



INTRODUCTION TO AUTOMOBILE ENGINEERING

What is an Automobile?

An automobile is a self-propelled vehicle that has its own power source. It's used to carry people or goods.

Examples: Cars, buses, and trucks

Types of Automobiles (Based on Load)

- Heavy Vehicles:
Large vehicles designed to carry heavy loads.
Examples: Big trucks
- Light Vehicles:
Smaller vehicles designed to carry lighter loads.
Examples: Cars



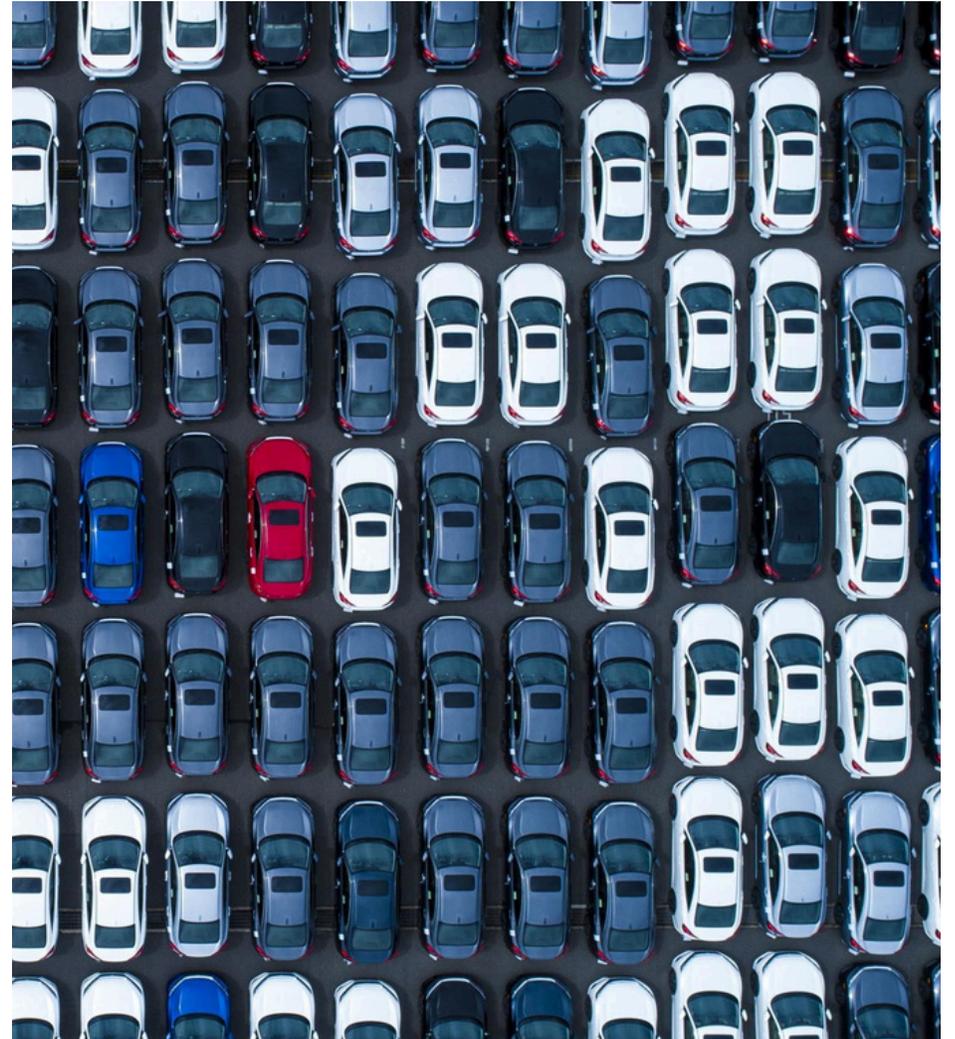
Types of Automobiles (Based on Wheels)

