

REFRIGERATION & AIR CONDITIONING

(Refrigeration and Psychrometric tables and charts allowed)

UNIT – I

INTRODUCTION TO REFRIGERATION: Necessity and applications – Unit of refrigeration and C.O.P. – Mechanical Refrigeration – Types of ideal cycles of refrigeration. Air Refrigeration: Bell Coleman cycle-open and dense air systems – refrigeration systems used in air crafts and problems.

UNIT – II

VAPOUR COMPRESSION REFRIGERATION: Working principle and essential components of the plant – simple vapour compression refrigeration cycle – COP – Representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – Actual cycle-Influence of various parameters on system performance – Use of p-h charts – numerical problems.

UNIT III

SYSTEM COMPONENTS: Compressors – general classification – comparison – Advantages and Disadvantages. Condensers – classification, Working Principles, Evaporators – classification– Working Principles, Expansion devices – Types, Working Principles

REFRIGERANTS – Desirable properties – classification refrigerants used – Nomenclature – Ozone Depletion – Global warming.

UNIT IV

VAPOR ABSORPTION SYSTEM: Calculation of max COP – description and working of NH₃ – water system and Li Br –water (Two shell & Four shell) System. Principle of operation of Three Fluid absorption system, salient features.

UNIT V

STEAM JET REFRIGERATION SYSTEM: Working Principle and Basic Components. Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube.

UNIT – VI

INTRODUCTION TO AIR CONDITIONING: Psychrometric Properties & Processes – Characterization of sensible and latent heat loads — Need for Ventilation, Consideration of Infiltration – Load concepts of RSHF, GSHF-Problems, Concept of ESHF and ADP temperature.

UNIT VII

Requirements of human comfort and concept of effective temperature-Comfort chart –Comfort Air conditioning – Requirements of Industrial air conditioning, Air conditioning Load Calculations.

UNIT – VIII

AIR CONDITIONING SYSTEMS: Classification of equipment, cooling, heating, humidification and dehumidification, filters, grills and registers fans and blowers. Heat Pump – Heat sources – different heat pump circuits.

TEXT BOOKS:

1. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar / Dhanpatrai
2. Refrigeration and Air Conditioning / CP Arora / TMH.

REFERENCE BOOKS:

1. Refrigeration and Air Conditioning / Manohar Prasad / New Age.
2. Principles of Refrigeration - Dossat / Pearson Education.
3. Basic Refrigeration and Air-Conditioning – Ananthanarayanan / TMH