

Systems in Mechanical Engineering 202041

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Course Objectives:

1. To identify the sources of energy and their conversions
2. To explain the basic concept of engineering thermodynamics and its application
3. To understanding the specifications of vehicles
4. To get acquainted with vehicle systems
5. To introduce manufacturing processes applying proper method to produce components
6. To be able to select and compare domestic appliances

Course Outcomes

On completion of the course, learner will be able to

CO1: Describe and compare the conversion of energy from renewable and non-renewable energy sources

CO2: Explain basic laws of thermodynamics, heat transfer and their applications

CO3: List down the types of road vehicles and their specifications

CO4: Illustrate various basic parts and transmission system of a road vehicle

CO5: Discuss several manufacturing processes and identify the suitable process

CO6: Explain various types of mechanism and its application

Unit III Vehicles and their Specifications

Classification of automobile. Vehicle specifications of two/three wheeler, light motor vehicles, trucks, buses and multi-axle vehicles. Engine components (Introduction). Study of engine specifications, comparison of specifications of vehicles. Introduction of Electric and Hybrid Vehicles. Cost analysis of the Vehicle.

Classification of automobile

<https://www.youtube.com/watch?v=6dHfFhXbY4o>

On the Basis of Load :

- (a) Heavy transport vehicle (HTV) or heavy motor vehicle (HMTV),
 - e.g. trucks, buses, etc.
- (b) Light transport vehicle (LTV)
 - e.g. pickup, station wagon, etc.
- (c) Light motor vehicle (LMV),
 - e.g. cars, jeeps, etc.

On the Basis of Wheels :

- (a) Two wheeler vehicle,
for example : Scooter, motorcycle, scooty, etc.
- (b) Three wheeler vehicle,
for example : Auto rickshaw, three wheeler scooter and tempo, etc.
- (c) Four wheeler vehicle,
for example : Car, jeep, trucks, buses, etc.
- (d) Six wheeler vehicle,
for example : Big trucks with two gear axles each having four wheels.

On the Basis of Fuel Used

(a) Petrol vehicle,

e.g. motorcycle, scooter, cars, etc.

(b) Diesel vehicle,

e.g. trucks, buses, etc.

(c) Electric vehicle,

e.g. battery drive

(d) Steam vehicle,

e.g. an engine which uses steam.

(e) Gas vehicle,

e.g. LPG and CNG vehicles, where LPG is liquefied petroleum gas and CNG is compressed natural gas.

Transmission

- (a) Conventional vehicles with manual transmission, e.g. car with 5 gears.
- (b) Semi-automatic
- (c) Automatic : In automatic transmission, gears are not required to be changed manually. It is automatically changes as per speed of the automobile.

Position of Engine

Engine in Front :

Most of the vehicles have engine in the front.

Example : most of the cars, buses, trucks in India.

Engine in the Rear Side:

Very few vehicles have engine located in the rear.

Example : Nano car

PARTS OF I. C. ENGINE :

1. Cylinder
2. Cylinder Head
3. Piston
4. Piston Rings
5. Gudgeon Pin
6. Connecting Rod
7. Crank Shaft
8. Crank
9. Engine Bearing
10. Fly wheel

Vehicle specifications of two/three wheeler

Honda	CB Shine
Dimensions	
Length * Width * Height	2,014 x 762 x 1,071 mm
Wheelbase	1266 mm
Ground Clearance	175 mm
Fuel Tank Capacity	11 liters
Kerb Weight	121 Kgs
Engine/Transmission	
Type	4-stroke, Air cooled
Displacement	124.7 cc
Max. Power	10.3 BHP / 7500 rpm
Max. Torque	1.1 KG-m @ 5500rpm
Clutch & Gear box	Multi-plate wet Clutch & 4 Speed constant mesh gear box
Fuel Supply System	Carburetor

