



SG PHYSICS

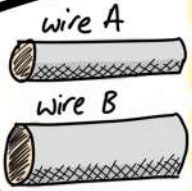
SECONDARY PHYSICS

The Ultimate Guide To Mastering Physics

PRESSURE

"cross-sectional area" of conductor

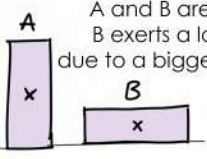
Topic: Current of Electricity



Thicker wire has bigger cross-sectional area, hence lower resistance

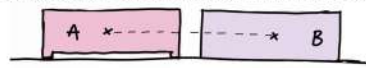
"area in contact" with the ground / body

Topic: Pressure



A and B are identical with same weight. B exerts a lower pressure on the ground due to a bigger area in contact with ground.

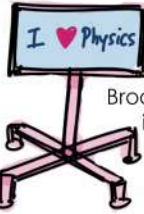
With same height of CG and area of base, both have the same stability. But A exerts a higher pressure on the ground due to smaller area in contact with the ground



Topic: Turning Effect of Force

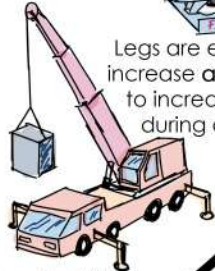
STABILITY

"area of base" of the body



Broad area of base to increase stability

F1 car has board area of base to increase stability



Legs are extended to increase area of base to increase stability during operation

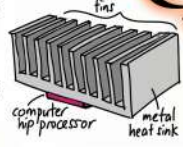
extended legs to lift the truck up

the word
AREA
in Physics

evan.toh



Fins / plates increase the surface area to increase rate of emission of radiation

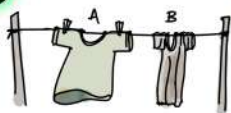


multiple bends inside solar panel to increase surface area to allow greater absorption of radiation

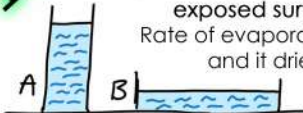
"surface area" of the body

Topic: Thermal Transfer

RADIATION



Shirt A is spread out to increase exposed surface area. Rate of evaporation increases and it dries faster.

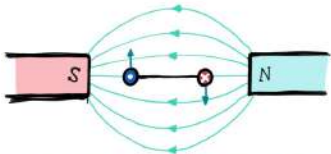


Container B has a bigger exposed surface area, hence the rate of evaporation is faster.

"exposed surface area" with the air

Topic: Thermal Properties

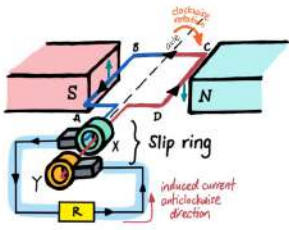
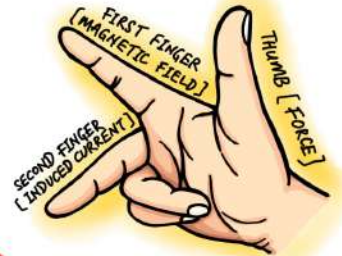
EVAPORATION



As the coil turns, it cuts the magnetic field lines of the magnets. This creates a changing magnetic flux. An induced emf / current will be produced.

MECHANICAL ENERGY to ELECTRICAL ENERGY

ac generator SLIP RING

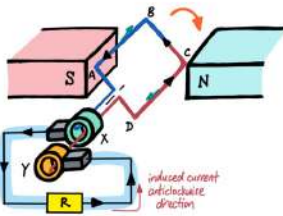


When the rotating coil is at horizontal position, the rate at which magnetic field lines are cut by the coil AB/CD is maximum.

Hence the magnitude of induced emf is the maximum. [Faraday's Law]

Using FRHR, the direction of induced current in the coil is from DCBA. The slip ring transfers the induced alternating current in the coil to the external circuit.

