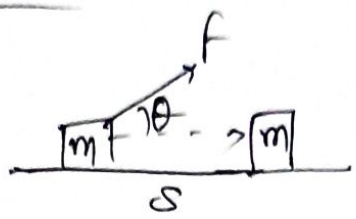
Work, Energy & Power :

$W = \vec{F} \cdot \vec{s}$

$\boxed{W = |F||s| \cos\theta}$



S.I unit of Work → Nm or Joule(J)

C.G.S " → dyne cm or erg

$\boxed{1J = 10^7 \text{ erg}}$

W = Force in the direction x displacement of displacement

① $\theta = 0°$	② $\theta = 180°$	③ $\theta = 90°$
→ F, → s	s ← , → f	↑ F, → s
$W = fs$	$W = -fs$	$W = 0$

Work Done By variable force

$$W = \int_{x_1}^{x_2} f_x dx + \int_{y_1}^{y_2} f_y dy + \int_{z_1}^{z_2} f_z dz$$ if $\vec{F} = F_x\hat{i} + f_y\hat{j} + f_z\hat{k}$

~~W = Area under proper algebric~~

$\boxed{W = \text{Area under } f-x \text{ curve}}$ with proper algebric sign.

$W = \int F \cdot dr$

$\boxed{d\vec{r} = dx\hat{i} + dy\hat{j} + dz\hat{k}}$

- The power of a machine gun firing 'n' bullets per second each of mass 'm' with a speed v will be

$\boxed{P = n\left(\frac{1}{2}mv^2\right)}$

- Power of pump needed to lift water, $\boxed{P = \left(\frac{dm}{dt}\right)gh}$

- Power $= \frac{dW}{dt} = \vec{F} \cdot \vec{v}$

- Efficiency, $\eta = \frac{\text{Output}}{\text{Input}}$

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