- **Two-Wheeled Vehicles:**
Vehicles with two wheels.
Examples: Scooters, motorcycles
- **Three-Wheeled Vehicles:**
Vehicles with three wheels.
Examples: Autorickshaws
- **Four-Wheeled Vehicles:**
Vehicles with four wheels.
Examples: Cars, buses



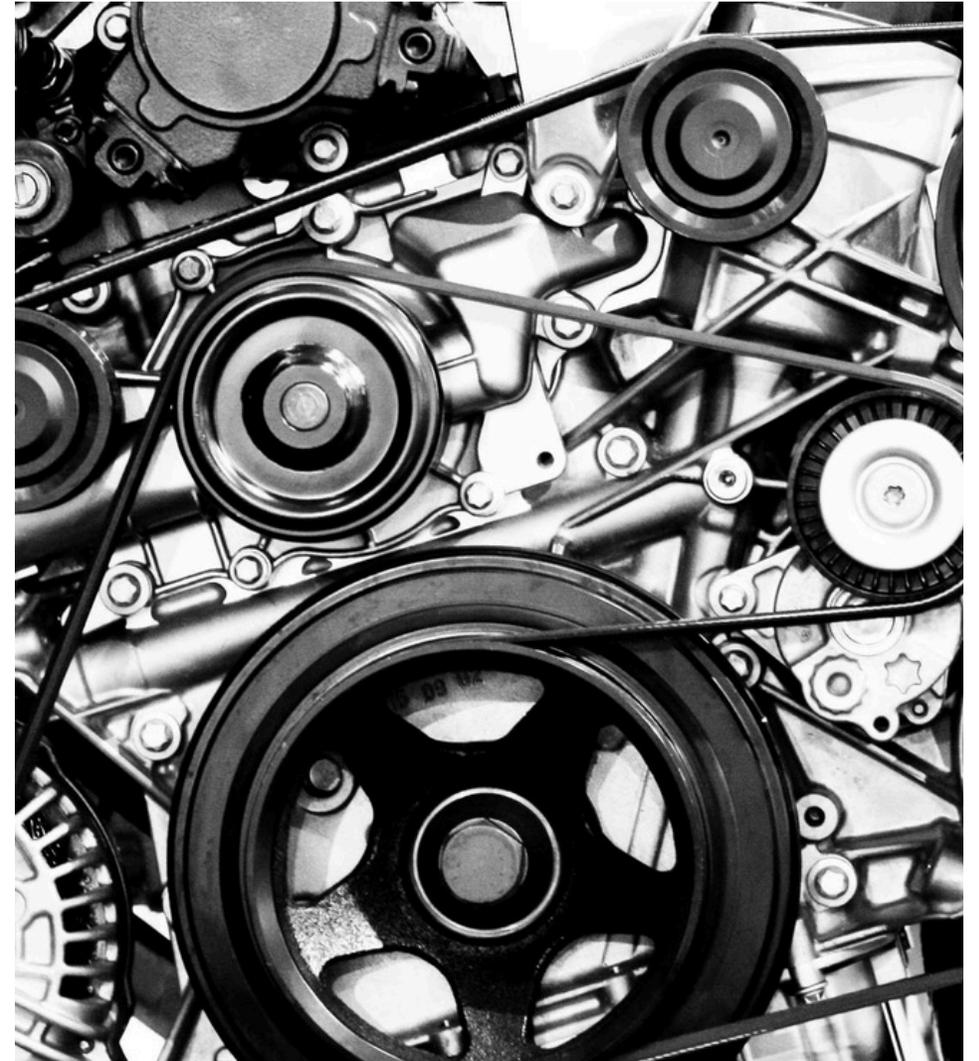
Types of Automobiles (Based on Fuel)

- **Petrol Vehicles:**
Vehicles that use petrol (gasoline) as fuel.
Examples: Cars, motorcycles
- **Diesel Vehicles:**
Vehicles that use diesel as fuel. Examples:
Trucks, buses
- **Electric Vehicles:**
Vehicles that use electricity.



