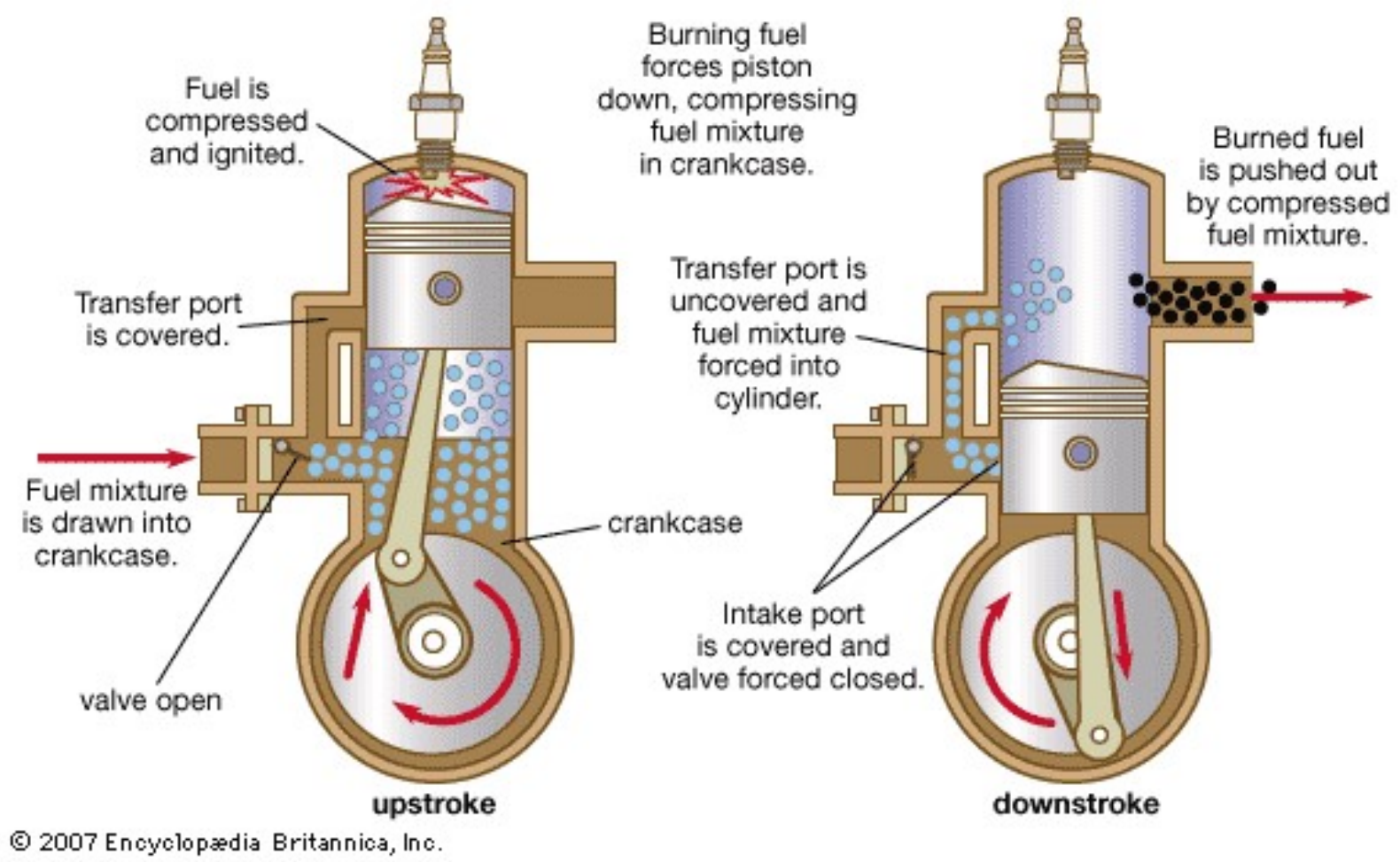
UNIT 1

Two wheeler Engines-Two-Stroke Engines

Two-Stroke Engines



Applications

- Two stroke engines are found on:
  - Weed trimmers
  - Snowmobiles
  - Older dirt bikes
  - Chainsaws
  - Nitro R/C Cars
  - Small outboards
  - Older Jet skis

The Basics

- Two stroke engines operate on the same principles as a four stroke engine.
  - Intake- Fuel mixture is drawn into ***crankcase*** during **upstroke**
  - Compression- mixture is compressed in the **crankcase** during downstroke and again during upstroke before combustion
  - Combustion-fuel is recompressed and ignited in cylinder during upstroke
  - Exhaust- burned mixture is forced out by **fresh mixture** being forced in during downstroke
  - Piston fires once every revolution. No traditional valves like a four-stroke. Piston serves as a "valve" by covering the ports.

