

On all math problems show the given, formula used, and work to receive full credit. Make sure all short answer questions are in complete sentences.

1. Which color of light in the continuous spectrum has the greatest wavelength?

Red

2. What color of light in the continuous spectrum has the shortest frequency?

Violet

3. What is the energy of a quantum of light of frequency 4.62×10^{15} hz?

Given:

$\nu = 4.62 \times 10^{15} \text{ Hz}$
 $h = 6.6262 \times 10^{-34} \text{ J}\cdot\text{s}$
 $E = ?$

Soln:

$E = h\nu$
 $= (6.6262 \times 10^{-34} \text{ J}\cdot\text{s}) (4.62 \times 10^{15} \frac{1}{\text{s}})$

$E = 3.06 \times 10^{-18} \text{ J}$

4. A wave has a length of 8.50×10^{-6} m. What is its frequency?

Given:

$\lambda = 8.50 \times 10^{-6} \text{ m}$
 $c = 3.00 \times 10^8 \text{ m/s}$
 $\nu = ?$

Soln:

$c = \lambda \nu$
 $\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8 \text{ m/s}}{8.50 \times 10^{-6} \text{ m}}$

$\nu = 3.53 \times 10^{13} \text{ Hz}$

5. A photon of blue-green light has a frequency of 6.17×10^{14} Hz and a wavelength of 4.86×10^{-7} meters. What is the amount of energy released by this photon? (show your work)

Given:

$\nu = 6.17 \times 10^{14} \text{ Hz}$
 $\lambda = 4.86 \times 10^{-7} \text{ m}$
 $E = ?$
 $h = 6.6262 \times 10^{-34} \text{ J}\cdot\text{s}$

Soln:

$E = h\nu$
 $= (6.6262 \times 10^{-34} \text{ J}\cdot\text{s}) (6.17 \times 10^{14} \text{ Hz})$

$E = 4.09 \times 10^{-19} \text{ J}$

6. With the exception of visible light (ROY G. BIV), list at least three other areas of the electromagnetic spectrum.

GAMMA RAYS

X-RAYS

Ultraviolet RAYS

Infrared rays

Radar

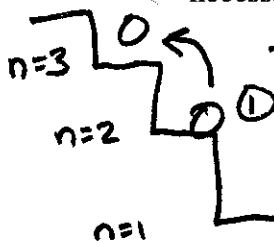
FM

TV

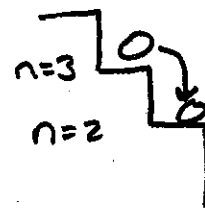
Shortwave

Am

7. Describe how photons are emitted that you can visually see. (Be specific, use a diagram if necessary)



- ① Electron @ Grounded state
- ② gains Quantum of Energy
- ③ moves to higher Level becomes excited state



- ④ Electron "falls" Back to Grounded state
- ⑤ emits Photon = to Quantum Energy

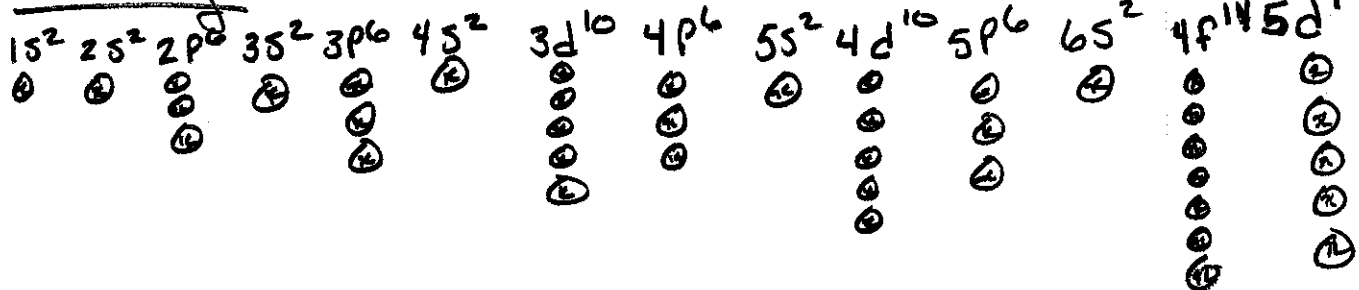
8. Name the part of the periodic table where the d orbitals are being filled?

Transition

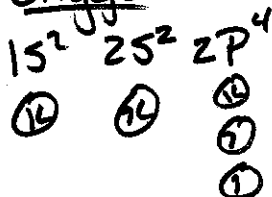
9. Write the electron configuration and orbital diagram for the following atoms.

- Mercury
- Oxygen
- Na
- Sn
- Fe
- Ce

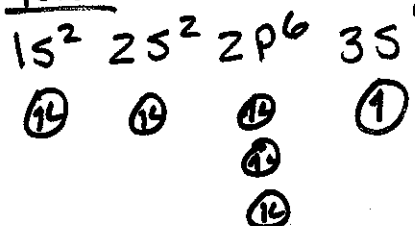
Mercury



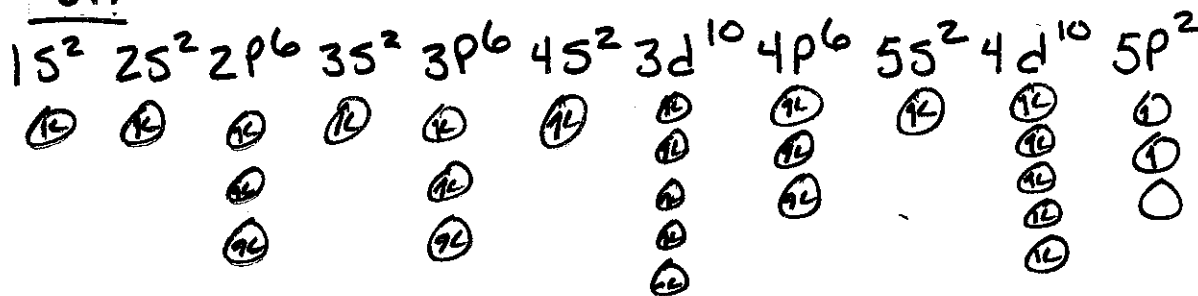
Oxygen



Na



Sn



Fe