Other Types of Automobiles

- Body Style: Different shapes and designs (Sedan, Hatchback etc.).
- Transmission: How the engine's power is transferred (Manual, Automatic)
- Drive: Which wheels get the power (Left-hand, Right-hand)
- Driving Axle: : Which wheels make the car move (Front- wheel, Rear-wheel, All-wheel)
- Engine Position Where the engine is located (Front, Rear)



5. On the basis of Transmission:

Conventional vehicles with manual transmission,
Example: car with 5 gears.

In automatic transmission, gears are not required to be changed manually.

6. On the basis of Drive:

Left hand drive and Right hand drive

7. On the basis of Driving Axle: Front wheel drive, Rear wheel drive, All wheel drive

8. Position of Engine: · Engine in Front -Most of the vehicles have engine in the front. Example : most of the cars, · Engine in the Rear Side Very few vehicles have engine located in the rear. Example : Nano car.



MAIN PARTS OF AN AUTOMOBILE

- Frame
 - Chassis
 - Body
 - Power Unit (Engine)
 - Transmission System
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Frame and Chassis

- Frame:

The skeleton of the vehicle; the main support.

- Chassis:

The frame plus other components like the engine, wheels, etc.



Body

The outer part of the vehicle that is attached to the chassis.

Types:

- Car
- Truck
- Bus
- Van



Resistances to Vehicle Motion

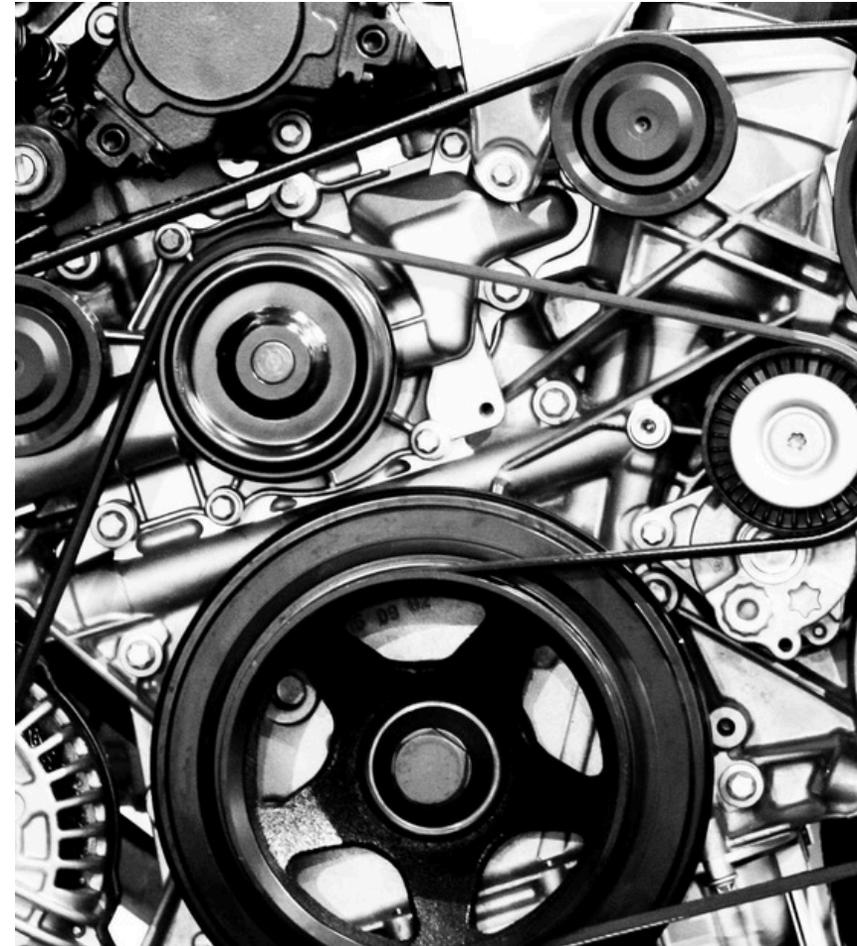
- Forces that oppose the movement of a vehicle.
- Aerodynamics : How air moves around the car.

