

①

$$d = 18 \text{ m} \quad d = 2r \Rightarrow r = 9 \text{ m}$$

$$f = 8.3 \text{ rev/min} \Rightarrow \frac{8.3 \text{ rev} / \cancel{\text{min}}}{\cancel{\text{min}} / 60 \text{ s}} = .1383 \text{ Hz}$$

$$v = \text{---} \text{ ms}^{-1}$$

$$v = 2\pi fr = 2(3.14)(.1383)(9)$$

$$v = 7.8 \text{ ms}^{-1}$$

③

$$r = \underline{4.6 \text{ m}}$$

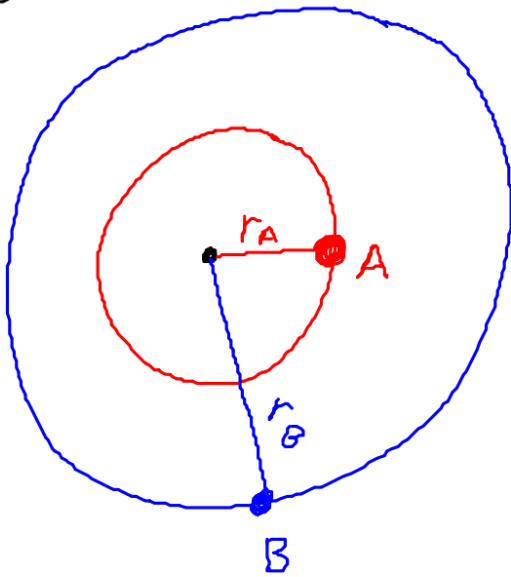
$$T = \underline{35 \text{ s}}$$

$$a_c = \underline{\quad} \text{ ms}^{-2}$$

$$a_c = \frac{v^2}{r} = \frac{(.8254)^2}{(4.6)} = .1482 = .15 \text{ ms}^{-2}$$

$$v = \frac{2\pi r}{T} = \frac{2(3.14)(4.6)}{(35)} = .8254 \text{ ms}^{-1}$$

2



$$a_A = 4.7 a_B$$

$$T_B = 2.4 T_A$$

$$\frac{r_A}{r_B} = ?$$

$$a = \frac{v^2}{r}$$

* Substitute for v *

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

$$a = \frac{\left(\frac{2\pi r}{T}\right)^2}{r} = \frac{4\pi^2 r^2}{T^2} \cdot \frac{1}{r}$$

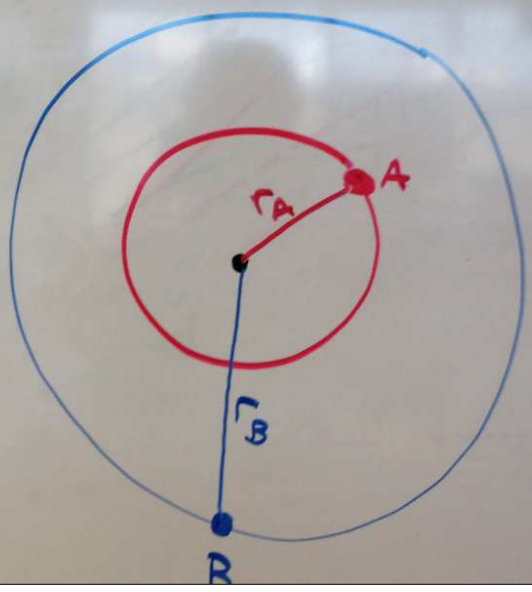
$$a = \frac{4\pi^2 r}{T^2}$$

$$a_A = \frac{4\pi^2 r_A}{T_A^2}$$

$$a_B = \frac{4\pi^2 r_B}{T_B^2}$$

① $a_A = 4.7 a_B$
② $T_B = 2.4 T_A$
* $\frac{r_A}{r_B} = ?$

$a = \frac{v^2}{r}$
 $v = \frac{2\pi r}{T}$



#1) Substitute $\frac{2\pi r}{T}$ for v.

$$a = \frac{v^2}{r} = \frac{\left(\frac{2\pi r}{T}\right)^2}{r} = \frac{4\pi^2 r^2}{T^2} \cdot \frac{1}{r} = \frac{4\pi^2 r}{T^2}$$

$$a = \frac{4\pi^2 r}{T^2}$$

$$a_A = \frac{4\pi^2 r_A}{T_A^2}$$

$$a_B = \frac{4\pi^2 r_B}{T_B^2}$$

#2) Substitute a_A and a_B in Eqn. (1)

$$\frac{4\pi^2 r_A}{T_A^2} = 4.7 \cdot \frac{4\pi^2 r_B}{T_B^2}$$

$$\frac{r_A}{T_A^2} = \frac{4.7 r_B}{T_B^2}$$

#3) Substitute T_B for Eqn (2)

$$\frac{r_A}{T_A^2} = \frac{4.7 r_B}{(2.4 T_A)^2}$$

$$\frac{r_A}{T_A^2} = \frac{4.7 r_B}{5.76 T_A^2}$$

a_B in Eqn. (1)

$$\frac{r_A}{r_B} = \frac{4.7}{5.76} \frac{r_B}{r_B}$$

$$\frac{\cancel{r_A} r_B}{T_B^2}$$

$$\frac{r_A}{r_B} = \frac{4.7}{5.76} \approx .82$$

Eqn (2)