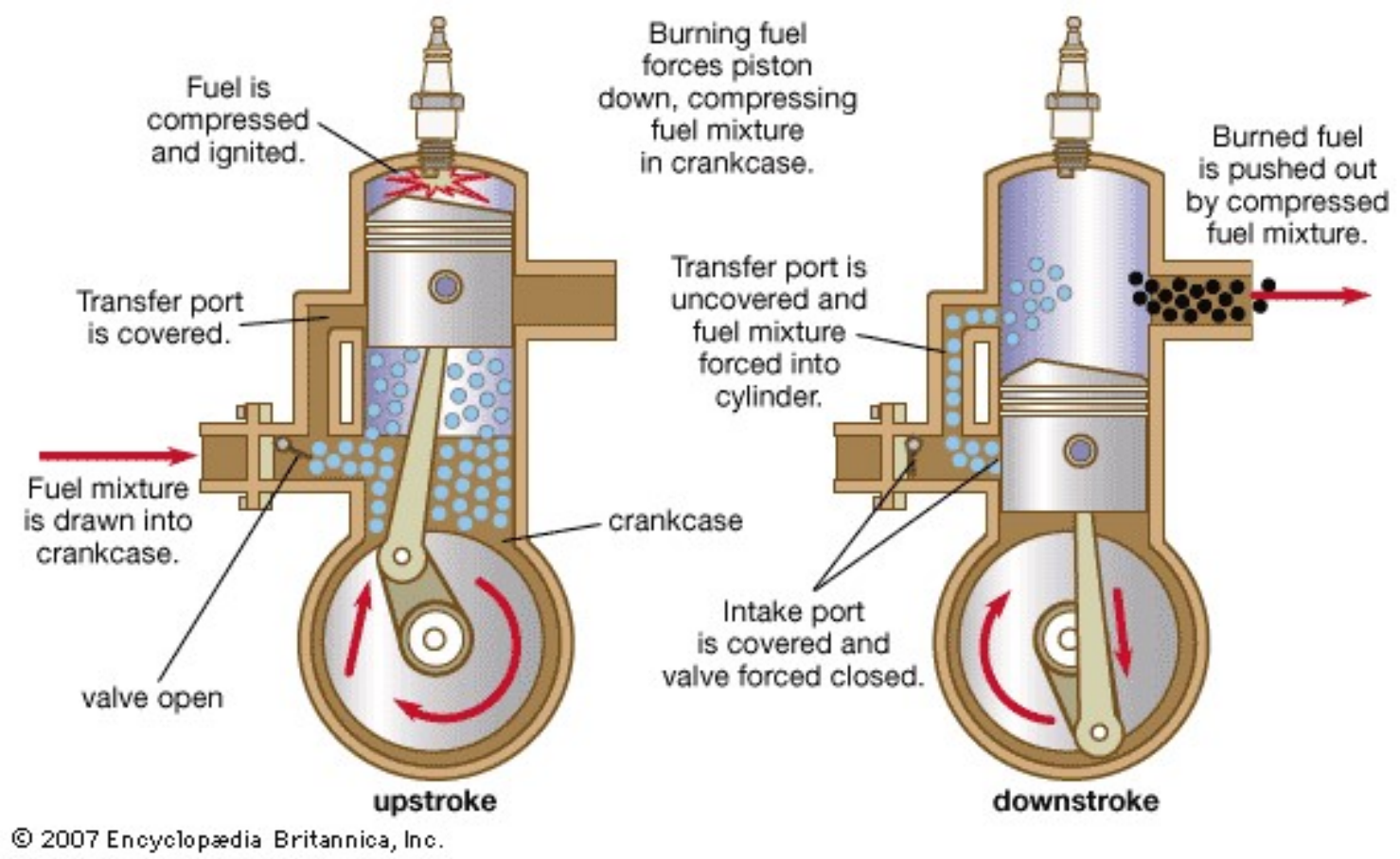
Upstroke (compression)

- One-way valve opens and fuel mixture is drawn into crankcase
- Transfer port is covered
- Fuel mixture is compressed (again) and ignited
- Piston covers exhaust port during compression

Downstroke (Combustion)

- Combustion forces piston down compressing fuel mixture in crankcase
- Intake port is covered and valve is forced closed
- Transfer port is uncovered forcing fuel mixture into cylinder
- This fuel mixture pushes the exhaust out the exhaust port

