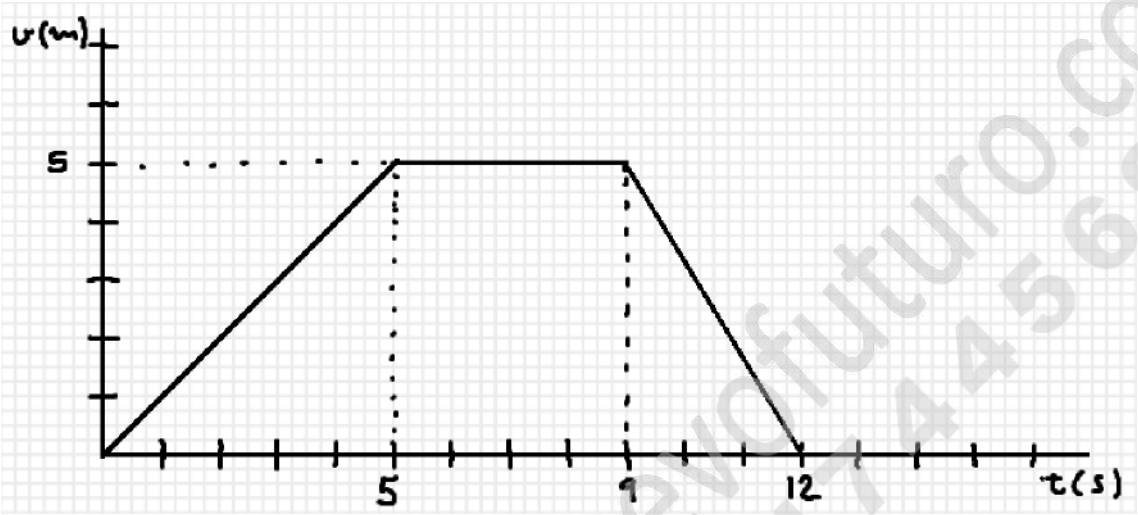
EXAMEN GRADO SUPERIOR MATEMÁTICAS 2021

1

a)



b)

$$a_I = \frac{5-0}{5-0} = 1\ m/s^2$$

$$a_{II} = \frac{5-5}{9-5} = \frac{0}{4} = 0\ m/s^2$$

$$a_{III} = \frac{0-5}{12-9} = -\frac{5}{3} = -1{,}67\frac{m}{s^2}$$

2

a)

$$\left|\overrightarrow{F_N}\right| = \left|\vec{P}\right| = mg = 1000 \cdot 9{,}8 = 9800$$

b)

$$a = \frac{\left|\vec{F}\right|}{m} = \frac{3000}{1000} = 3\ m/s^2$$

c)

$$MRUA \rightarrow x = x_0 + v_0 t + \frac{1}{2}at^2$$

$$x = \frac{3}{2}t^2\ m$$

$$v = v_0 + at$$

$$v = 3t\frac{m}{s}$$

d)

$$v = 3 \cdot 5 = 15\ m/s$$

3

a)

$$W = \Delta E_m = mgh = 10000 \cdot 9{,}8 \cdot 30 = 2940000 = 2{,}94 \cdot 10^6\ J$$

b)

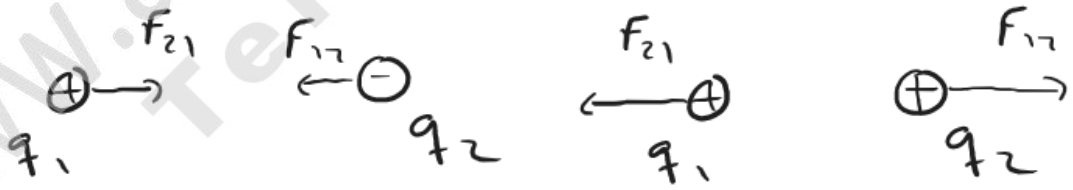
$$P = \frac{E}{t} = \frac{2{,}94 \cdot 10^6}{3600} = 816{,}67\ W$$

4

a)

$$|F_{12}| = k\frac{q_1 q_2}{r_{12}^2} = 9 \cdot 10^9 \cdot \frac{3 \cdot 10^{-6} \cdot 8 \cdot 10^{-6}}{2^2} = 0{,}054\ N$$

b)



5

a)

$$A = 0{,}1\ m$$

b)

$$\omega = \frac{2\pi}{0{,}2} = \frac{2\pi}{T} \rightarrow T = 0{,}2\ s$$

c)

$$k = \frac{2\pi}{3} = \frac{2\pi}{\lambda} \rightarrow \lambda = 3\ m$$

d)

$$v = \frac{\lambda}{T} = \frac{3}{0{,}2} = 15\frac{m}{s}$$