

$c = 3.0 \times 10^8 \text{ m/s}$ $h = 6.26 \times 10^{-34} \text{ J}\cdot\text{s}$ $c = \lambda\nu$ $E = h\nu$

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1.(4 Pts) What is the wavelength of radiation that has a frequency of $6.912 \times 10^{14} \text{ s}^{-1}$?

$$c = \lambda\nu$$

$$\lambda = \frac{c}{\nu} = \frac{3.0 \times 10^8 \text{ m/s}}{6.912 \times 10^{14} \text{ s}^{-1}} = 4.34 \times 10^{-7} \text{ m}$$

2.(4 Pts) Calculate the frequency of visible light having a wavelength of 486.1 nm.

$$\nu = \frac{c}{\lambda}$$

$$\nu = \frac{3.0 \times 10^8 \text{ m/s}}{486.1 \times 10^{-9} \text{ m}} = 6.17 \times 10^{14} \text{ s}^{-1}$$

3.(2 Pts) The number of orbitals in a d subshell is

- A. 1 B. 2 C. 3 **D. 5** E. 7

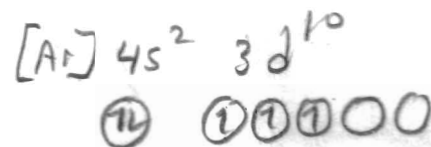
($10e^- \Rightarrow 5 \text{ orbitals}$)

4.(4 Pts) Identify which elements match the following electron configurations?

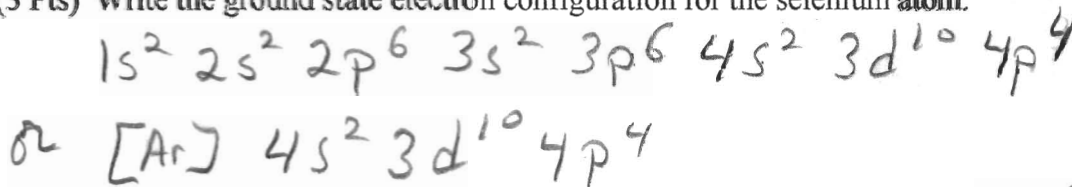
- a. $1s^2 2s^2 2p^6 3s^2$ Mg b. $[\text{Kr}]5s^2 4d^{10} 5p^3$ Sb

5.(2 Pts) An atom of vanadium has ___ unpaired electrons and is ____.

- A. 0, diamagnetic B. 2, diamagnetic **C. 3, paramagnetic**
 D. 5, paramagnetic E. 4, diamagnetic



6.(3 Pts) Write the ground state electron configuration for the selenium atom.



7.(2 Pts) How many 3d electrons does an Fe^{3+} ion have?

- A. 9 B. 6 **C. 5** D. 4 E. 3

Looses $4s^2$ and $1 3d e^-$

8.(2 Pts) Which of those atoms listed below will have the smallest radius?

- A. Al **B. P** C. As D. Te E. Na

9.(2 Pts) Which of the elements listed below will have the greatest ionization energy?

- A. Cs B. Ga C. K D. Bi **E. As**