

# Electrons - Unit 4

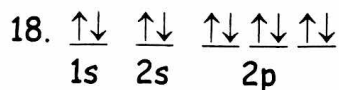
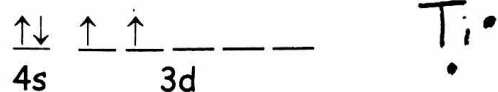
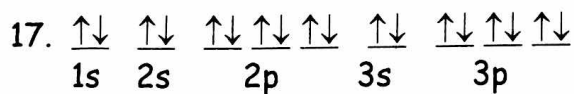
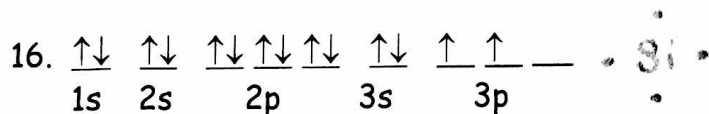
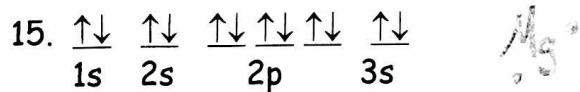
## ANSWER SHEET

\*\*ALL NUMERICAL ANSWERS MUST INCLUDE THE PROPER UNITS \*\*

1.  $1.3 \times 10^{-21}$  J
2.  $7.0 \times 10^{-7}$  m
3.  $3.3 \times 10^{16}$  Hz
4.  $9.9 \times 10^{-14}$  J
5.  $5.1 \times 10^8$  Hz
6. photon
7. ground state
8. excited state
9. Louis de Broglie
10. Heisenberg Uncertainty Principle
11. Pauli Exclusion Principle
12. Aufbau Principle
13. Hund's Rule
14. valence electrons

19.  $1s^2 2s^2 2p^3 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{N}}}$ :
20.  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 \text{ K} \cdot$
21.  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5 \text{ Cr} \cdot$   
(Remember: Cr makes an exception to gain stability.)

22.  $[\text{Kr}] 5s^2 4d^{10} 5p^3 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Sb}}}$ :
23.  $[\text{Xe}] 6s^2 4f^{14} 5d^{10} 6p^3 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Bi}}}$ :
24.  $[\text{Kr}] 5s^2 4d^5 \text{ Te} \cdot$
25.  $[\text{Ar}] 4s^2 3d^{10} 4p^2 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Ge}}}$ :
26.  $\text{Te}^{2-}$   $[\text{Kr}] 5s^2 4d^{10} 5p^6 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Te}^{2-}}}$ :
27.  $\text{B}^{3+}$   $1s^2 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{B}^{3+}}}$ :
28.  $\text{Ba}^{2+}$   $[\text{Kr}] 5s^2 4d^{10} 5p^6 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Ba}^{2+}}}$ :
29.  $\text{Br}^-$   $[\text{Ar}] 4s^2 3d^{10} 4p^6 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Br}^-}}$ :
30.  $\text{K}^+$   $[\text{Ne}] 3s^2 3p^6 \cdot \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{K}^+}}$ :



# Review Unit 4

1.  $E = ?$

$$E = h \cdot \nu$$

$$\nu = 2.0 \times 10^{12} \text{ Hz}$$

$$= (6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (2.0 \times 10^{12} \frac{1}{\text{s}}) = 1.3 \times 10^{-21} \text{ J}$$

2.  $\lambda = ?$

$$\lambda = \frac{c}{\nu} = \frac{3.00 \times 10^8 \text{ m/s}}{4.3 \times 10^{14} \text{ 1/s}} = 7.0 \times 10^{-7} \text{ m}$$

$$\nu = 4.3 \times 10^{14} \text{ Hz}$$

3.  $\nu = ?$

$$c = \lambda \cdot \nu \text{ so}$$

$$\lambda = \frac{9.2 \text{ nm}}{1 \text{ nm}} \left| \frac{1 \times 10^{-9} \text{ m}}{1 \text{ nm}} \right. = 9.2 \times 10^{-9} \text{ m}$$

$$\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8 \text{ m/s}}{9.2 \times 10^{-9} \text{ m}} = 3.3 \times 10^{16} \text{ Hz}$$

4.  $E = ?$

$$\lambda = \frac{2.0 \text{ pm}}{1 \text{ pm}} \left| \frac{1 \times 10^{-12} \text{ m}}{1 \text{ pm}} \right. = 2.0 \times 10^{-12} \text{ m}$$

$$E = \frac{h \cdot c}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s}) (3.00 \times 10^8 \frac{1}{\text{s}})}{(2.0 \times 10^{-12} \text{ m})}$$

$$E = 9.9 \times 10^{-14} \text{ J}$$

5.  $\nu = ?$

$$E = 3.4 \times 10^{-25} \text{ J}$$

$$\frac{E}{h} = \frac{h \cdot \nu}{h} \text{ so } \frac{E}{h} = \nu = \frac{(3.4 \times 10^{-25} \text{ J})}{(6.626 \times 10^{-34} \text{ J}\cdot\text{s})} = 5.1 \times 10^8 \text{ Hz}$$