Components of an Engine

Engines have many parts that work together to create power.

Types of Engines:

- Spark Ignition (SI) Engine (Petrol Engine)
- Compression Ignition (CI) Engine (Diesel Engine)

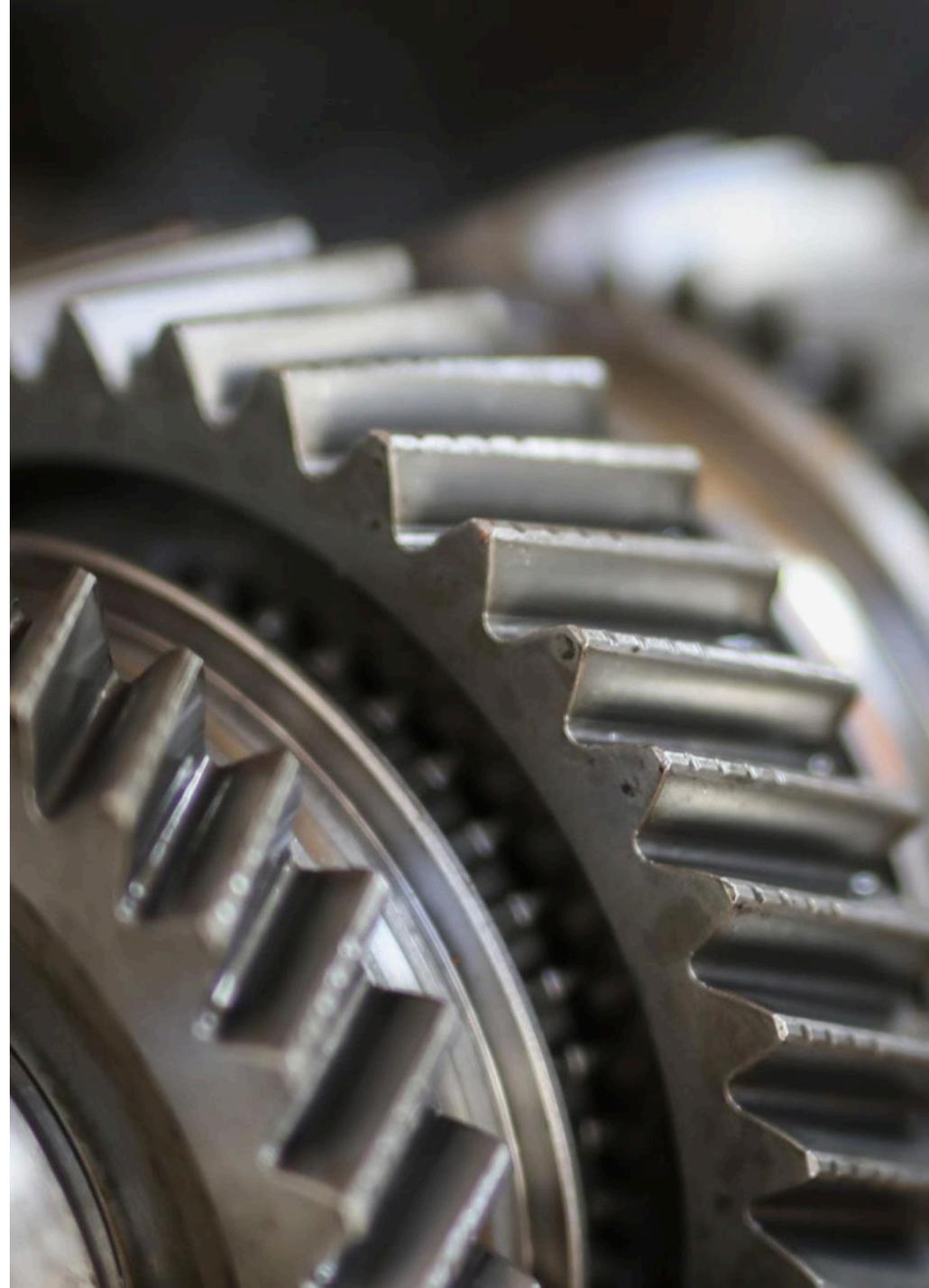


Basic Engine Parts

- Cylinder Block: Main frame of the engine
- Piston: Sliding part that creates power.
- Piston Rings: Seal the piston to prevent leaks.
- Piston Pin: Connects piston to connecting rod
- Connecting Rod: Connects piston to crankshaft
- Crankshaft: Converts up-and-down motion to rotary motion



