

# REFRIGERATION & AIR-CONDITIONING

## THEORY – I

### **THERMODYNAMIC PRINCIPLES AND PROCESS :**

Thermodynamic properties ,process, and cycle – units and dimensions – force, mass, weight, density, specific volume and specific gravity – detailed study of power and energy – laws of thermodynamics – pressure and temperature – Boyle's law – Charles law and universal gas equation – specific heats of gases – isothermal process – adiabatic process – polytropic and throttling process – entropy adiabatic and isentropic on T- diagram – entropy of vapour – joule – Thompson effect – modes of heat transfer – Fourier's law – Newton's law of cooling – Stefan- Boltzman law.

### **REFRIGERATION METHODS AND AIR REFRIGERATION :**

Refrigeration – definition – Reversed Carnot cycle – Bollcoleman air-refrigeration – vapour Refrigeration – Coefficient of Performance.

### **REFRIGERANT :**

Refrigerants – properties – classification – Halocarbon components – Hydrocarbons – inorganic compounds – secondary refrigerants – anti-freeze solutions – selection of refrigerant – leakage test – refrigerant piping materials and valves.

### **PSYCHROMETRIC PROPERTIES OF AIR :**

Corposition of air – Dalton's law of partial pressure of water vapour in air – partial pressure water vapour – dew point temperature – maximum water vapour content – absolute humidity – relative humidity – wet bulb and dry bulb temperature – heat content of air – sensible and latent heat – specific volume of air – psychrometric chart – humidity ratio – different process like cooling by dehumidification – sensible heating or cooling and humidification – mixing of air – sensible heat ratio.

### **COOLING LOAD :**

Source of heat load – wall gain load, air change load, product load, infiltration & ventilation Load, and miscellaneous load – equipment running time – coefficient of transmission or U Factor- temperature differential across walls, ceilings and floors – effects of solar radiation – Respiration heat – air quantities and change – principles only.

### **ELECTRICAL :**

Electromotive force and potential difference, electric current and resistance – Faraday's law – Ohm's law – Energy and power and their units and calculations. Principle of moving coil – moving iron and dynamometer – Voltmeter, ammeter, Wattmeter, energy meter and Megger – Electric conductor – types of wire – switch – holder - socket and fuse – Insulation – Earthing.

### **TOOLS :**

Types of hand tools and instruments used by refrigeration mechanics & electricians – precautions and safety in handling the tools – Precautions to avoid electric shock – safety measure to handle refrigerants.

### **REFERENCE :**

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