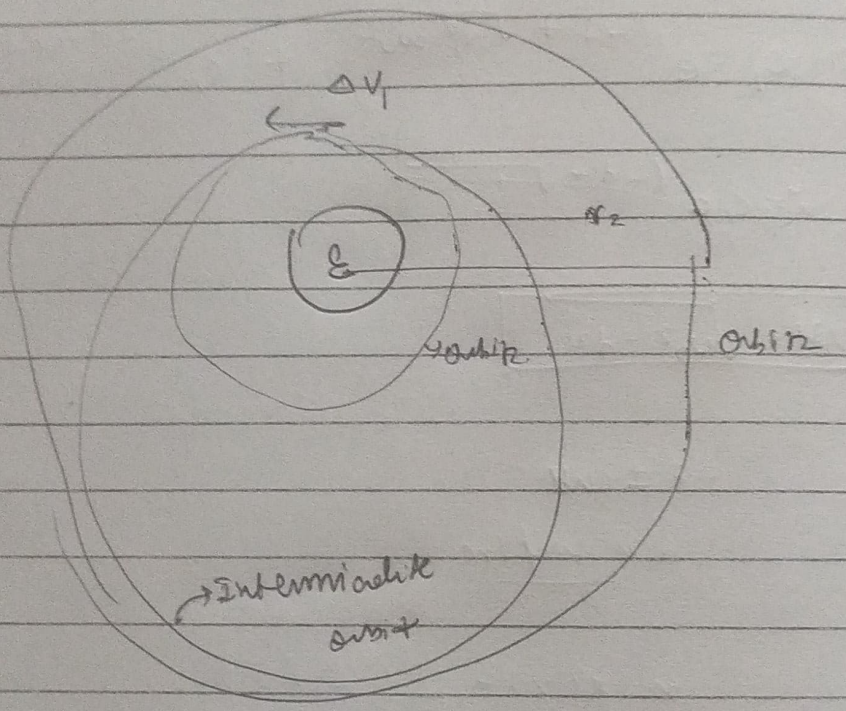
ΔV_1
r_2
Orbit
Orbit
Intermediate
orbit

(1) Transferring from orbit 1 to intermediate orbit.

$$-\frac{GMem}{r_1} + \frac{1}{2}mv^2 = -\frac{Gmam}{r_1+r_2}.$$

$$v' = \sqrt{\frac{GMe}{r_1}}\sqrt{\frac{r_2}{r_1+r_2}}.$$

$$\Delta v_1' = \sqrt{\frac{GMe}{r_1}}\left(\sqrt{\frac{r_2}{r_1+r_2}} - 1\right).$$

Transferring from ~~orbit~~ intermediate orbit to orbit 2.

$$-\frac{GMem}{r+r_2} + \frac{1}{2}mv_2^2 = -\frac{Gmem}{2r_2}.$$

$$\Delta v_2 = \sqrt{\frac{Gm}{r}}\left(1 - \sqrt{\frac{2r_1}{r_1+r_2}}\right)$$

$$\Delta v_{orbit} = \Delta v' + \Delta v_2.$$

$$= \sqrt{\frac{Gm}{r}}\left(\sqrt{\frac{2r_2}{r_1+r_2}} - 1\right) + \sqrt{\frac{Gm}{r}}\left(1 - \sqrt{\frac{2r_1}{r_1+r_2}}\right)$$

On substituting the required information in the eqn we get,

$r_1 = 35800\text{km} = 42200$ km (b/w geostationary and graveyard orbit)

$r_2 = 42450$ km.

$(\Delta V_{total}) = \Delta v_1 + \Delta v_2 = 9.07$ m/s.

$r = 35800$ km $= 42200$. } (b/w geostationary & low earth orbit)

$r_2 = 6800$.

$(\Delta V_{total}) = -3856$ m/s.

$\Delta V_{graveyard} > \Delta V_{low\ earth\ orbit}$.

i. we would prefer transfer to graveyard orbit