- Crankshaft: Converts up-and-down motion to rotary motion.
- Flywheel: Helps keep the engine running smoothly.
- Cylinder Head: Top of the combustion chamber, holds valves.
- Intake/Exhaust Valves: Open and close to let gases in and out.
- Camshaft: Opens and closes the valves.
- Timing Gears: Connect crankshaft to camshaft.
- Spark Plug: Ignites the fuel in a petrol engine.

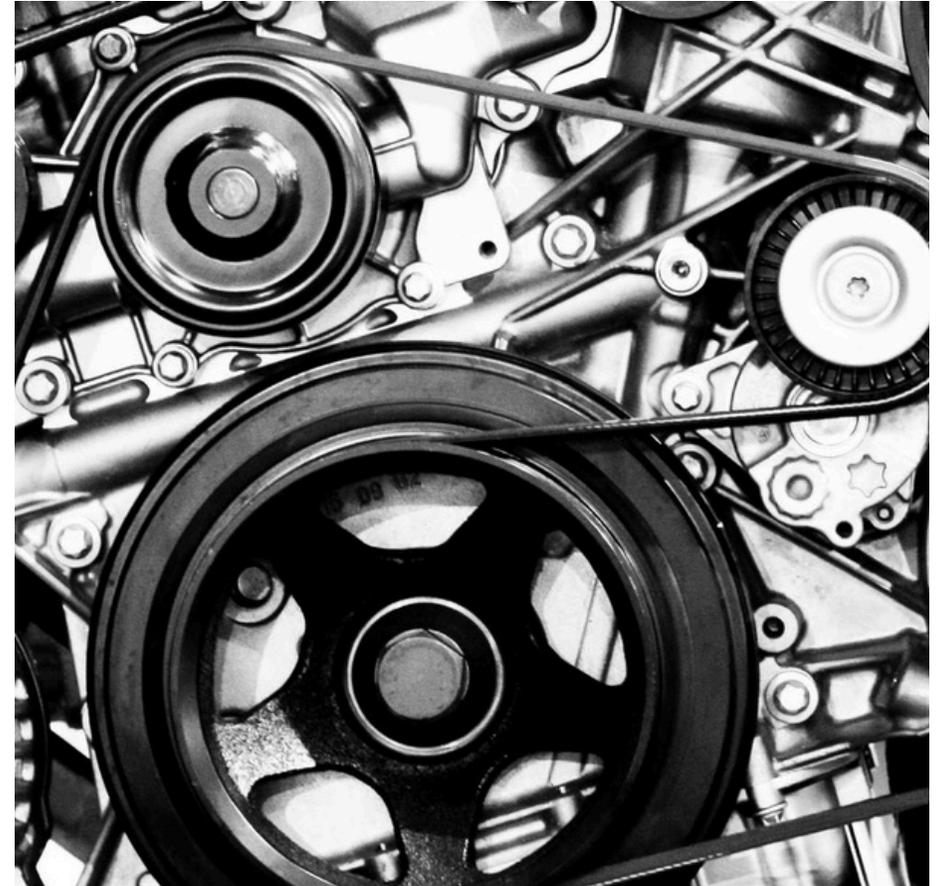


Why Diesel Engines Are Not Preferred in Commercial Vehicles

While diesel engines are fuel efficient, they have some disadvantages.

