Chapter 45 Even Answers

2. $^{144}_{54}\text{Xe}$, $^{143}_{54}\text{Xe}$, $^{142}_{54}\text{Xe}$

4. $^{1}_{0}\text{n} + ^{238}_{92}\text{U} \rightarrow ^{239}_{92}\text{U} \rightarrow ^{239}_{93}\text{Np} + \text{e}^- + \bar{\nu}$; $^{239}_{93}\text{Np} \rightarrow ^{239}_{94}\text{Pu} + \text{e}^- + \bar{\nu}$

6. 2.63 kg/d

8. (a) $4.84V^{-1/3}$ (b) $6V^{-1/3}$

(c) $6.30V^{-1/3}$ (d) the sphere, the parallelepiped

10. 2.68×10^5

12. (a) 31.9 g/h (b) 122 g/h

14. (a) 3.24×10^{-15} m (b) 444 keV (c) $2v_i/5$

(d) 740 keV (e) Possibly by tunneling.

16. (a) 2.52×10^{31} J (b) 1.14×10^9 yr

18. (a) 10^{14} cm^{-3} (b) 1.24×10^5 J/m^3 (c) 1.77 T

20. 12.4 h

22. (a) 10.0 h (b) 3.16 m

24. (a) 0.436 cm (b) 5.79 cm

26. 2.39×10^{-3} °C

28. 3.96×10^{-4} J/kg

30. (a) $C(\Delta V)^2/2E$ (b) $C(\Delta V)/e$

32. (a) about 8 min (b) 27.6 min (c) 30 min ± 30%

34. ~10^3 Bq

36. (a) See solution (b) R/λ

38. (a) 1.5×10^{24} nuclei (b) 0.6 kg

42. 1.02 MeV

44. $\dfrac{m N_{\mathrm{A}}(200\ \mathrm{MeV})}{(235\ \mathrm{g/mol})\left[c_w(100^\circ\mathrm{C} - T_c) + L_v + c_{\mathrm{s}}(T_h - 100^\circ\mathrm{C})\right]}$

46. 223 W

48. (a) $\sim 10^8\ \mathrm{m}^3$ (b) $\sim 10^{13}$ J

(c) $\sim 10^{14}$ J (d) ~10 kilotons

50. 26 collisions

52. 400 rad

54. 3.53×10^{38} protons /s

56. (a) 5.68×10^8 K (b) 120 kJ

58. (a) See solution (b) 35.2 (c) 2.89×10^{15}