Two-Stroke


Fuel is compressed and ignited.
Transfer port is covered.
Fuel mixture is drawn into crankcase.
valve open
crankcase
upstroke
Burning fuel forces piston down, compressing fuel mixture in crankcase.
Transfer port is uncovered and fuel mixture forced into cylinder.
Intake port is covered and valve forced closed.
Burned fuel is pushed out by compressed fuel mixture.
downstroke
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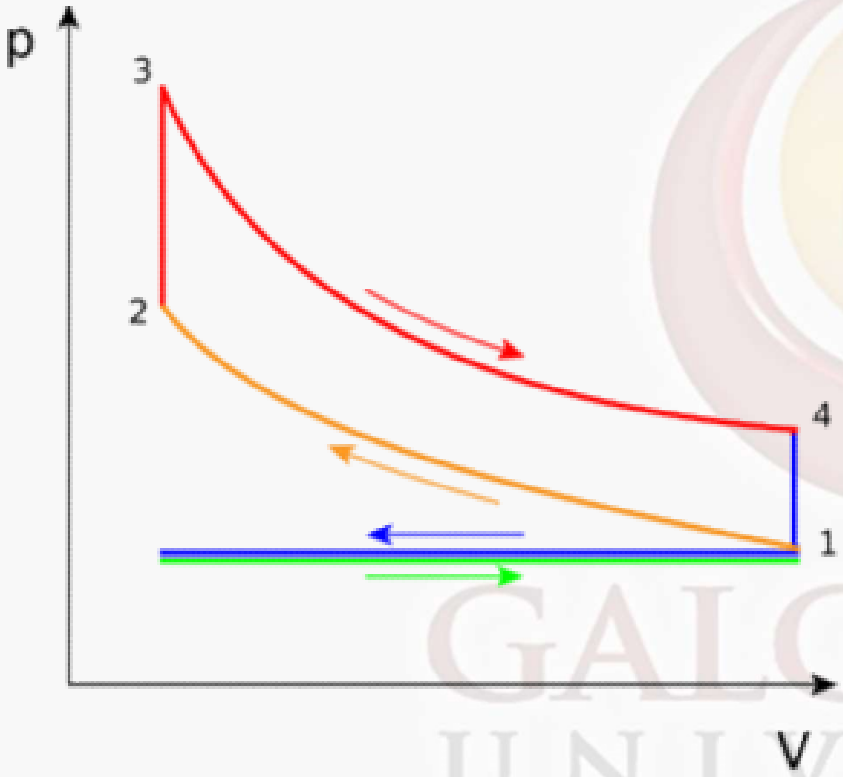
Advantages

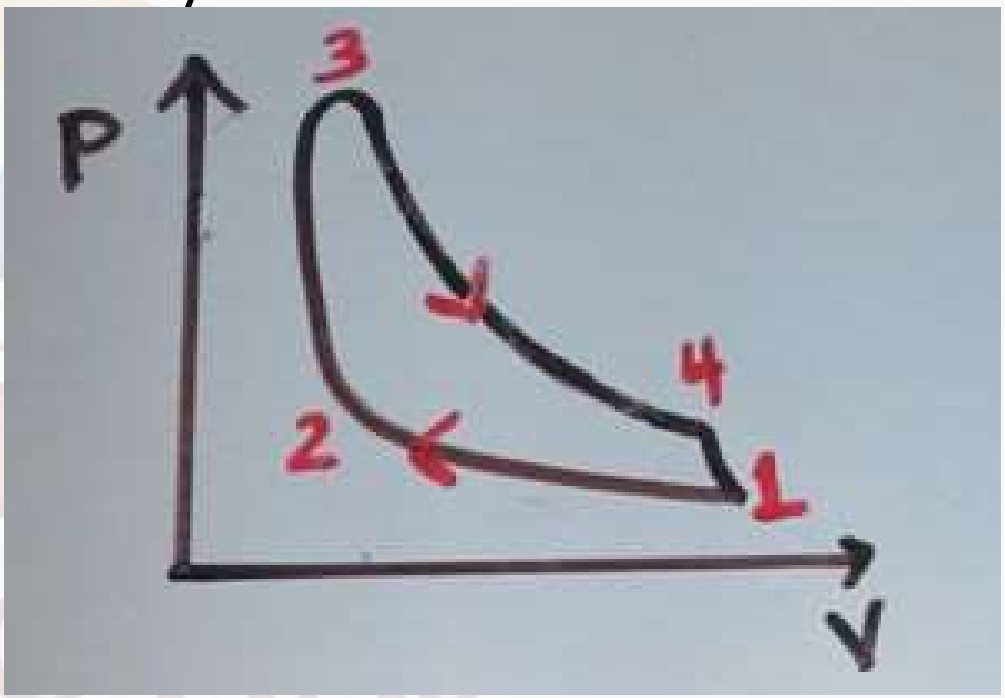
- Less parts = Lighter
- Fires once every revolution = 2x power of four stroke
- Cheaper, less complex and easier to work on
- Can work in any orientation (upside down, sideways)

Disadvantages

- No dedicated lubrication system (not as durable)
- Not fuel efficient and require expensive oil to be mixed with gas (one gallon oil/1,000 miles)
- Produce a lot of pollution due to burning of gas and oil.

Ideal VS real cycle





Types of two stroke engines

- **Based on scavenging method**
  i)Crankcase & ii) Separately scavenged engine
- **Based on scavenging process (air flow)**
  i)Cross flow scavenging,
  ii)Loop scavenging (MAN, Schnuerle, Curtis type)
  iii)Uni-flow scavenging (opposed piston, poppet valve, sleeve valve)
- **Based on overall port-timing**
  i) Symmetrical & ii) Unsymmetrical