Q1 :-

* SPW = 13.7648

From Fig 4-1 :-

$$A_{VOC} = \frac{(62-14)}{1000\ VM} * 0.5\ M * 3600\ V * 365 * 15$$

$$A_{VOC} = 473040\ \$$$

$$PV_{OC} = A_{VOC} * SPW = 6.51 * 10^6 \text{ dollar}$$

Q2 :-

λ increases from λ_1 0.3 to λ_2 0.6 , η stop = 0.82 (λ_1)

η stop = 0.58 (λ_2)

Solution from Fig (4-3) → (V/C = 0.5) :

(λ_1) → $A_{VOC} = (14.7/1000\ V)(320)(2)(0.82)(15)(365) = 42237\ \$$

(λ_2) → $A_{VOC} = (10.3/1000\ V)(320)(2)(0.58)(15)(365) = 20933\ \$$

$A_{VOC\ (saving)} = 21304\ \$$ ⇒ $PV_{OC} = (SPW)(A_{saving}) = 293245\ \$$

Q3:-

Choosing A over B will result in;

P_B = present benifit = 3.5 million $

P_C = present cost = (0.1 to 0.6)(13.7648) = 9.64 million $

$B/C = P_B/P_C = 0.363$

∴ B is more feasible

Q4:-

Using equation (7-8a) with deceleration rate ~~Rate (a) = 11.2 m/s²~~

deceleration rate (a) = 11.2 m/s², G = -3%, d = 96 ft

$$96 = \frac{(V_i^2 - V_f^2)}{30\left[(a/32.2) \pm G/100\right]}, \quad V_i = 45 \text{ mph}$$

$$V_p = 33.30 \text{ mph}$$

Q5:-

$R_L = 350m$ (table 7-3) , $\Delta_L = 38^\circ$

$T_L = R_L \tan\frac{\Delta_L}{2} = 120.51\ m$

$\Delta_S = 24^\circ$, $T_S = R_S \tan\frac{\Delta_S}{2} = 42.51\ m$

$T_L + T_S = 163.02\ m$

$\Rightarrow \frac{P}{\sin 24} = \frac{163.02}{\sin 118} \Rightarrow P = 75.10\ m$

$LT = T_L + P = 195.61\ m$

Station PC = Station PI $- P = 325.14\ m$

Q6:-

$R = 716$ ft (table 7-3)

$m = 18 + 6 = 24$ ft

$R_s = 716 - 6 = 710$ ft

$$S = \left(\frac{R_s}{28.65}\right)\left(\cos^{-1}\frac{[R_s - m]}{(R_s)}\right)$$

$S = 370.24$ ft

From table 7-6 by (interpolation):