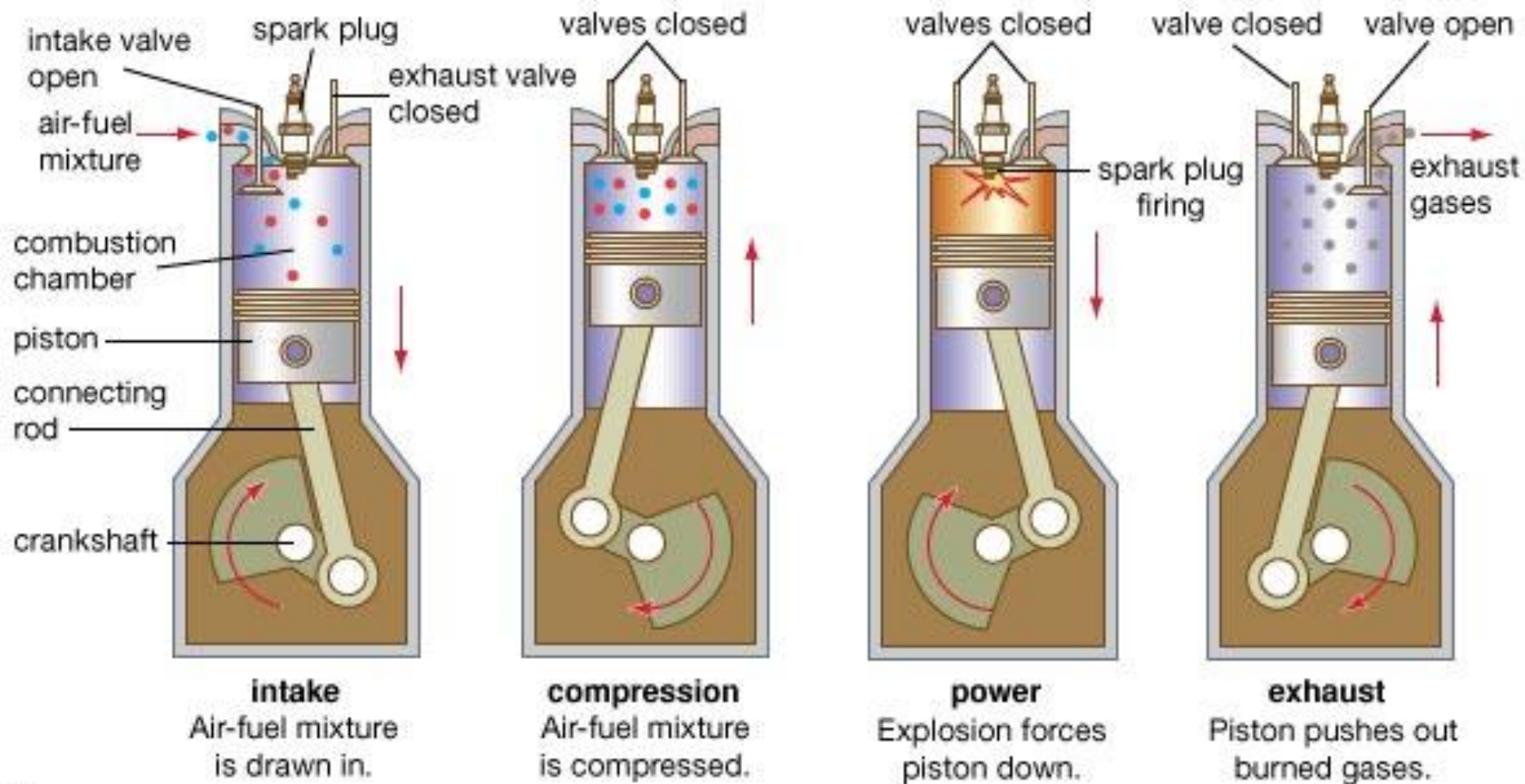
Breaks & Tyres	
Front & Rear Brake	Disc, 240 mm & Drum, 130 mm
Front & Rear Tyres	2.75 – 18 42P & 2.75 – 18 48P
Electricals	
Ignition	Digital
Battery	12V-3Ah MF
Starting	Kick/Self-start

