20. (a) The first step is to add energy to produce $^4\text{He} \rightarrow p + {}^3\text{H}$, which – to make the electrons "balance" – may be rewritten as $^4\text{He} \rightarrow {}^1\text{H} + {}^3\text{H}$. The energy needed is $\Delta E_1 = (m_{^3\text{H}} + m_{^1\text{H}} - m_{^4\text{He}})c^2 = (3.01605\,\text{u} + 1.00783\,\text{u} - 4.00260\,\text{u})(931.5\,\text{MeV/u}) = 19.8\,\text{MeV}$. The second step is to add energy to produce $^3\text{H} \rightarrow n + {}^2\text{H}$. The energy needed is $\Delta E_2 = (m_{^2\text{H}} + m_n - m_{^3\text{H}})c^2 = (2.01410\,\text{u} + 1.00867\,\text{u} - 3.01605\,\text{u})(931.5\,\text{MeV/u}) = 6.26\,\text{MeV}$. The third step: $^2\text{H} \rightarrow p + n$, which – to make the electrons "balance" – may be rewritten as $^2\text{H} \rightarrow {}^1\text{H} + n$. The work required is $\Delta E_3 = (m_{^1\text{H}} + m_n - m_{^2\text{H}})c^2 = (1.00783\,\text{u} + 1.00867\,\text{u} - 2.01410\,\text{u})(931.5\,\text{MeV/u}) = 2.23\,\text{MeV}$.

(b) The total binding energy is $\Delta E_{\text{be}} = \Delta E_1 + \Delta E_2 + \Delta E_3 = 19.8\,\text{MeV} + 6.26\,\text{MeV} + 2.23\,\text{MeV} = 28.3\,\text{MeV}$.

(c) The binding energy per nucleon is $\Delta E_{\text{ben}} = \Delta E_{\text{be}}/A = 28.3\,\text{MeV}/4 = 7.07\,\text{MeV}$.