

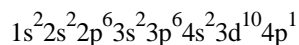
4. Three sets of quantum numbers are listed below. Pick the best answer.

I. $n = 3, l = 3, m_l = 2$ II. $n = 4, l = 2, m_l = 0$ III. $n = 1, l = 0, m_l = 0$

- a) I and II are allowed sets, III is not
- b) only III is an allowed set
- c) II and III are allowed sets, I is not *
- d) all three sets are allowed
- e) only II is an allowed set

5. What is the maximum number of electrons that can occupy the energy level with principal quantum number, $n = 5$?

6. In what group of the periodic table would an element with the following electron configuration belong?



- a) Group 1
- b) Group 13
- c) Group 15
- d) Group 17
- e) none of these

7. Write the **electron configurations** and **orbital diagrams** for the following atoms. You may write these in shorthand notation. Also, identify whether the element is paramagnetic or diamagnetic.

a) Cl

b) Tc

Potentially Useful Information

$$c = \lambda\nu$$

$$E = h\nu$$

$$E = \frac{hc}{\lambda}$$

$$c = 3.00 \times 10^8 \text{ m/s}$$

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$

$$E_n = -R_H \left(\frac{1}{n^2} \right)$$

$$\Delta E = -R_H \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$$

$$R_H = 2.18 \times 10^{-18} \text{ J}$$

$$\Delta E = E_f - E_i$$

$$\lambda = \frac{h}{mu}$$