

KEY

Chapter 5

I. What is the maximum number of electrons that can occupy:

- (A) 3p 6 (B) 6s 2 (C) 4d 10 (D) fourth energy level 32

II. How many sublevels are in these main levels?

- (A) 1 1 (B) 3 3 (C) 4 4 (D) 5 4

(s,p,d) (s,p,d,f) (s,p,d,f)

III. State the following rules.

(A) Aufbau Principle-- Start @ lowest Energy level first (i.e. 1s)

(B) Pauli Exclusion Principle-- e⁻ have opposite spin (↑ ↓)

(C) Hund's Rule-- fill all open orbitals before pairing

IV. Which of the following sublevels has the highest energy?

(A) 2s 3s 2p 3p (B) 3s 3p 3d 4s

(C) 3s 4p 3d 3p (D) 3p 4s 5d 6s

V. What element is represented by the following configuration?

(A) 1s² 2s² 2p⁶ 3s² 3p⁴ S (B) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d¹⁰ 4s² Zn

(C) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹⁰ 4p¹ Ga

VI. Write the electron configurations for the following elements.

(A) Scandium #21 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹

(B) Chlorine #17 1s² 2s² 2p⁶ 3s² 3p⁵

(C) Zirconium #40 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹⁰ 4p⁶ 5s² 4d²

(D) Arsenic #33 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹⁰ 4p³

VII. Using orbital notation (↑↓); draw the following atoms.

(A) Carbon #6 $\frac{\uparrow\downarrow}{1s} \frac{\uparrow\downarrow}{2s} \frac{\uparrow}{2p} \frac{\uparrow}{2p} \text{---}$

(B) Aluminum #13 $\frac{\uparrow\downarrow}{1s} \frac{\uparrow\downarrow}{2s} \frac{\uparrow\downarrow\uparrow\downarrow}{2p} \frac{\uparrow\downarrow}{3s} \frac{\uparrow}{3p} \text{---}$

(C) Manganese #25 $\frac{\uparrow\downarrow}{1s} \frac{\uparrow\downarrow}{2s} \frac{\uparrow\downarrow\uparrow\downarrow}{2p} \frac{\uparrow\downarrow}{3s} \frac{\uparrow\downarrow\uparrow\downarrow}{3p} \frac{\uparrow\downarrow}{4s} \frac{\uparrow}{3d} \frac{\uparrow}{3d} \frac{\uparrow}{3d} \frac{\uparrow}{3d} \frac{\uparrow}{3d}$

(D) Selenium #34 $\frac{\uparrow\downarrow}{1s} \frac{\uparrow\downarrow}{2s} \frac{\uparrow\downarrow\uparrow\downarrow}{2p} \frac{\uparrow\downarrow}{3s} \frac{\uparrow\downarrow\uparrow\downarrow}{3p} \frac{\uparrow\downarrow}{4s} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{4p}$

(E) Radon #86 $\frac{\uparrow\downarrow}{1s} \frac{\uparrow\downarrow}{2s} \frac{\uparrow\downarrow\uparrow\downarrow}{2p} \frac{\uparrow\downarrow}{3s} \frac{\uparrow\downarrow\uparrow\downarrow}{3p} \frac{\uparrow\downarrow}{4s} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{3d} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{4p} \frac{\uparrow\downarrow}{5s} \frac{\uparrow\downarrow}{4d} \frac{\uparrow\downarrow}{5p} \frac{\uparrow\downarrow}{5p} \frac{\uparrow\downarrow}{5p} \frac{\uparrow\downarrow}{6s} \frac{\uparrow\downarrow}{4f} \frac{\uparrow\downarrow}{4f} \frac{\uparrow\downarrow}{4f} \frac{\uparrow\downarrow}{4f} \frac{\uparrow\downarrow}{4f} \frac{\uparrow\downarrow}{5d} \frac{\uparrow\downarrow}{5d} \frac{\uparrow\downarrow}{5d} \frac{\uparrow\downarrow}{5d} \frac{\uparrow\downarrow}{5d} \frac{\uparrow\downarrow}{6p} \frac{\uparrow\downarrow}{6p} \frac{\uparrow\downarrow}{6p}$