HOSTED ON :

TEAM-BHP.com

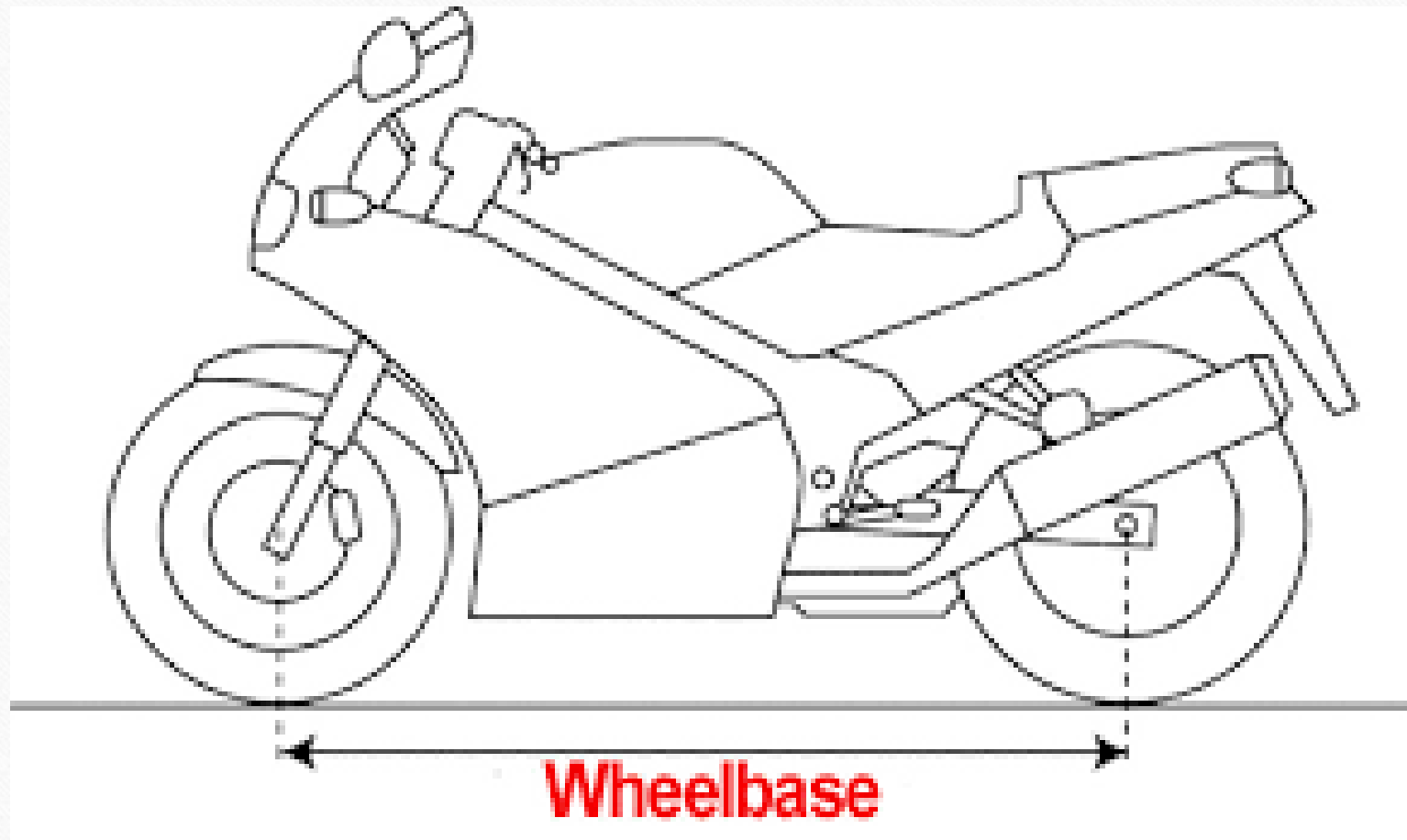
Engine Specification	Value
Engine type	E2876E302
Cylinder number	In-line 4, 4-stroke cy
Cylinder bore	128 mm
Motor length	2650 mm
Motor width	1000 mm
Motor height	1500 mm
Stroke	166 mm
Firing order	1-3-4-2
Speed	1000 rpm
Compression ratio	12:1
Maximum electrical power at ISO condition	130 kW
Weight	1850 kg
Molar air-fuel ratio	1.5
Intake type	Naturally aspirated
Rated voltage	220 V
Rated current	18 A
Starting mode	24VDC electric starting s
Frequency	50 HZ/60 HZ

