

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.

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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.

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Chapter 3 : Combustion in SI and CI Engines

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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

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**Chapter 4 : Lubrication, Cooling and Supercharging
of IC Engines 4-1 to 4-43**

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

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**Chapter 5 : Testing and Performance of IC Engines
5-1 to 5-54**

Syllabus : Rating, Testing and Performance : Measurements of speed, air flow, fuel consumption, indicated power brake power, frictional horse power, and smoke, testing of engines as per Indian Standard 10001, performance test for variable speed I C Engines, heat balance sheet, governing test for constant speed IC engines, effect of fuel injection parameters in CI engines and ignition advance of SI engines on performance of engine. Rating of

internal combustion engine based on (I) continuous operation of engine (II) Maximum power an engine can develop (III) Power calculated from empirical formula, Trouble Shooting and Overhauling of Engines.

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Chapter 6 : Emission of I.C. Engines 6-1 to 6-16

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.

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**Chapter 7 : Unconventional Engines and Alternate
Fuels for IC Engines 7-1 to 7-22**

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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