

$$\textcircled{1} \lambda = \frac{c}{\nu} = \frac{3 \times 10^8 \frac{\text{m}}{\text{s}}}{5.6 \times 10^{16} \frac{1}{\text{s}}} = 5.3571 \times 10^{-9} \rightarrow \boxed{5.4 \times 10^{-9} \text{ m}}$$

$$\textcircled{2} 8.34 \times 10^3 \text{ MHz} \times \frac{1 \times 10^6 \text{ Hz}}{1 \text{ MHz}} = 8.34 \times 10^9 \text{ Hz}$$

$$\lambda = \frac{c}{\nu} = \frac{3 \times 10^8 \frac{\text{m}}{\text{s}}}{8.34 \times 10^9 \frac{1}{\text{s}}} = 3.5971 \times 10^{-2} \rightarrow \boxed{3.60 \times 10^{-2} \text{ m}}$$

$$\textcircled{3} \lambda = \frac{hc}{E} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3 \times 10^8 \frac{\text{m}}{\text{s}})}{2.0 \times 10^{-21} \text{ J}}$$

$$= 9.939 \times 10^{-5} \rightarrow \boxed{9.9 \times 10^{-5} \text{ m}}$$

$$\textcircled{4} 4.56 \times 10^{-18} \text{ KJ} \times \frac{1 \times 10^3 \text{ J}}{1 \text{ KJ}} = 4.56 \times 10^{-15} \text{ J}$$

$$\lambda = \frac{hc}{E} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3 \times 10^8 \frac{\text{m}}{\text{s}})}{4.56 \times 10^{-15} \text{ J}}$$

$$= 4.3592 \times 10^{-11} \rightarrow \boxed{4.36 \times 10^{-11} \text{ m}}$$

$$\textcircled{5} \quad v = \frac{c}{\lambda} = \frac{3 \times 10^8 \frac{\text{m}}{\text{s}}}{5.800 \times 10^{-11} \text{m}} = 5.1724 \times 10^{18} \rightarrow \boxed{5.172 \times 10^{18} \frac{1}{\text{s}}}$$

$$\textcircled{6} \quad 610 \text{ nm} \times \frac{1 \times 10^9 \text{ m}}{1 \text{ nm}} = 6.1 \times 10^{-7} \text{ m}$$

$$v = \frac{c}{\lambda} = \frac{3 \times 10^8 \frac{\text{m}}{\text{s}}}{6.1 \times 10^{-7} \text{m}} = 4.9180 \times 10^{14} \rightarrow \boxed{4.9 \times 10^{14} \frac{1}{\text{s}}}$$

$$\textcircled{7} \quad v = \frac{E}{h} = \frac{5.91 \times 10^{19} \text{ J}}{6.626 \times 10^{-34} \text{ J}\cdot\text{s}} = 8.9194 \times 10^{14} \rightarrow \boxed{8.92 \times 10^{14} \frac{1}{\text{s}}}$$

$$\textcircled{8} \quad 4.0 \times 10^{-16} \text{ kJ} \times \frac{1 \times 10^3 \text{ J}}{1 \text{ kJ}} = 4.0 \times 10^{-13} \text{ J}$$

$$v = \frac{E}{h} = \frac{4.0 \times 10^{-13} \text{ J}}{6.626 \times 10^{-34} \text{ J}\cdot\text{s}} = 6.0368 \times 10^{20} \rightarrow \boxed{6.0 \times 10^{20} \frac{1}{\text{s}}}$$

$$\textcircled{9} \quad E = h\nu = (6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (8.80 \times 10^{14} \frac{1}{\text{s}})$$

$$= 5.8308 \times 10^{-19} \rightarrow \boxed{5.83 \times 10^{-19} \text{ J}}$$

$$\textcircled{10} \quad 3.03 \times 10^9 \text{ MHz} \times \frac{1 \times 10^6 \text{ Hz}}{1 \text{ MHz}} = 3.03 \times 10^{15} \text{ Hz}$$

$$E = h\nu = (6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3.03 \times 10^{15} \frac{1}{\text{s}})$$

$$= 2.00767 \times 10^{-18} \rightarrow \boxed{2.01 \times 10^{-18} \text{ J}}$$

$$\textcircled{11} \quad E = \frac{hc}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3 \times 10^8 \frac{\text{m}}{\text{s}})}{4.670 \times 10^{-9} \text{ m}}$$

$$= 4.2565 \times 10^{-17} \rightarrow \boxed{4.257 \times 10^{-17} \text{ J}}$$

$$\textcircled{12} \quad 3,400 \text{ nm} \times \frac{1 \times 10^{-3} \text{ m}}{1 \text{ nm}} = 3.4 \text{ m}$$

$$E = \frac{hc}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3 \times 10^8 \frac{\text{m}}{\text{s}})}{3.4 \text{ m}}$$

$$= 5.84647 \times 10^{-26} \rightarrow \boxed{5.8 \times 10^{-26} \text{ J}}$$