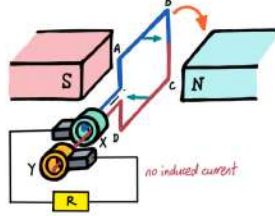
Direction of current in the external circuit is anticlockwise.



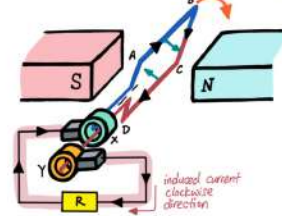
When the coil is at an angle, the rate at which the magnetic field lines are cut is lower.

Magnitude of induced emf lower

Direction of current in the external circuit is anticlockwise.

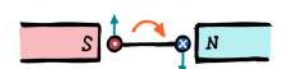
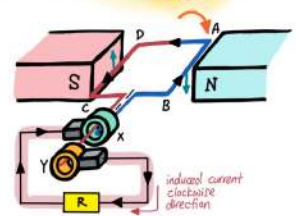


When coil is at vertical position, the coil AB & CD is moving parallel to the magnetic field. Hence AB & CD do not cut the magnetic field lines and no induced emf produced



When the coil goes beyond vertical position, the rate in which the coil AB/CD cut the magnetic field lines is lower, ∴ magnitude of induced emf is lower

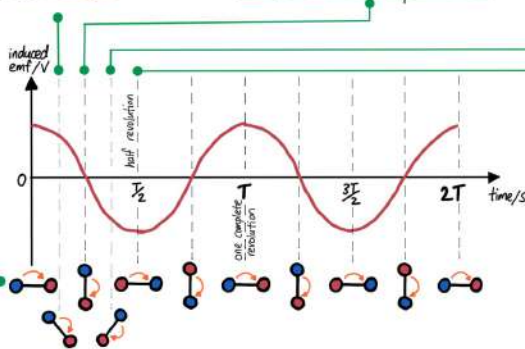
Direction of current in the external circuit is clockwise.



When the coil turns 180°, at horizontal position, the rate in which the coil cuts the magnetic field lines is maximum.

Direction of current in the external circuit is clockwise.

every 180° turn / half a revolution at the vertical position:
- the direction of the current reverses.
- an alternating current (a.c) is formed.



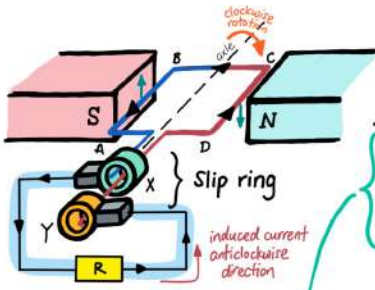
FUNCTION OF SLIP-RING

- provides a connection between the coil & the external circuit.
- allows the induced alternating current in the coil to be transferred to the external circuit.
- ensures free rotation, prevent entanglement.

MECHANICAL ENERGY to
ELECTRICAL ENERGY

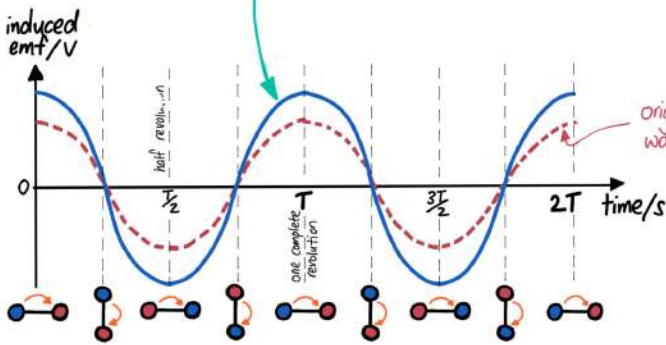
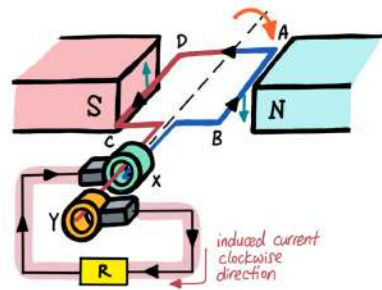
ac generator

