Chapter 1 : Introduction to Internal Combustion (I.C.) Engines 1-1 to 1-55

Syllabus : Introduction : Comparison of SI and CI Engines, Difference in thermodynamic and operating variables, comparison of performance characteristics, comparison of initial and maintenance costs application of SI and CI engine.

Syllabus : Fuels and its supply system for SI and CI engine : Important qualities of IC engine fuels, rating of fuels, Carburetion, mixture requirement for different loads and speeds, simple carburetor and its working, types of carburetors, MPFI, types of injection systems in CI engine, fuel pumps and injectors, types of nozzles, spray formation.

Syllabus : Combustion in SI and CI Engines : Combustion equations, calculations of air requirement in I C Engine, stoichiometric air fuel ratio, proximate and ultimate analysis, enthalpy of formation, adiabatic flame temperature.

Stages of combustion in SI engines, abnormal combustion and knocking in SI engines, factors affecting knocking, effects of knocking, control of knocking, combustion chambers for SI engines, Stages of combustion in CI engines, detonation in C.I. engines, factors affecting detonation, controlling detonation, combustion chamber for SI and CI engine

Syllabus : Engine lubrication: Types of lubricants and their properties, SAE rating of lubricants, Types of lubrication systems **Engine Cooling :** Necessity of engine cooling, disadvantages of overcooling, Cooling systems and their comparison: Air cooling, Liquid cooling

Supercharging/Turbo-charging : Objectives, Limitations, Methods and Types, Different arrangements of turbochargers and superchargers

Syllabus : Emission of IC engine : Emission from SI engine, effect of engine maintenance on exhaust emission control of SI engine, diesel emission, diesel smoke and control, diesel and control comparison of gasoline and diesel emission. Measurement and calculation for of emission constituents.

Syllabus : Unconventional Engines & Alternative Fuels for IC Engine: Working principle of stratified charge engines sterling engine, Wankel engine.

Methanol, Ethanol, vegetable oils, bio gas, bio-fuels, hydrogen and comparison of their properties with Diesel and petrol.

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