- Ch-4: 52 Time for rocks to travel $1km$ is $t = \frac{1000}{v\cos 40}$ then plug $t$ into $y(t) = y_o + v\sin 60t - \frac{1}{2}gt^2$ with $y(t) - y_o = -900$ and solve for $v$.
- Ch-2:67 $v_{tan} = \frac{200}{32.2} \to a_c = \frac{v_{tan}^2}{30}$
- Ch-2:67 $\omega = \frac{360\times 2\pi}{60} \sim 36rad/s \to a_c = \frac{36^2}{0.1}\frac{m}{s^2}$
- Ch-2:72 $\vec{v}_{rc} = \vec{v}_{rE} + \vec{v}_{Ec}$ where $\vec{v}_{rc}$ is velocity of rain-drop w.r.t car and $\vec{v}_{rE}$ is velocity of rain-drop w.r.t Earth and $\vec{v}_{Ec} = -\vec{v}_{Ec}$ is velocity of Earth w.r.t to car .
- Ch-2:83 Radius of the circle at latitude $\lambda$ is $r = R_E\cos\lambda$. Elephant's centripetal acceleration due to Earth's rotation is $a_c = \omega^2 r = (\frac{2\pi}{T})^2 R_E\cos\lambda$ where $T$ is period of rotation.
- Ch-10:30 $\omega = \frac{2000\times 2\pi}{60}\frac{rad}{s}$ and angle traversed in $10s$ is $\theta = \frac{2000\times 2\pi}{60} \times 10radians$. Converting to degrees is easy.
- Ch-10:40 $\alpha = \frac{\omega_f^2 - \omega_i^2}{2\theta} = \frac{400^2 - 600^2}{80} = -2500\frac{rev}{min^2}$
Time elapsed is $t = \frac{400-600}{-2500}min$
- Ch-10:42 In $10s$ the point at the bottom goes through a change in angular displacement of $\Delta\theta = \frac{1}{2}(5)(10)^2 = 250radians$ which is equal to 39.78 revolutions which means $\Delta\theta = 280°$ which means the point is $10°$ below the horizontal on left half of wheel. $a_{tan} = r\alpha = 2.5 \times 0.5\frac{m}{s^2}$.
- Ch-10:109 $33\frac{1}{3}rev/min = 3.49\frac{rad}{s} \to \alpha = \frac{0-3.49}{60}$
No. of revolutions is $\frac{3.49(60) - \frac{1}{2}\alpha(60)^2}{2\pi}$
- **Additional Problem (a)** $60mph = 1056.11\frac{inches}{s}$
**(b) If the edge of the tire that hits the ground has linear velocity** $60mph$ **then a point on the edge of tire has tangential velocity equal to** $60mph \to \omega = \frac{1056.11}{15} = 70\frac{rad}{s}$ **which is** $672rev/min$
**(c) Angular velocity of wheel is** $70\frac{rad}{s}$
**(d)** $\omega(t) = \omega_o + \alpha t$
**(e)** $\alpha = \frac{70}{9}\frac{rad}{s^2}$
**(f)** $\Delta\theta = \frac{1}{2}(\frac{70}{9})(9)^2$**. No of revolutions are** $\frac{\Delta\theta}{2*\pi}$