AMCT06 BASIC MECHANICAL ENGINEERING

UNIT-1 LAWS OF THERMODYNAMICS

1.1 Basic concepts and hints; Zeroth law;
1.2 First Law of Thermodynamics- Statement and application;
1.3 Steady flow energy equation-problems-
1.4 Second law of Thermodynamics- Kelvin- Plank statement and Clausius statement- problems;
1.5 Limitations; Heat Engine, Refrigerator and Heat Pump, Available energy,
1.6 Third law of Thermodynamics - Statement.

UNIT-2 HEATING AND EXPANSION OF GASES

2.1 Expressions for work done,
2.2 Internal energy and Constant Volume, Isothermal,
2.3 Adiabatic and problems; Free expansion and Throttling process.
2.4 Heat transfer for Constant Pressure, Polytropic processes-Derivations and

UNIT-3 AIR STANDARD CYCLES

3.1 Carnot cycle; Stirlings cycle; Joule cycle; Otto cycle;
3.2 Diesel cycle; Dual combustion Cycle Derivations and problems.

UNIT-4 I.C. ENGINES, STEAM AND ITS PROPERTIES AND STEAM TURBINES

4.1 Engine nomenclature and classification; SI Engine;
4.2 CI Engine; Four Stroke cycle, Two stroke cycle; Performance of I.C.Engine;
4.3 Brake thermal efficiency; Indicated Thermal Efficiency, Specific fuel consumption.
4.4 Steam - Properties of steam; Dryness fraction; latent heat;
4.5 Total heat of wet steam; Dry steam; superheated steam.
4.6 Use of steam tables; volume of wet steam, volume of superheated steam;
4.7 External work of evaporation; Internal energy;
4.8 Entropy of vapour, Expansion of vapour, Rankine cycle.
4.9 Steam turbines- Impulse and Reaction types - Principles of operation.

UNIT-5 SIMPLE MECHANISM, FLY WHEEL, DRIVES AND BALANCING

5.1 Definition of Kinematic Links, Pairs and Kinematic Chains;
5.2 Flywheel-Turning moment Diagram; Fluctuation of Energy.
5.3 Belt and rope drives; Velocity ratio; slip; Creep; Ratio of tensions;
5.4 Length of belt; Power Transmitted; gear trains-types.
5.5 Balancing of rotating masses in same plane; balancing of masses rotating in different planes.

References Books:

1. Smith, “Chemical Thermodynamics “, Reinhold Publishing Co., 1977.
2. Bhaskaran, K.A., and Venkatesh, A., “Engineering Thermodynamics “, Tata McGraw Hill, 1973.
3. Pandya A. and Shah, “Theory of Machines “, Charatakar Publishers, 1975.