Four-stroke cycle









Wheelbase



www.careformotorbike.com



PULSAR 125 CC V/S SHINE 125 TECHNICAL SPECIFICATION

FEATURES	PULSAR 125 CC	SHINE 125
ENGINE	4 STROKE DTS-I, SINGLE CYLINDER 2 VALE	4 STROKE AIR COOLED , SI-ENGINE
ENG. DISPLACEMENT	124.38 CC	124.73 CC
MAX. NET POWER	12 PS @ 8500 RPM	10.16 BHP @ 7500 RPM
IGNITION SYSTEM	DC CDI	
TRANSMISSION	5 SPEED CONSTANT (1 DOWN 4 UP)	5 SPEED CONSTANT (1 DOWN 4 UP)
FUEL TANK CAPACITY	11.5 LTR	10.5 LTR
WHEEL BASE	1323 MM	1266 MM
LENGTH	2055 MM	2012 MM
WIDTH	765 MM	762 MM
GROUND CLEARANCE	165 MM	160 MM
TYRE FRONT	80/100 TUBELESS	80/100 TUBELESS
TYRE REAR	100/90 TUBELESS	80/100 TUBELESS
TAIL/ STOP LAMP	LED	
WEIGHT	139.5 KG	123 KG
REAR SUSPENSION	NITROX 4 WAY ADJUSTABLE	SPRING LOADED HYDRAULIC TYPE
BATTERY	12 V 4 AH VRLA	12 V 3 AH (MF)
HEADLAMPS	35/35W HS1	12 V 35/35W
PRICE	81990/- ON ROAD	86248/- ON ROAD



Engine	<i>Value:</i>
Type	Single cylinder, 2-stroke; forced air cooler
Displacement	145.45 cc
Max. power, $P_{e,max}$	7.00 HP, 5.15 kW at 5000; rpm
Max. torque, $T_{e,max}$	12.1 Nm at 3500 rpm
Transmission	4 forward and 1 reverse
Gear ratios [†] , r_t	[0.20, 0.34, 0.54, 0.89]
Primary ratio [†] , r_p	0.88
Final drive ratio [†] , r_d	0.24

Clutch type

Wet multi-disc type

Brakes

Front & rear hydraulic
break system

Weights & Measures

Gross vehicle weight, m_v

610 Kg

Kerb weight

272 Kg

Chassis type

Monocoque

Dimensions

Overall length

2625 mm

Overall width, W

1300 mm

Overall height, H

1710 mm

Wheel base, L

2000 mm

Ground clearance

180 mm

Turning radius

2.88 m

Tyres, r_w	4.00-8, 4PR
Roll resistance [‡] , c_r	0.015
Air drag coefficient [‡] , c_d	0.44
Frontal surface area [‡] , A_f	2.0 m ²
Electric system	
System voltage	12 V
Alternator output ‡	13.5 V, 35 A at 3600 rpm
Fuel economy	
Mileage within a city	18 to 20 Km/liter (45 mpg)
Mileage on the highway	25 Km/liter (60 mpg)
Average traveled distance	40 to 60 Km/day
Maximum speed	56–80 Km/h (35–50 mph)
Fuel tank capacity	8 liters (including 1.4 liters reserve)
Gas tank travel distance	145 Km to 190 Km (90 mi)



+



Base Curb Weight

Payload

GVW

<

GVWR

