

PHYSICS SS3.(Revision on machine)

A machine is a device by means of which a little force called an effort applied at one end of the machine is used to overcome a greater load at the other end. It also makes our work easier, and convenient.

The mechanical advantage of a machine is the ratio of load to the effort.

$M.A = \text{load} / \text{Effort}$.

The Velocity ratio of a machine is the ratio of the distance moved by the effort to the distance moved by the load.

$V.R = \text{distance moved by effort} / \text{distance moved by load}$.

The efficiency of a machine is the ratio of the useful work put into the machine to the useful work done by the machine.

$\text{Efficiency (E)} = M.A / V.R \times 100\%$.

Example 1: What does it mean that the mechanical advantage of a machine is 4?

Answer: It means the ratio of the load to the effort is 4:1.

Example 2: A machine with V.R 5 requires 1000J of work to raise a load of 500N through a vertical distance of 1.5m. Find the efficiency and the M.A of the machine.

SOLUTION.

The efficiency $E = \text{work output} / \text{work input} \times 100\%$.

So, $E = \text{load} \times \text{distance moved by the load} / \text{work input} \times 100$

$$= 500 \times 1.5 / 1000 \times 100$$

$E = 75\%$.

Also, $E = M.A / V.R \times 100\%$

$$75 = M.A / V.R \times 100.$$

ASSIGNMENT.

Answer question 1-10 from the textbook calculations in Physics exercises on machine.