**Name: Period: Seat#:**

**S-37, 38, 39, 40, 41, 42**

**Directions:** Try these problems. If you can DO them, check the box (🗹).   
If you CANNOT do them, write some notes TO YOURSELF about what you need to study to succeed at these problems.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Formulas and Constants | | | | | |
| c = υ | E = hυ | E = | En =  |  = |  |
| c = 2.998 x 108 m/s h = 6.626 x 10-34 J·s Rhc = 2.18 x 10-18 J R = 1.0974 x 107 m-1 | | | | | |

**S37 – Quick Check #1**

🞎 **Electromagnetic Spectrum**

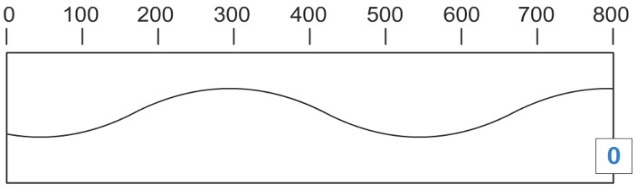
List all electromagnetic radiations from low energy to high.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **R O Y G B V**  ***Visible range*** |  |  |  |

We can see electromagnetic radiation with wavelengths between 400 nm and 700 nm.

Is 400 nm red light or violet light? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Justify your answer.

Consider this graphic from the **Online Tutorial: Electromagnetic Radiation**. The scale is in nm.



What is the wavelength (λ) of this wave? \_\_\_\_\_\_\_nm

Would you be able to see this wave? \_\_\_\_\_\_\_\_

What is this wavelength in meters? \_\_\_\_\_\_\_\_\_\_\_m

🞎 **Calculations**

Yellow light from a sodium vapor light has a wavelength of 589 nm.   
Calculate the frequency of this color of yellow light in Hz.

A radio station (KPCC) has a frequency of 89.3 MHz (megahertz).

How many Hz are in a MHz? \_\_\_\_\_\_\_\_\_

What is the frequency of this radio wave in s-1? \_\_\_\_\_\_\_\_

What is the energy of the radio waves being emitted (in Joules)?

**S38 – Quick Check #2**

🞎 **Calculations**

Calculate the energy of level n=3 of the hydrogen atom.

Calculate the energy and wavelength of light emitted when an electron drops from level n=5 to n=2.  
What color will this light be? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A runner with a mass of 50.0 kg moves at a velocity of 2.00 m/s.  
Calculate her deBroglie wavelength as she moves?

**S39 – Quick Check #3**

* **Orbital Diagrams**

How many electrons does neutral Vanadium have? \_\_\_\_\_ Correctly fill in the orbital diagram below.



How many valence electrons does Vanadium have? \_\_\_\_\_\_

Put a box around them.

Which electrons above are *furthest away* from the nucleus? \_\_\_\_\_\_\_\_

Write the Long Form electron configuration for Vanadium.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the Short Form (noble gas) electron configuration for Vanadium.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which electrons in Vanadium have the *greatest amount of energy*? \_\_\_\_\_\_\_\_

Would Vanadium be considered to be an s-block, p-block, d-block or f-block element? \_\_\_\_\_\_\_

Correctly fill in one of the diagrams below for Manganese ion (Mn2+), which has \_\_\_\_\_ electrons.

Correctly fill in one of the diagrams below for Molybdenum, Mo, which has \_\_\_\_\_ electrons.





* **Periodicity**

Looking at the periodic table, shade in a “period” red. Shade in a “group” blue.   
 A picture containing text, crossword puzzle, receipt

Description automatically generated  
   
What is the difference between a “group” and a “family”? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**S40 – Quick Check #4**

* **Paramagnatism**

These elements are in Period \_\_\_. List them from least to most paramagnetic: \_\_\_\_<\_\_\_\_<\_\_\_

|  |  |  |
| --- | --- | --- |
| **Be** | **C** | **F** |
|  |  |  |

**S41 – Quick Check #5**

* **Periodic Trends (Periodicity)**

Write the equation for the first ionization energy of Be. What is the phase of Be? \_\_\_\_ (g)/(l)/(s)

Write the equation for the first ionization energy of F.

|  |  |
| --- | --- |
| 14  Si  28.09 | 15  P  30.97 |
| 32  Ge  72.59 | 33  As  74.92 |

Looking at the four elements to the right, which of these elements.

Which would have the ***largest*** atomic size?

What is your ***explanation*** for your answer above? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If beryllium turned into an ion, would the size of that ion be bigger or smaller than neutral Be? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**S42 – Quick Check #6**

* **Mixed Problems**

Write the ground state electron configuration (short form or long form) for an arsenic atom.

Is an isolated arsenic atom in the ground state paramagnetic or diamagnetic?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Justify your answer.

What **ion charge** would As be expected to form? \_\_\_\_\_\_

The ion would be named \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the electron configuration for the ion.