SLIP RING

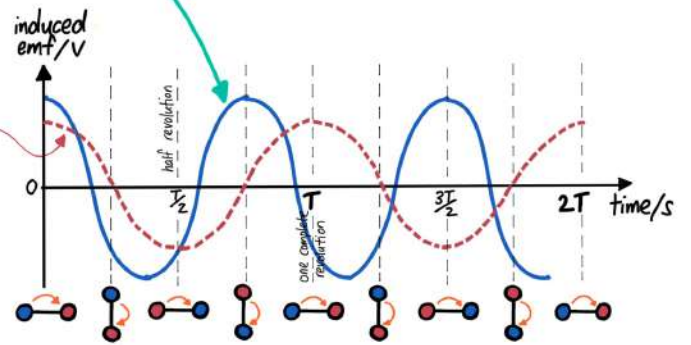


TO INCREASE THE MAGNITUDE OF INDUCED EMF/CURRENT

- 1 increase strength of magnet field by using stronger magnet.
- 2 increase the number of turns in the coil.
- 3 wind the coil around a soft iron core / insert soft iron core.
- 4 increase the speed of rotation of the coil.



- 1 increase strength of magnet field by using stronger magnet.
 - 2 increase the number of turns in the coil.
 - 3 wind the coil around a soft iron core / insert soft iron core.
- ➔ affect the magnitude of induced emf, not frequency



- 4 increase the speed of rotation of the coil.
- ➔ affect the magnitude of induced emf and frequency

ACTION-REACTION PAIR

● SAME TYPE OF FORCE

● ACT ON DIFFERENT BODIES

● SAME MAGNITUDE

● ACT IN OPPOSITE DIRECTIONS

YES

FORCE ON WATER
BY NOZZLE &



FORCE ON NOZZLE
BY WATER

YES

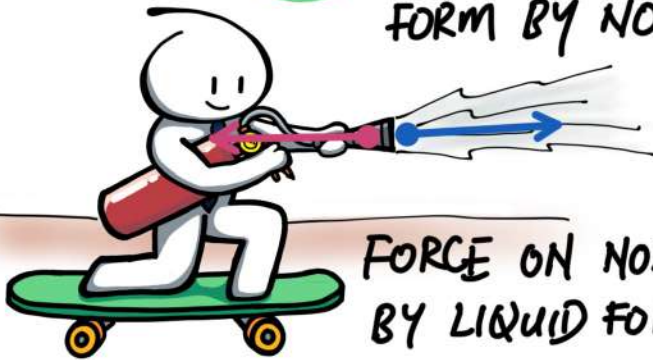
FORCE ON BULLET
BY PISTON &



FORCE ON PISTON
BY BULLET (RECOIL)

YES

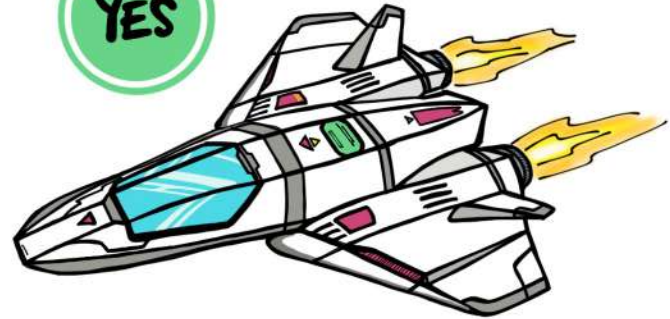
FORCE ON LIQUID
FORM BY NOZZLE &



FORCE ON NOZZLE
BY LIQUID FORM

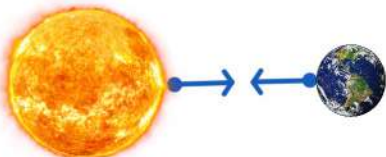
YES

[IN AIR OR OUTER SPACE]



FORCE ON EXHAUST BY ENGINE
FORCE ON ENGINE BY EXHAUST
(THRUST)

OTHER EXAMPLES :



