. [7M]
b) Explain the working of Thermostatic Expansion valve with neat sketch. Write its advantages and disadvantages. [9M]
- 6 a) Define the term "effective temperature" and explain its importance in air conditioning system. Describe the factors which affect effective temperature. [8M]
b) Explain in brief as to how the human body reacts to changes in temperature of environment. Also explain the effect of activities on the heat load calculation for comfort application. [8M]
- 7 a) With the help of a circuit diagram explain how a single air conditioning unit is used as an air-conditioner in summer and heat pump in winter. [9M]
b) Explain about Grills and Registers along with their performance effects [7M]

