

## Answer-10

→ Working principle and use of wheel and axle:-

Wheel and axle machine based on the principle that a small force applied to the rim of a wheel will exert a larger force on an object attached to the axle. The mechanical advantage is the ratio of the radius of the wheel to that of axle.

→ Ideal Mechanical Advantage IMA =

$$IMA = \frac{F_{out}}{F_{in}} = \frac{\text{Radius wheel}}{\text{Radius axle}}$$

→ Actual Mechanical Advantage AMA =  $\frac{F_{out}}{F_{in}} = \eta \cdot \frac{R_{wheel}}{R_{axle}}$

where,  $\eta = \frac{P_{out}}{P_{in}}$  is the efficiency of the wheel,

the ratio of Power output to power input.

→ Uses :-

- ① Electric fans.
- ② Motors
- ③ Revolving doors.
- ④ Merry go rounds
- ⑤ wheel used in skateboards
- ⑥ Roller blades, Cars. etc.