$$\frac{V - 45}{10.24} = \frac{5}{65} \Rightarrow V = 45.79 \text{ mph}$$

Q7 :-

$$D = 725.82 - 511.95 = 213.87 \text{ ft}$$

$$h_I = 217.16 - (0.05)(213.87) = 206.47 \text{ ft}$$

$$h_c = 192.43 \text{ ft}$$

$$Y = h_I - h_c = 14.04 \text{ ft}$$

$$A = |0.03 - 0.05| = 0.02$$

Using equation given in class :-

$$L = 3236 + 3207 = 6443 \text{ ft}$$

Q8:-

$$\frac{e_D}{150} = \frac{2\%}{60} \Rightarrow e_D = 5\%$$

$$\frac{e_{PC}}{100} = \frac{2\%}{60} \Rightarrow e_{PC} = 3.33\%$$

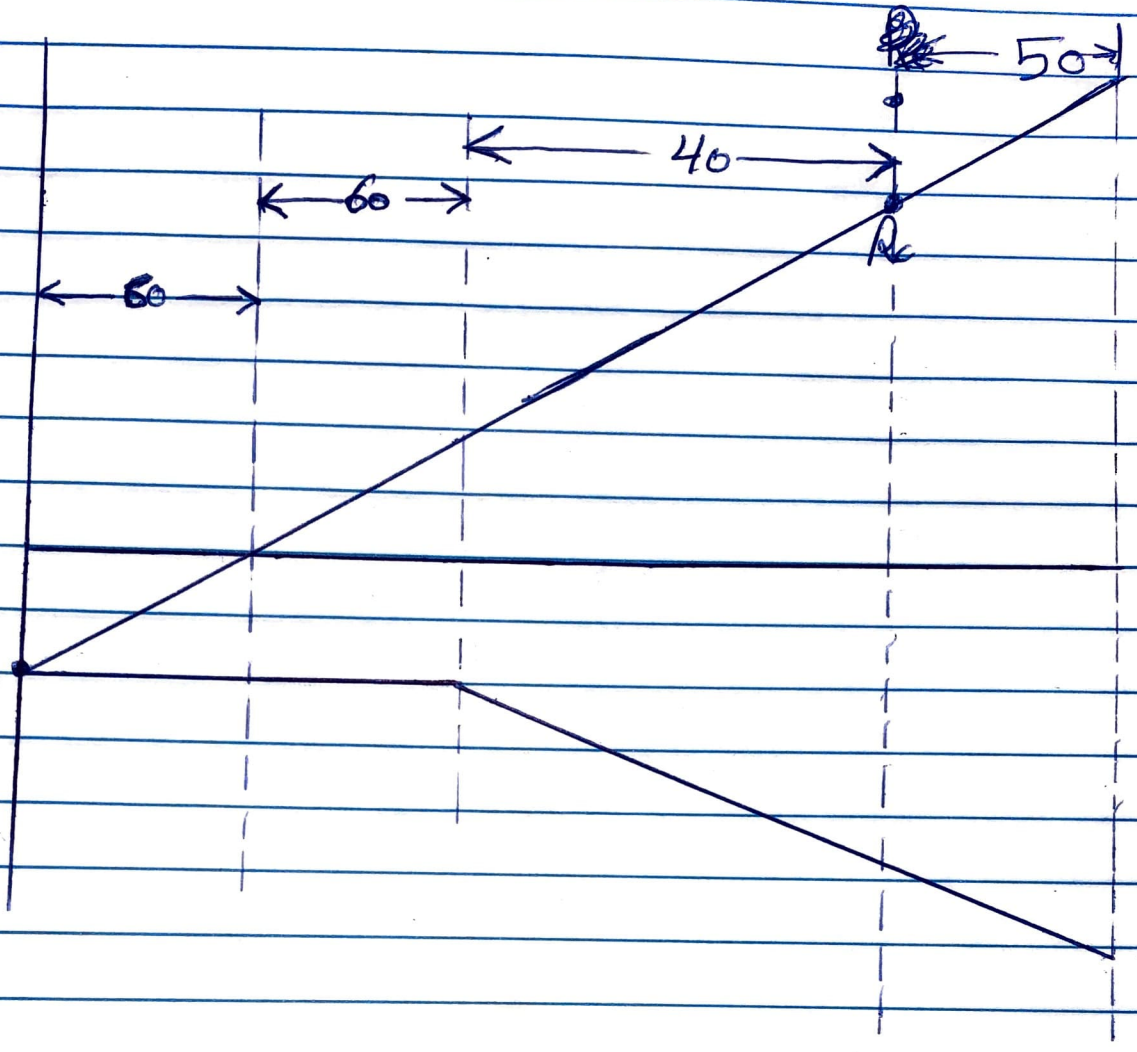
→ Sta beginning TR $= 612.78 - \frac{2}{3}(150) - 60$

$= 452.78$ ft

→ Sta ending TR $= 612.78 - \frac{2}{3}(150) = 512.78$ ft

→ Sta RE begins to rotate $= 612.78 - (100 - 60) = 572.7$

→ Sta Lille $= 612.78 + 50 = 662.78$ ft



Graph for Q8