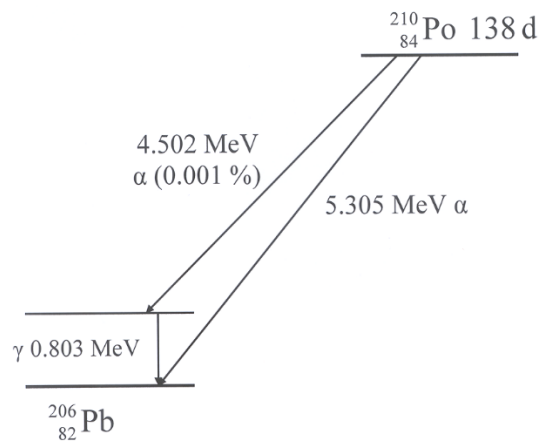**SOLUTION**

Week 08

W_t = 0.12 (tissue weighting factor for lungs to get effective dose)

W_r = 20 (weighting factor for alpha radiation to get equivalent dose)

E_α = 5.307 MeV

m = 1 kg

Activity per cigarette = 0.516 pCi

Figure 1 - Decay scheme of Polonium-210

A = 0.516 pCi/Cigarette = 1.9092 · 10^{-2} Bq/Cigarette

A^{total} = 1.9092 · 10^{-2} Bq/Cigarette · 30 Cigarettes = 0.57276 Bq

$$D^{total} = \frac{A^T \cdot E_\alpha \cdot t}{m} = \frac{0.57276 \cdot (5.305 \cdot 1.6 \cdot 10^{-13}) \cdot (365.25 \cdot 24 \cdot 3600)}{1} = 15.358 \ \mu Gy/year$$

H^{total} = D^{total} · W_r = 307.15 μSv/year

E^{total} = H^{total} · W_t = 36.86 μSv/year