Dimension and Units of Work

Dimension : As work = Force × displacement

$\therefore$ [W] = [Force] × [Displacement]

$= [MLT^{-2}] \times [L] = [ML^2T^{-2}]$

Units : The units of work are of two types

Absolute units	**Gravitational units**
Joule [S.I.]: Work done is said to be one Joule, when 1 Newton force displaces the body through 1 meter in its own direction. From W = F.s 1 Joule = 1 Newton × 1 metre	kg-m [S.I.]: 1 Kg-m of work is done when a force of 1kg-wt. displaces the body through 1m in its own direction. From W = F s 1 kg-m = 1 kg-wt × 1 metre = 9.81 N × 1 metre = 9.81 Joule
Erg [C.G.S.] : Work done is said to be one erg when 1 dyne force displaces the body through 1 cm in its own direction. From W = F s $1\,Erg = 1Dyne \times 1cm$	gm-cm [C.G.S.] : 1 gm-cm of work is done when a force of 1gm-wt displaces the body through 1cm in its own direction. From W = F s 1 gm-cm = 1gm-wt × 1cm. = 981 dyne × 1cm = 981 erg
Relation between Joule and erg 1 Joule = 1 N × 1 m = 10^5 dyne × 10^2 cm = 10^7 dyne × cm = 10^7 Erg	