

AMAE-08 APPLIED THERMODYNAMICS AND HEAT TRANSFER

UNIT-1 GAS POWER CYCLES

- 1.1 Air standard cycles-Otto-Diesel-Dual-Work output,
- 1.2 Efficiency and MEP calculations- comparison of the cycles for same compression ratio and heat addition, same compression ratio and heat rejection,
- 1.3 Same peak pressure, peak temperature and heat rejection, same peak pressure and heat input, same peak pressure and work output, Brayton cycle

UNIT-2 RECIPROCATING AIRCOMPRESSORS & REFRIGERATION CYCLES

- 2.1 Single acting and double acting air compressors, work required, effect of clearance volume, volumetric efficiency, isothermal efficiency, free air delivery,
- 2.2 Fundamentals of refrigeration, C.O.P., reversed Carnot cycle, simple vapour compression refrigeration system, T-S, P-H diagrams, simple vapour absorption refrigeration system, desirable properties of an ideal refrigerant.

UNIT-3 CONDUCTION

- 3.1 Mechanism of Heat Transfer- Conduction, Convection and Radiation-
- 3.2 General Differential equation of Heat Conduction- Fourier Law of Conduction- Cartesian
- 3.3 One Dimensional Steady State Heat Conduction- Conduction through Plane Wall, Cylinders and Spherical systems- Composite System- Conduction with Internal Heat Generation-
- 3.4 Extended Surfaces- Unsteady Heat Conduction- Lumped Analysis- Use of Heislers Chart.

UNIT-4 CONVECTION

- 4.1 Convective Heat Transfer Coefficients- Boundary Layer Concept- Types of Convection
- 4.2 Forced Convection- Dimensional Analysis
- 4.3 External Flow- Flow over Plates, Cylinders and Spheres-
- 4.4 Internal Flow- Laminar and Turbulent Flow
- 4.5 Flow over Bank of tubes- Free Convection- Dimensional Analysis- Flow over Vertical Plate.

UNIT-5 RADIATION

- 5.1 Basic Concepts, Laws of Radiation- Stefan Boltzmann Law,
- 5.2 Kirchhoff Law- Black Body Radiation- Grey body radiation Shape Factor Algebra
- 5.3 Electrical Analogy- Radiation Shields- Introduction to Gas Radiation.

References Books:

1. Nag. P.K. "Basic and applied Thermodynamics" Tata McGraw-Hill Publishing Co. Ltd, New Delhi, 2004
2. Nag. P..K. " Heat Transfer", Tata McGraw-Hill, New Delhi, 2002
3. Kothandaraman.C.P "Fundamentals of Heat and Mass Transfer" New Age International, New Delhi, 1998