

$$\textcircled{1} \quad r = 6400 \text{ km}$$

$$V_T = ?$$

$$T = \frac{24 \text{ hr}}{1 \text{ Rev}} * \frac{3,600 \text{ s}}{1 \text{ hr}}$$

$$T = 86,400 \text{ s}$$

$$r = 6400 \text{ km} * \frac{1000 \text{ m}}{1 \text{ km}} = 6,400,000 \text{ m}$$

$$V_T = \frac{2\pi r}{T}$$

$$V_T = \frac{2\pi (6,400,000 \text{ m})}{86,400 \text{ s}} = \boxed{465.42 \frac{\text{m}}{\text{s}}}$$

$$\textcircled{2} \quad \omega = ? \quad \frac{\text{rad}}{\text{s}}$$

rotación de la tierra

$$\omega = \frac{V_T}{r}$$

$$\omega = \frac{465.42 \frac{\text{m}}{\text{s}}}{6,400,000 \text{ m}} = \boxed{7.27 \frac{\text{rad}}{\text{s}}}$$

$$\textcircled{3} \quad \omega = ?$$

$$V_T = \frac{90 \text{ km}}{\text{h}}$$

$$d = 1.40 \text{ m}$$

$$V_T = 90 \frac{\text{km}}{\text{h}} * \frac{1 \text{ h}}{3,600 \text{ s}} * \frac{1,000 \text{ m}}{1 \text{ km}}$$

$$V_T = \frac{25 \text{ m}}{\text{s}}$$

$$d = 2r$$

$$r = \frac{d}{2} = \frac{1.40 \text{ m}}{2} = 0.70 \text{ m}$$

$$\omega = \frac{V_T}{r} = \frac{\frac{25 \text{ m}}{\text{s}}}{0.70 \text{ m}} = \boxed{35.71 \frac{\text{rad}}{\text{s}}}$$

$$\textcircled{4} \quad n = 2000 \text{ rev}$$

$$t = 1 \text{ min} = 60 \text{ s}$$

$$\omega = \frac{\text{grados}}{\text{s}}$$

$$n = 2000 \text{ rev} * \frac{360^\circ}{1 \text{ rev}} = 720,000^\circ$$

$$\omega = \frac{\Delta}{t} = \frac{720,000^\circ}{60 \text{ s}} = \boxed{12,000 \frac{\text{grados}}{\text{s}}}$$

5) $n = 120 \text{ rev}$
 $t = 1 \text{ min} = 60 \text{ s}$
 $d = 3 \text{ m}$
 $r = 1.5 \text{ m}$

a) $T = \frac{t}{n}$

$$T = \frac{60 \text{ s}}{120 \text{ rev}} = 0.5 \text{ seg.}$$

b) $N = \frac{1}{T}$

$$N = \frac{1}{0.5 \text{ seg}} = 2 \frac{\text{rev}}{\text{s}} = \boxed{2 \text{ Hz}}$$

c) $\omega = \frac{2\pi}{T}$

$$\omega = \frac{2\pi}{0.5 \text{ s}} = \boxed{12.57 \frac{\text{rad}}{\text{s}}}$$

d) $V_T = \omega r$

$$V_T = 12.57 \frac{\text{rad}}{\text{s}} * 1.5 \text{ m}$$

$$\boxed{V_T = 18.85 \frac{\text{m}}{\text{s}}}$$

e) $a_c = \frac{V_T^2}{r}$

$$a_c = \frac{(18.85 \text{ m/s})^2}{1.5 \text{ m}} = \boxed{236 \frac{\text{m}}{\text{s}^2}}$$

⑥

$$V_T = ?$$

$$a_c = ?$$

$$r = 1.2 \text{ m}$$

$$\omega = 35.4 \frac{\text{rad}}{\text{s}}$$

$$\omega = \frac{V_T}{r} \Rightarrow V_T = \omega \cdot r$$

$$V_T = 35.4 \frac{\text{rad}}{\text{s}} * 1.2 \text{ m} = \boxed{42.48 \frac{\text{m}}{\text{s}}}$$

$$a_c = \frac{V_T^2}{r}$$

$$a_c = \frac{(42.48 \text{ m/s})^2}{1.2 \text{ m}} = \boxed{1503.79 \frac{\text{m}}{\text{s}^2}}$$

7) $\Delta = 2 \text{ rad}$
 $t = 0.25 \text{ seg.}$
 $r = 30 \text{ cm} = 0.30 \text{ m}$

a) ω

b) V_T

c) T

d) N

a) $\omega = \frac{\Delta}{t}$

$$\omega = \frac{2 \text{ rad}}{0.25 \text{ s}} = \boxed{8 \frac{\text{rad}}{\text{s}}}$$

b) $V_T = \omega \cdot r$

$$V_T = 8 \frac{\text{rad}}{\text{s}} * 0.30 \text{ m} = \boxed{2.4 \frac{\text{m}}{\text{s}}}$$

c) $T = \frac{2\pi}{\omega}$

$$T = \frac{2\pi}{8 \frac{\text{rad}}{\text{s}}} = \boxed{0.78 \text{ s}}$$

d) $N = \frac{1}{T}$

$$N = \frac{1}{0.78 \text{ s}} = 1.28 \frac{\text{rev}}{\text{s}} = \boxed{1.28 \text{ Hz}}$$

8) $r = 50 \text{ cm} = 0.5 \text{ m}$
 $n = 400 \text{ rev}$
 $t = 5 \text{ min} = 300 \text{ s}$

- a) N
 b) T
 c) ω y V_T
 d) a_c

b) $T = \frac{t}{n}$

$$T = \frac{300 \text{ s}}{400 \text{ rev}} = \boxed{0.75 \text{ s}}$$

a) $N = \frac{1}{T}$

$$N = \frac{1}{0.75 \text{ s}} = 1.33 \frac{\text{rev}}{\text{s}} = \boxed{1.33 \text{ Hz}}$$

c) $\omega = \frac{2\pi}{T}$

$$\omega = \frac{2\pi}{0.75 \text{ s}} = \boxed{8.38 \frac{\text{rad}}{\text{s}}}$$

$$V_T = \omega \cdot r$$

$$V_T = 8.38 \frac{\text{rad}}{\text{s}} * 0.50 \text{ m} = \boxed{4.19 \frac{\text{m}}{\text{s}}}$$

d) $a_c = \frac{V_T^2}{r}$

$$a_c = \frac{(4.19 \text{ m/s})^2}{0.50 \text{ m}} = \boxed{35.11 \frac{\text{m}}{\text{s}^2}}$$