

# AMEL02 THERMODYNAMICS

## UNIT-1 COMBUSTION OF FUEL

- 1.1 Introduction, Mass fraction and Mole Fraction, Symbols for Elements and Compounds,
- 1.2 Combustion Equations of Gaseous Fuels, Theoretical or Minimum Mass of Air Required for Complete Combustion,
- 1.3 Theoretical or Minimum Volume of Air required for Complete Combustion, Excess Air Supplied, Air Fuel ratio, Analysis of products of combustion, Combustion Equations,
- 1.4 Volumetric analysis of products, Conversion of volumetric analysis to gravimetric analysis, Volume Fraction,
- 1.5 Conversion of volumetric Analysis into Mass Analysis or Gravimetric Analysis,
- 1.6 Conversion of Mass Analysis into Volumetric Analysis, Mass of Carbon in Fuel Gases, The analysis of Fuel Gas, The Orsat Apparatus.

## UNIT-2 ENTROPY

- 2.1 Introduction, Entropy as a property, The Second Law, Analysis for Entropy, Clausius Inequality, Change of entropy in an irreversible process,
- 2.2 Change of Entropy for Ideal Gas and Pure Substance,
- 2.3 Change of Entropy of a perfect gas during Various Thermodynamics Processes, Change of Entropy during Constant Process (or Isobaric Process),
- 2.4 Change of Entropy during Constant Temperature Process (or Isothermal process), Change of Entropy during
- 2.5 Reversible Adiabatic Process (or Isentropic Process), Change of Entropy during Polytropic Process ( $pvn = \text{Constant}$ ).

## UNIT-3 AIR COMPRESSOR

- 3.1 Introduction, Uses of Compressed air for industries, Types of Air Compressors, Capacity Control of Compressor,
- 3.2 Types of compressor valves, Work done by Reciprocating Air Compressor with Clearance Volume,
- 3.3 Effect of Clearance on volumetric efficiency,
- 3.4 Condition for maximum efficiency in two stage compression with intercooling.

## UNIT-4 IC ENGINE

- 4.1 Introduction, Classification of I.C. Engines, Fuel Supply System for S.I. and C.I. Engine, Ignition Systems of Petrol Engines,
- 4.2 Fuel Injection system for Diesel Engines, Cooling Systems for I.C. Engines, Lubrication System for I.C. Engines,
- 4.3 Governing of internal combustion engines, Main Components of I.C. Engines,
- 4.4 Reciprocating Internal Combustion Engines, Four-Stroke cycle, Two-stroke cycle.

## UNIT-5 IC ENGINE TESTING & PERFORMANCE

- 5.1 Indicated Power, Measurement of friction power, Indicated mean Effective Pressure,

- 5.2 Measurement of fuel consumption, Energy balance of an I.C. Engine,  
5.3 Determination of mechanical, Thermal and Relative efficiency.

### **UNIT-6 STEAM PROCESS**

- 6.1 Introduction, Thermodynamics Processes of Vapour, Enthalpy – Entropy or H-S Chart or Mollier Diagram,  
6.2 Measurement of dryness-fraction of steam, Bucket or Barrel Calorimeter,  
6.3 BOILER, Introduction, Classification of Boilers, Boiler Mountings and Accessories,  
6.4 Equivalent Evaporation, Boiler Efficiency, Heat Losses in a Boiler, Heat Balance Sheet, Boiler Draught.

### **UNIT-7 VAPOUR POWER CYCLE**

- 7.1 Introduction, The Carnot cycle, the ideal Rankine Cycle,  
7.2 Factors affecting the performance of Rankine cycle.

### **UNIT-8 AIR STANDARD CYCLE**

- 8.1 Introduction, Otto Cycle, Diesel Cycle, Dual Combustion Cycle,  
8.2 Comparison of Otto, Diesel Dual Cycle,  
8.3 Air and Fuel-vapour mixtures Concept of air fuel Cycle.

### **Reference Books:**

1. Engineering Thermodynamics by M Achuthan
2. Thermodynamics: Kinetic Theory and Statistical Thermodynamics by F W Sears and G L Salinger
3. Fundamentals of Engineering Thermodynamics by M J Moran and H N Shapiro

