

This quiz is take-home and open book, and it is intended that all members of the group contribute to completing it. It is a violation of the Academic Honor Code to sign a quiz that you did not work on.

**The quiz is due at the end of class on Thursday, September 21.**

**List names in alphabetical order, and give social security numbers! Put names on all pages, and staple pages together**

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### Points

- (3) 1. Calculate the **wavelength** of the radio waves used to broadcast the AM station at 1210 KHz.

$$l = \frac{c}{n} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{1210 \text{ KHz} \times 10^3 \frac{\text{Hz}}{\text{Kz}}} = 247.93 \text{ m (round to 248 or 247.9)}$$

1 pt. setup, 1 pt. correct KHz conversion, 1 pt. final calculation, 0.5 pts if unit missing.

(don't deduct for sig fig here. One could use c to a greater # of sig figs.)

- (3) 2. Calculate the energy of a quantum of red light with a wavelength of 700 nm. (Planck's constant,  $h = 6.63 \times 10^{-34}$  Js.

$$E = h\nu = \frac{hc}{l} = \frac{(6.63 \times 10^{-34} \text{ Js})(3.00 \times 10^8 \text{ ms}^{-1})}{700 \text{ nm} \times 10^{-9} \frac{\text{m}}{\text{nm}}} = 2.84 \times 10^{-19} \text{ J}$$

1 pt. setup, 1 pt correct nm conversion, 1 pt final calculation, 0.5 pts if unit missing.

- (3) 3. Give the electronic configuration for the following elements. (Use the abbreviation style shown in the example).

**Example: B**  $1s^2 2s^2 2p$

N  $1s^2 2s^2 2p^3$

Si  $1s^2 2s^2 2p^6 3s^2 3p^2$

Ne  $1s^2 2s^2 2p^6$

Cl  $1s^2 2s^2 2p^6 3s^2 3p^5$

K  $1s^2 2s^2 2p^6 3s^2 3p^6 4s$

F  $1s^2 2s^2 2p^5$

List names in alphabetical order. Be sure to staple pages together!

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(6) 4. Give the **maximum** number of electrons that can be found in:

(a) The third **shell** ( $n = 3$ )

18 ( $2n^2$ )

(b) The 2s **orbital**

2

(c) The **subshell** of 3p orbitals.

6

(d) The fifth **shell** ( $n = 5$ )

50 ( $2n^2$ )

(e) The **subshell** of 4d orbitals

10

(f) One 4p **orbital**.

2