CHAPTER EIGHT

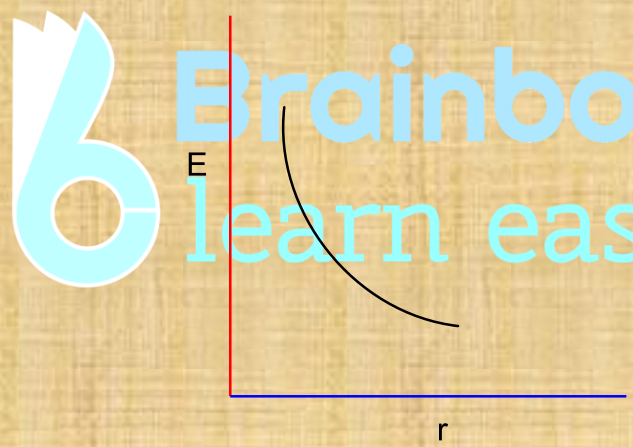
GRAVITATION

Gravitational field strength:

"The gravitational force acting on a unit mass kept in a gravitational field".

$$E_G = \frac{GM}{R^2}$$

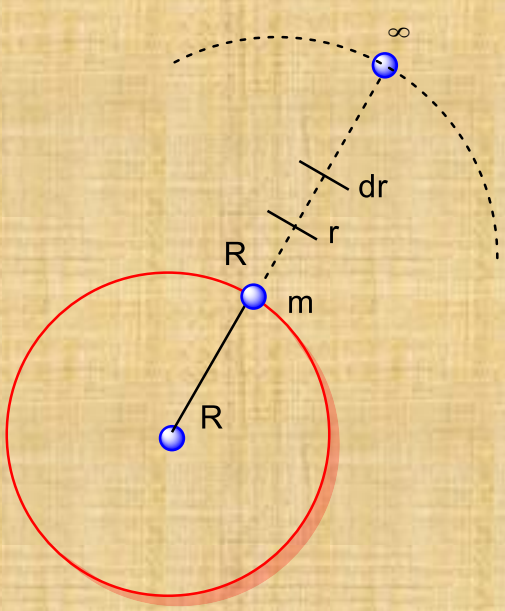
Units: N/Kg DF: LT^{-2}



Gravitational potential:

The amount of work done in bringing a unit mass from infinity to a certain point in the gravitational field of another massive object".

Work done in moving a object through a distance 'dr'.



$dw = F.dr$

$$= \frac{GMm}{r^2} dr$$

$\therefore$ Total work done

$$W = \int dw = -\int_R^{\infty} \frac{GMm}{r^2} dr$$

$$= -GMm\left[-\frac{1}{r}\right]_R^{\infty}$$

$$= -GMm\left[-\frac{1}{\infty} + \frac{1}{R}\right]$$

$$W = = -\frac{GMm}{R}$$

This is called **Gravitational P.E**, denoted by 'V'.

If unit mass is considered Gravitational potential.

$V_g = w/m$

$$\boxed{V_g = -\frac{GM}{R}}$$