GRAVITATIONAL FORCE



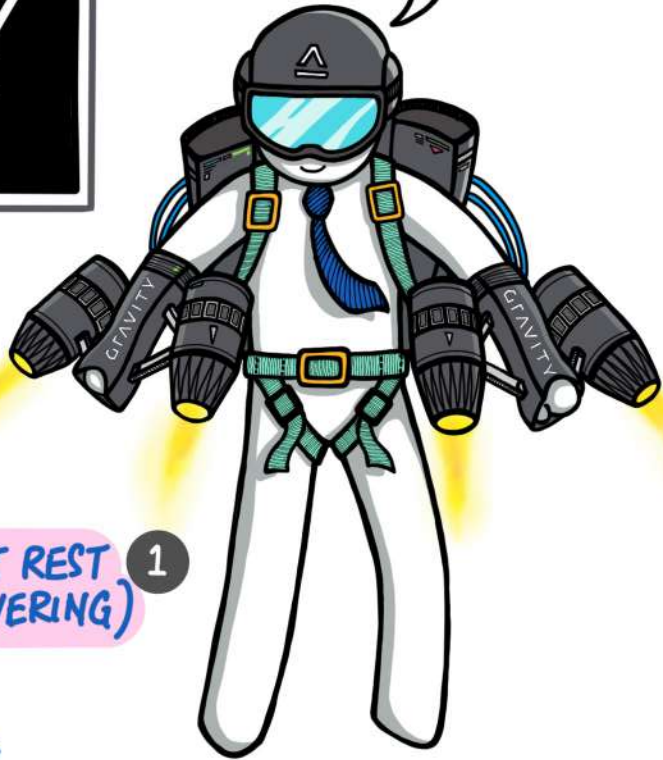
MAGNETIC FORCE



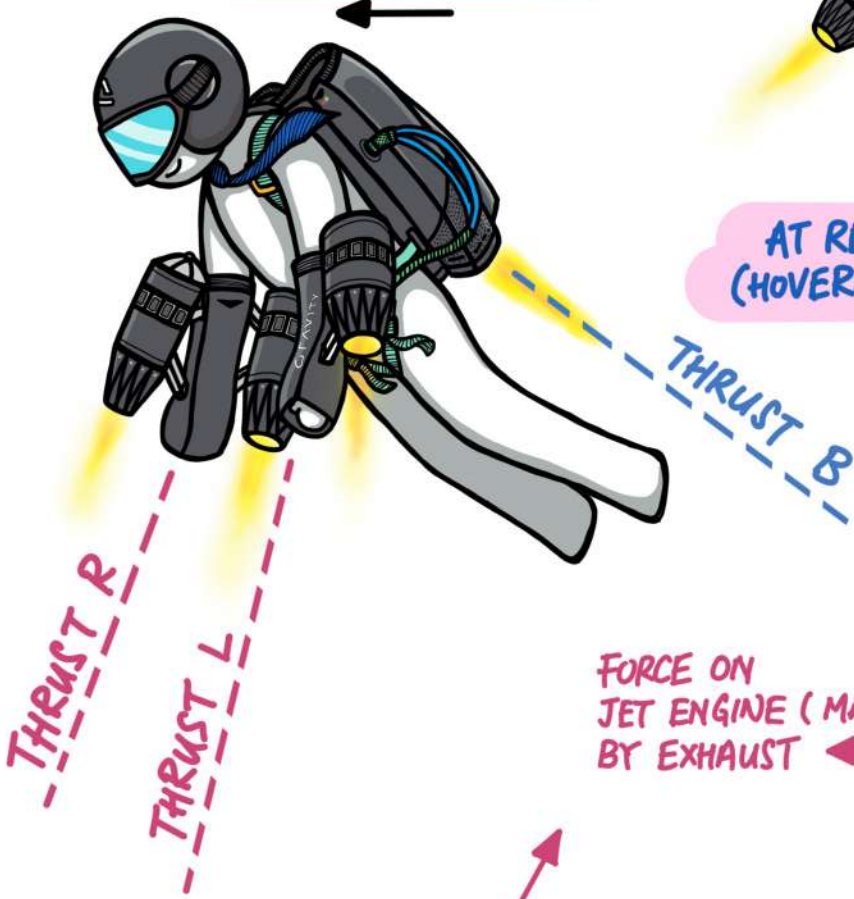
ELECTRIC FORCE

GRAVITY FLYING JET SUIT

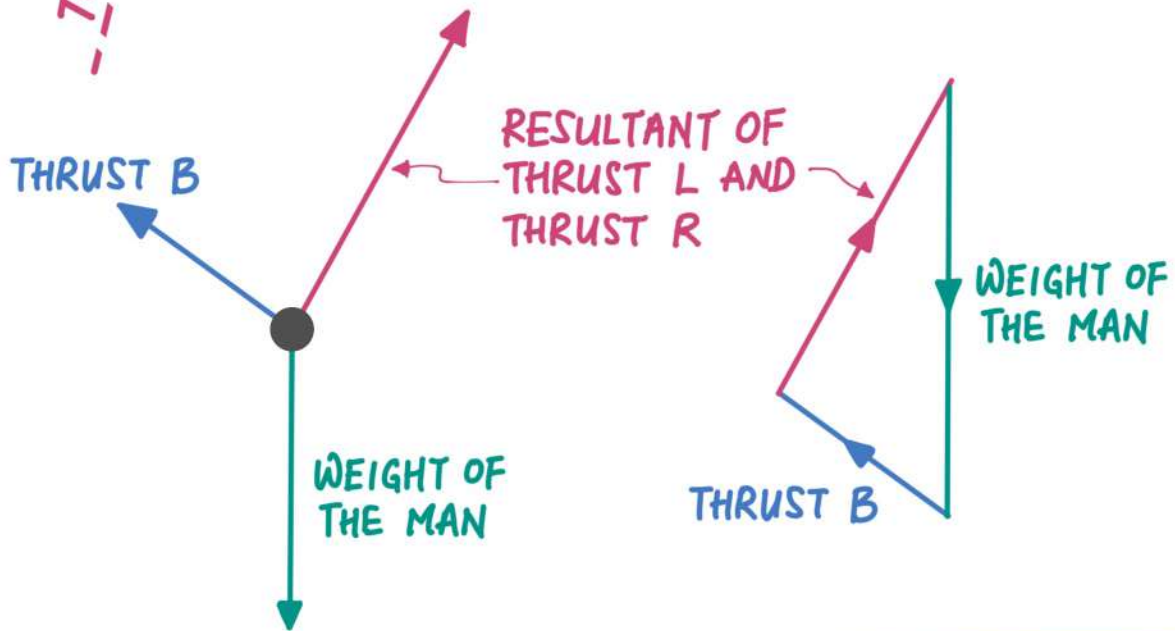
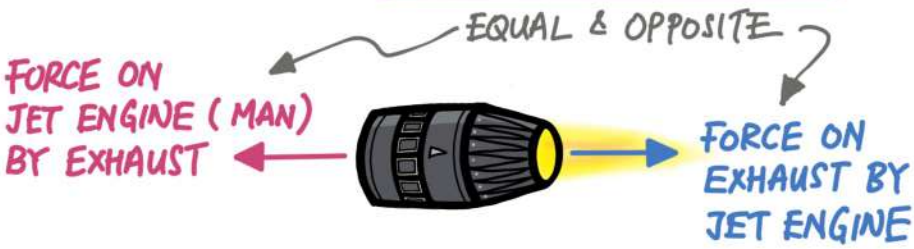
I AM IRONMAN!



2 CONSTANT VELOCITY



NEWTON'S 3RD LAW



NEWTON'S 1ST LAW

- 1 AT REST (HOVERING)
- 2 CONSTANT VELOCITY

- ALL 3 FORCES BALANCED
- NET FORCE ZERO
- CLOSED-LOOP VECTOR DIAGRAM



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