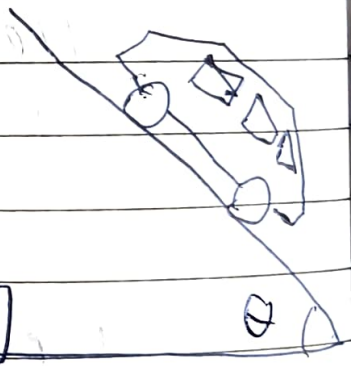
* Assignment - 2 *

Q:1 Equation of maximum tractive effort for can inclined at angle θ



$$F_T = ma + R_a + R_R + R_g$$
$$= ma + \left[\frac{1}{2} \times \rho \times C_d \times A \times V^2\right] + [\mu_R mg\cos\theta] + [mg\sin\theta]$$

So here can is standing so $a = 0$ & $V = 0$

$\mu_R = \mu_f$ (static friction) $= 0.7$

so, $F_T = m \cdot 0 + [1/2 \times \rho \times C_d \times A \times 0] + [\mu_f mg\cos\theta] + [mg\sin\theta]$

$\therefore F_T = \mu_f \cdot mg\cos\theta + mg\sin\theta$

$F_T = mg[\mu_f \cos\theta + \sin\theta]$

- For maximum gradeability $\theta = 45°$

$F_T = mg[\mu_f \cos 45° + \sin 45°]$

$F_T = mg[\mu_f/\sqrt{2} + 1/\sqrt{2}]$

JAY PRAKASH Date_____ Page_____

Q12 $m = 1765\ kg$; $l = 2.84m$; $a_1 = 1.22m$

$a_2 = 1.62m$

As vehicle stands on ground so $\theta = 0°$

so gravitational Resistance $R_g = W\sin\theta = 0°$

& for Rolling Resistance R_R

$R_R = R_{R\,front} + R_{R\,Rear}$

$= x R_{Rf} + x R_R$

$= 0.5 R_{Rf} + 0.5 R_{RR}$

Total load acting on front & Rear is

$F_T = F_{Tf} + F_{TR}$

$= 0.5 F_{Tf} + 0.5 F_{TR}$

$= 0.5 [ma + R_a + R_R + R_g] + 0.5 [ma + R_a + R_R + R_g]$

~~= 0.5 [1765~~

$V = 0$

Here vehicle Parked at Road so $a = 0$;

$F_T = 0.5 [m \times 0 + 1/2 \times \rho \times a \times 0 + R_R + 0] + 0.5 [m \times 0 + 1/2 \times \rho \times a \times 0 + R_R + 0]$

$F_T = 0.5 [R_{Rf} + R_{RR}]$

$= 0.5 [\mu_f mg\cos\theta] + 0.5 [\mu_f mg\cos\theta]$

$F_{Tf} = 0.5 \times 0.7 \times 1765 \times 9.81$

$F_{Tf} = 6060\ N$ OR $F_{Tf} = 6.06\ kN$

Same force is applied on Rear Rear because vehicle stand on ground level

so $F_{TR} = 6.06\ kN$

Q13 Completed in word file

Find attached file.