1) a $\frac{Z_A}{A} = \left(\frac{1}{2}\right) \frac{81}{8\phi + \phi.6\, A^{2/3}}$ from Eq 2.9 in text

$\frac{Z_A}{A} = \frac{81}{26\phi. + 1.2\,(6\phi)^{2/3}} = \frac{81}{16\phi + 15.3} = \phi.462$

$Z_A = \phi.462 * 6\phi = 27.7$

(higher than Z=27 Co)

b $^{6\phi}_{27}Co \longrightarrow {}^{60}_{28}Ni^{+} + \beta^{-} + \bar{\nu} + Q_{\beta^-}$

c $Q_{\beta^-} = \Delta(^{60}Co) - \Delta(^{60}Ni)$

$Q = (-61.649\ MeV) - (-64.472\ MeV)$

$Q = {}^{+}2.823\ MeV$

mass defects use neutral atoms to account for electrons

from "Nuclens" program

2)

a $^{18}_{9}F \longrightarrow {}^{18}_{8}O^{-} + \beta^{+} + \nu + Q_{\beta+}$

$Q = \Delta(^{18}F) - \Delta(^{18}O) - 2m_e c^2$

$= +\phi.8737 - (-\phi.7815) - 1.\phi22\ MeV$

$= +\phi.6332\ MeV$

from "Nuclens" program

b $A = A_0 e^{-\lambda t} = 35\phi\ MBq\ e^{-\left(\frac{\ln 2 \times 3 \times 6\phi\ min}{1\phi9.771\ min}\right)}$

$= 35\phi\ MBq\ e^{-1.1366}$

$= 35\phi \times \phi.32\phi9\ MBq$

$= 112.\ MBq$ (3.036 mCi)