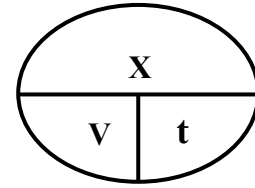


The laws

Uniform acceleration

$$\begin{aligned} V_t &= V_o + at \\ X &= V_o t + \frac{1}{2} at^2 \\ V_t^2 &= V_o^2 + 2ax \end{aligned}$$

Uniform velocity



(a) is replaced by (g) when the body is thrown upwards (-g) or downwards (g)

$$F = m.a, \quad \text{weight } (F_g) = mg, \quad P_L = m.v$$

$$\text{(Centripetal acceleration)} \quad a_c = \frac{V_o^2}{r}, \quad \text{(Centripetal force)} \quad F_c = m a_c = m \frac{V_o^2}{r}$$

$$\begin{aligned} F &= G \frac{m_1 m_2}{d^2}, & m_1 &= \frac{F d^2}{G m_2} \\ g &= G \frac{m_e}{r_e^2}, & \frac{g_1}{g_2} &= \frac{m_1 r_2^2}{m_2 r_1^2}, & \frac{g_1}{g_2} &= \frac{\rho_1 r_1}{\rho_2 r_2} \end{aligned}$$

The sliding force = $F_g \sin \theta$

$$W = F \cdot d \cdot \cos \theta$$

$$\text{(potential energy) } P.E. = m g d, \quad \text{(kinetic energy) } K.E. = \frac{1}{2} m v^2$$

The law of conservation of linear momentum

$$m_1 v_1 + m_2 v_2 \text{ (before collision)} = m_1 v_1' + m_2 v_2' \text{ (after collision)}$$

$$\text{Impulse} = F \cdot \Delta t = \Delta P_L$$

$$V_{\text{esc}} = \sqrt{2gr_e}$$

$$V_o = \sqrt{gr_o} = \sqrt{G \frac{m_e}{r_o}}$$

1. If the elevator is in rest or moving by a constant speed .

$$\begin{array}{ccc} F_T & = & F_g \\ \text{apparent weight} & & \text{real weight} \end{array}$$

2. If the elevator is moving up with acc. (a)

$$F_T - F_g = ma$$

3. If the elevator is moving down with acc. (a)

$$F_T = F_g - ma$$

If $a = g \quad \therefore F_T = F_g - mg = \text{Zero}$
 So the body and the elevator is in free fall case.

$$t^{\circ} C = \frac{5}{9} (t^{\circ} F - 32), \quad T K = t^{\circ} C + 273$$

$$t = 100 \frac{L_t - L_0}{L_{100} - L_0}, \quad t = 100 \frac{P_t - P_0}{P_{100} - P_0}, \quad t = 100 \frac{R_t - R_0}{R_{100} - R_0}$$

$$q_{th} \text{ (heat capacity)} = \frac{Q_{th}}{\Delta t} \text{ J/K},$$

$$C_{th} \text{ (specific heat)} = \frac{Q_{th}}{m \Delta t} = \frac{q_{th}}{m} \text{ J/kg.K}$$

$$Q_{th} \text{ (the heat)} = q_{th} \Delta t = m C_{th} \Delta t$$

$$L_{th} = \frac{Q_{th}}{m} \text{ J/kg} \quad \therefore Q_{th} = m L_{th}$$

1) The gravitational pot. diff. $(v) = g \Delta d$

2) The gravitational pot. gradient $(g) = \frac{V}{\Delta d}$

3)

4) The elec. field intensity $\epsilon = K \frac{q}{d^2} = \frac{F_e}{q} = \frac{v}{d}$

5) The electric potential difference $V = K \frac{q}{d} = \epsilon \cdot d = \frac{w}{q}$

6) The capacitance (C) $C = \frac{\text{Charge}}{\text{elec. pot}}$

$$I = \frac{q}{t} \text{ Ampere} \quad \text{---} \quad V = \frac{w}{q} \text{ volt} \quad \text{---} \quad V = IR$$

$$\text{Electric Energy (W)} = VIt \text{ (joule)}$$

$$\text{Electric power (P}_w\text{)} = \frac{W}{t} = VI = V^2/R = I^2R \quad (\text{watt})$$

$$\text{Cost of usage} = \text{Power (in kw)} \times \text{time (hour)} \times \text{cost of 1k.w.h}$$

$$\text{The elec. energy} = \text{The heat energy}$$

$$VI t = (m_1 C_{th1} + m_2 C_{th2}) \Delta t$$