**Question 1:**

Consider the element with the electron configuration [Kr] 5s2 4d7 . What is the nature of this element Write the name of the family it belongs to.

**Question 2:**

The general electron configuration for all elements in group 5A is nsx npy. Give the value for x and y.

**Question 3:**

The atomic radius is largely determined by how strongly the outer-shell electrons are held by the nucleus. True or false?

**Question 4:**

Write the electron configuration AND closed shell electron configuration for the lead (Pb) atom.

**Question 5:**

Isoelectronic means that the species have the same number of electrons but a different electron configuration.

**Question 6:**

Consider an electron for a hydrogen atom in an excited state. The maximum wavelength of electromagnetic radiation that can completely remove (ionize) the electron from the H atom is 1460 nm. Determine the initial excited state for the electron.

**Question 7:**

How many orbital(s) can have the designation: 3 dx2-y2?

**Question 8:**

What is the maximum number of electrons in an atom that can have the quantum numbers: n=5, ms = +1/2

**Question 9:**

Calculate the frequency of the light emitted when an electron in Li2+ drops from the fourth excited state to the second excited state.

**Question 10:**

Photo Gray lenses incorporate small amounts of silver chloride in the glas of the lens. When light hits the AgCl particles, the following reaction occurs:

AgCl 🡪 Ag + Cl

The silver metal formed causes the lenses to darken. The enthalpy change for this reaction is 3.10 \* 10^2 kJ/mol. Assuming that all this energy must be supplied by light, what is the maximum wavelength of light that can cause this reaction?

**Question 11:**

Arrange the following atoms in order of increasing size: Sr, Ne, Se.

**Question 12:**

Carbon emits energy at a wavelength of 150nm. The total amount of energy emitted by a carbon sample is 1.98\*105 J. Calculate the number of carbon atoms present in the sample, assuming that each atom emits one photon.

**Question 13:**

An atom of a particular element is travelling at 1% of speed of light. The De Broglie wavelength is found to be 3.31 \* 10-3pm. Which element is this?

**Question 14:**

The effective nuclear charge that the outermost electrons feel increases across the period as a result of incomplete shielding by electron in the same shell. True or false?

**Question 15:**

Arrange the following atoms in order of increasing effective nuclear charge experienced by the electrons K, Mg, P, Rh, and Ti.

Answers:

1. Transition metal
2. X=2, y=3 so: ns2np
3. True
4. 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d10 5p6 6s2 4f14 5d10 6p2 AND [Xe] 6p2
5. False
6. 4
7. 1
8. 25
9. 2.097E+15 Hz
10. 386nm
11. Ne Se Sr
12. 1.49E+23 atoms C
13. Calcium
14. True
15. Mg < P < K < Ti < Rh