Chapter 46 Even Answers

2. 2.27×10^{23} Hz, 1.32×10^{-15} m

4. $\bar{\nu}_\mu$, ν_e

6. (a) 0.782 MeV (b) $v_e = 0.919c$, $v_p = 380$ km/s

(c) The electron is relativistic, the proton is not.

8. $\sim 10^{-16}$ m

10. $\bar{\nu}_\mu$

12. (a) L_e and L_μ (b) charge (c) baryon number

(d) baryon number (e) charge

14. The second reaction does not conserve baryon number.

16. $0.828c$

18. (a) See solution (b) $E_e = E_\gamma = 469$ MeV, $p_e = p_\gamma = 469$ MeV/c

(c) 0.999 999 4 c

20. The ρ^0 decays via the strong interaction; the K_s^0 must decay via the weak interaction.

22. (a) electron and lepton numbers (b) lepton number

(c) charge and strangeness conservation (d) baryon number

(e) strangeness

24. (a) baryon number, charge, L_e, L_τ

(b) baryon number, charge, L_e, L_μ, L_τ

(c) strangeness, charge, L_e, L_μ, L_τ

(d) baryon number, strangeness, charge, L_e, L_μ, L_τ

(e) baryon number, strangeness, charge, L_e, L_μ, L_τ

(f) baryon number, strangeness, charge, L_e, L_μ, L_τ

32. a neutron, udd

34. (a) $-e$, antiproton (b) 0, antineutron

36. (a) 590.07 nm (b) 597 nm (c) 661 nm

38. (a) $c\left(\frac{z^2+2z}{z^2+2z+2}\right)$ (b) $\frac{c}{H}\left(\frac{z^2+2z}{z^2+2z+2}\right)$

40. (a) $\sim 10^{13}$ K (b) $\sim 10^{10}$ K

42. (a) 1.61×10^{-35} m (b) 5.38×10^{-44} s (c) yes

44. (a) charge conservation (b) energy conservation (c) baryon number conservation

46. a neutron

48. 2.04 MeV

50. 1116 MeV/c^2 (a Λ^0 particle)

52. 70.4 MeV

54. 29.7 MeV

56. (a) Electron-positron annihilation; e^-

(b) A neutrino collides with a neutron; W^+