

32083 REFRIGERATION AND AIRCONDITIONING

DETAILED SYLLABUS

UNIT I REFRIGERATION SYSTEM AND REFRIGERATION EQUIPMENTS

Thermodynamic state of a pure substance, modes of heat transfer –laws of heat transfer - mechanisms of production of cold - unit of refrigeration –types of refrigeration - reversed Carnot cycle - C.O.P of heat engine- heat pump- refrigerating machine – principle of working of open and closed air system of refrigeration – advantages and disadvantages – and its application of air cycle-problems Compressor – principle of working and constructional details of reciprocating and rotary compressors, hermetically and semi hermetically sealed compressors- condensers- principle of working and constructional details of air cooled and water cooled condensers, evaporative condensers- advantages and disadvantages - natural and forced draught cooling towers. Evaporators- natural circulation and forced circulation type – principle of working constructional details.

UNIT II VAPOUR COMPRESSION REFRIGERATION SYSTEM ,VAPOUR ABSORPTION REFRIGERATION SYSTEM AND CRYOGENIC REFRIGERATION SYSTEMS

Principle of working of vapour compression system – analysis of vapour compression cycle using T-s diagram and p-H diagram- refrigerating effect- compression work - C.O.P - effect of superheating and under cooling – effect of evaporative pressure and condenser pressure- problems – liquid vapour refrigeration heat exchangers - advantages and disadvantages of superheating and under cooling –use of flash chamber and accumulator. Simple absorption system – Electrolux system - solar absorption refrigeration system- absorption system comparison with mechanical refrigeration system. Refrigerators for above 2 K- Philips Refrigerator--Giffered McMohan refrigerator- refrigerators for below 2 K - Magnetic refrigeration systems.

For Notes, Syllabus, Question Papers and Many more

UNIT III REFRIGERATION FLOW CONTROLS, REFRIGERANTS AND LUBRICANTS AND APPLICATIONS OF REFRIGERATION

Capillary tube-automatic expansion valve-thermostatic expansion valve-electronic expansion valve-solenoid valve-evaporator pressure regulator –suction pressure regulator-classification of refrigerantsselection of a refrigerant-properties and applications of following refrigerants SO₂ , CH₄ ,F22 , and NH₃ –CFCs refrigerants- equivalent of CFCs refrigerants (R-123a,R-143a,R-69S)- blends of refrigerants(R400 and R500 Series) - lubricants used in refrigeration and their applications. Slow freezing – quick freezing- cold storage-frozen storage-freeze drying –dairy refrigeration –ice cream cabinets-ice making – water cooler, milk cooler, bottle cooler-frost free refrigeration.

UNIT IV PSYCHOMETRICS AND COMFORT AIR CONDITIONING SYSTEMS

Psychrometry properties - adiabatic saturation of air by evaporation of water- psychrometric chart and its uses – psychrometric processes – sensible heating and cooling - humidifying and heating - dehumidifying and cooling - adiabatic cooling with humidification - total heating or cooling processes -sensible heat factor - by pass factor – adiabatic mixing – evaporative cooling - problems – governing optimum effective temperature – comfort chart-design consideration. Equipment for air conditioning and insulation factors – air purification – temperature control – humidity control – dry and wet filters- centrifugal dust collector – air washer humidifier – dehumidifier - fans and blowers – grills and registers – summer and winter air conditioning, window and split air conditioners – – properties of ideal insulator, types of insulating materials .

UNIT V COOLING LOAD CALCULATIONS AND DUCT DESIGN , ENERGY CONSERVATION TECHNIQUES

Different heat sources – conduction heat load – radiation load of sun – occupants load – equipment load - infiltration air load – miscellaneous heat sources –fresh air load - problems. Classification of duct systems - Duct design – equal friction method – velocity reduction method – problems. Chilled water Systems -Air handling Units. Energy conservation and design decisions - heat reclaim – thermal storage – ice

For Notes, Syllabus, Question Papers and Many more
builder – ice harvester – variable refrigerant flow (VRF) – variable
primary flow (VPF).

Text books:

- 1) Refrigeration and air conditioning, P.L . Ballaney, Khanna Publishers,
2B, North Market, Naisarak, New Delhi 110 006.
- 2) Refrigeration and air conditioning, V.K. Jain,
- 3) Industrial Refrigeration Hand Book, Wilbert F. Steocker