Disadvantages:

- Heavier and more expensive
- Lower RPM, less acceleration
- More smoke and noise
- Harder to start in cold weather



Advantages of Diesel Engines

- Better fuel economy
- Longer engine life



Fuel Injection System for SI Engines

Fuel Injection System for SI Engines Delivering the right mix of fuel and air to the engine.

Carburetion Process of mixing fuel and air.

Carburetor A device that atomizes fuel and mixes it with air.



Factors Affecting Carburetion

- Factors:
 - Engine Speed
 - Fuel vaporization
 - Air temperature
 - Carburetor design
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Principle of Carburetion

Suction from the piston draws in air and fuel, which mix in the carburetor.

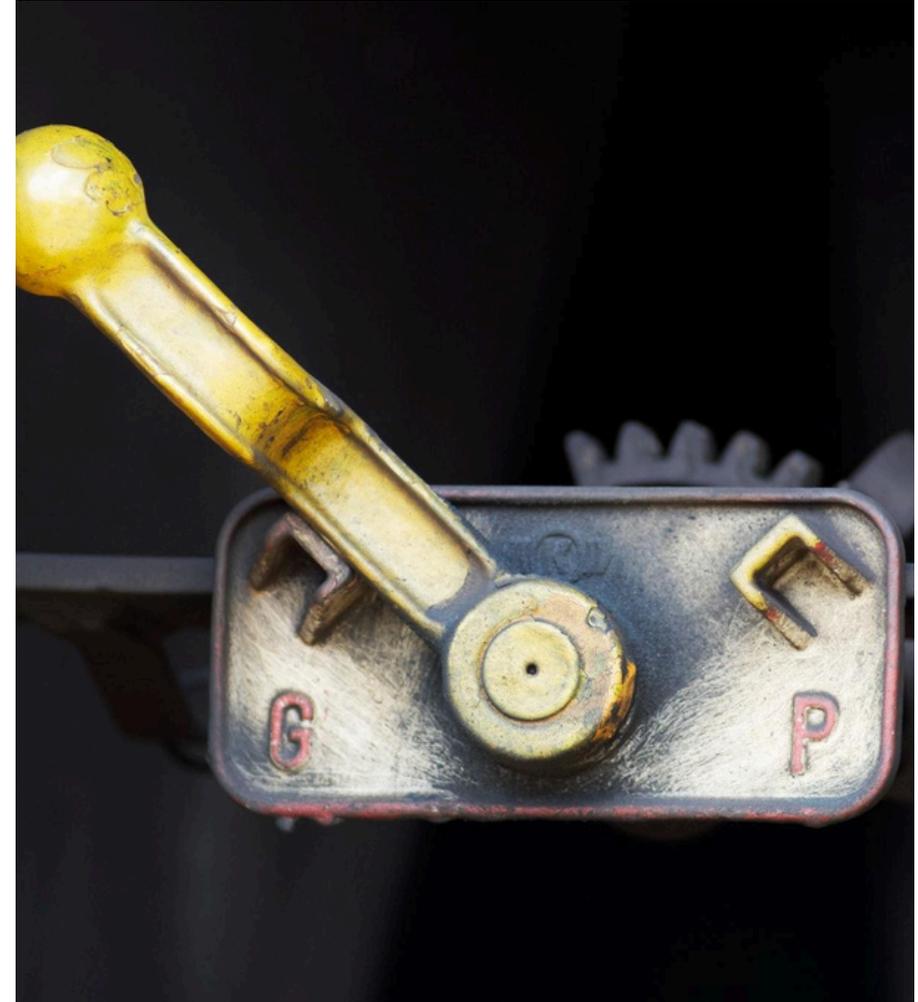
Venturi effect: The narrowing in the carburetor that increases air speed and helps mix the fuel.



The Simple Carburetor

Components:

- Float chamber
- Fuel discharge nozzle
- Metering orifice
- Venturi
- Throttle valve



Definition of 'Engine'

An engine is a device, which transforms one form of energy into another form. Normally, most of the engines convert thermal energy into mechanical work and therefore they are called 'heat engines'.





Thank You

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