



Bhartiya Skill Development University

Syllabus for Ph.D. Entrance Test

Refrigeration & Air Conditioning

1. 1st law of thermodynamics for open and closed systems, 2nd law of thermodynamics, Kelvin-Planck and Clausius statements, and Clausius inequality. 3rd law of thermodynamics.
2. Heat Engines, Heat Pumps and Refrigeration Systems, Maximum COP, Thermodynamic properties, Thermodynamic processes, T-s and p-h diagrams, Continuity and Momentum equations, Bernoulli's equation and friction factor, Modes of heat transfer, Concept of thermal resistance and overall heat transfer coefficient, Radiative heat transfer coefficient, Forced Convection, Free Convection, Boiling and Condensation heat transfer coefficients, Joule Thompson coefficient and Inversion Temperature, Linde, Claude and Stirling cycles for liquefaction of air.
3. Vapour Compression Refrigeration Systems, Vapour Absorption Refrigeration Systems, Air Cycle Refrigeration Systems, Vapour Jet Refrigeration Systems, Thermoelectric systems, Vortex tube systems, Intermittent-Solar Refrigeration Systems, Combined Cycles, refrigerants and classifications, compressor and its classifications, refrigerant components classification working and applications,
4. Comfort Air Conditioning: Residential air conditioning, Commercial air conditioning, Industrial air conditioning, Industrial Refrigeration: Chemical and process industries Dairy plants, Petroleum refineries, Food processing and food chain.
5. Psychrometry, heating, and cooling load calculations, nanofluids, Psychrometric process, building management system and control, VRV, Air distribution system: duct design, diffusers, air handling unit and fan coil unit, chiller, low-temperature refrigeration, cryogenics.
6. Energy conservation in refrigeration and air conditioning system. Phase change heat transfer and heat exchanger. HVAC system in Automobiles