2.18 30314 THEORY OF MECHANICAL ENGINEERING

UNIT-1 MECHANICAL PROPERTIES OF METALS:

1.1 Definitions
- 1.1.1 Elasticity
- 1.1.2 Plasticity
- 1.1.3 Ductility
- 1.1.4 Brittleness
- 1.1.5 Toughness
- 1.1.6 Hardness
- 1.1.7 Malleability
- 1.1.8 Fatigue

1.2 Examples of applications of above terms related to electrical engineering.

UNIT-2 BASIC CONCEPT OF THERMAL ENGINEERING:

2.1 Energy
2.2 Internal energy
2.3 Potential energy
2.4 Kinetic energy
2.5 Heat
2.6 Work and enthalpy
2.7 Specific heat
2.8 Specific heat ratio
2.9 Characteristics gas equation
2.10 Universal gas constant
2.11 First law of thermodynamics
2.12 Second law of thermodynamics

UNIT-3 HYDRAULICS:

3.1 Physical properties of a fluid
- 3.1.1 Density
- 3.1.2 Specific volume
- 3.1.3 Specific weight
- 3.1.4 Specific gravity
- 3.1.5 Viscosity

3.2 Pascal's law

UNIT-4 PRESSURE MEASURING DEVICES:

4.1 Manometers
- 4.1.1 Simple manometers
- 4.1.2 Differential manometers
- 4.1.3 Inverted 'U' tube

4.2 Pressure gauges

4.3 Continuity equation

UNIT-5 BERNAULLI'S THEOREM:

5.1 Energy of a fluid
5.1.1 Pressure energy
5.1.2 Velocity energy
5.1.3 Datum energy
5.2 Venturimeter& its uses

UNIT-6 PUMPS:

6.1 Types of lumps
6.2 Centrifugal pump
6.3 Reciprocation pump
6.4 Their relative advantages and performance

UNIT-7 TURBINE:

7.1 Working principles and types of water turbines
7.2 Selection of turbines
7.3 Brief idea of turbine
7.3.1 Pelton wheel turbine
7.3.2 Francis turbine

UNIT-8 PROPERTIES OF STEAM:

8.1 Generation of steam at constant pressure
8.2 Enthalpy of water wet steam
8.3 Enthalpy of dry saturated stem
8.4 Dryness fraction
8.5 Superheated steam
8.6 Latent enthalpy
8.7 Enthalpy of steam
8.8 Specific volume
8.7 External work during evaporation
8.8 Internal content enthalpy
8.9 Internal energy of steam
8.10 Use of steam table
8.11 Simple numerical problems

UNIT-9 BOILERS:

9.1 Classification of boilers
9.2 Working of common boilers
9.2.1 Babcox and Wilcox
9.2.2 Chichram boiler
9.3 Boiler mounting and their accessories

9.4 Introduction to modern high pressure boiler for thermal power station (Lamont boiler, weffler boiler, Benson boiler and Velox boiler).

UNIT-10 STEAM TURBINES:

10.1 Introduction
10.2 Types of steam turbine
10.3 Working principle of steam turbine
10.4 Uses and advantages of steam turbine

UNIT-11 I.C. ENGINES:

11.1 I.C. engine cycle (Otto, diesel)
11.2 Working principle of
11.2.1 Two stroke petrol and diesel
11.2.2 Four stroke petrol and diesel

UNIT-12 TRANSMISSION:

12.1 Belt drive
12.2 Rope drive
12.3 velocity ratio
12.4 Tension ratio
12.5 Effect of centrifugal tension
12.6 Application of these drives

UNIT-13 LUBRICATION:

13.1 Object of lubrication
13.2 Different methods of lubrication
13.3 Properties of lubricants

Reference books:

1. Thermodynamics & Heat Power Engg. Mathur & Mehta
2. Thermal Engg. P.L. Ballaney
3. Hydraulics & Hyd. Machines Khurmi
4. Strength of Materials G.C.Singh 5. Heat Engines Pande & Shah