

30/9. HW # 4.

$$\begin{aligned}
 1. \quad E(2,8,3) &= \frac{\pi^2 \hbar^2}{2m} (2^2 + 8^2 + 3^2) \\
 &= \frac{\pi^2 (1.05 \times 10^{-34})^2}{2(9.11 \times 10^{-31})} (4 + 64 + 9) \\
 &= 4.599 \times 10^{-36}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad E(2,2) &= \frac{\pi^2 (1.05 \times 10^{-34})^2}{2(9.11 \times 10^{-31})} (2^2 + 2^2) \\
 &= 4.78 \times 10^{-37}
 \end{aligned}$$

$$3. \quad k = 1.46 \times 10^{23}$$

Mess.?

$$\begin{aligned}
 1.46 \times 10^{23} \times 6.022 \times 10^{24} &= \frac{8.79 \times 10^{47}}{39} \\
 &= 2.25 \times 10^{46}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad \text{Density of Benamine} &= 5323 \text{ kg/m}^3 \\
 10 \text{ cm}^3 &= \frac{5323}{100} = 53.23 \text{ kg/cm}^3 \\
 53.23 \times 10 &= \underline{532.3}
 \end{aligned}$$

$$5. \quad 6.4 \times 10^{-81} = 64.184 \times 6.022 \times 10^{34} = \underline{4.166 \times 10^{38}}$$

6. $2.3 \times 10^{23} \rightarrow Rb-$

$$\frac{2.3 \times 10^{23}}{6.022 \times 10^{24}} = 3.819 \times 10^{-2} \times 85.47$$

$$= 3.26 \times 10^{-10}$$

7. $Sr \ 5.32 \text{ eV} \rightarrow 0 \text{ eV}$
 Weighs 12.3g

EV between $5.32 \rightarrow 0$.

$$E(2, 8, 18, 8, 2) = \frac{\pi^2 (1.05 \times 10^{-34})^2}{2 (9.11 \times 10^{-31})} (2^2 + 8^2 + 18^2 + 8^2 + 2^2)$$

$$= 2.747 \times 10^{-37} \times 1.68 \times 10^{19}$$

$$= 2.923 \times 10^{-18} \text{ eV}$$

8. $\Delta E = 7.051 \times 10^{-23} \text{ eV}$

$$\frac{7.051 \times 10^{-23}}{1.684 \times 10^{19}} = \frac{6.6268 \times 10^{-34} \cdot 2 (9.11 \times 10^{-31})}{(2^2 + 1^2) \pi^2 (1.05 \times 10^{-34})^2}$$

$$= 0 \text{ eV}$$

9. $Cd \ Ag_7 \ Ge_4 \ Ga_2 \ Se_4 \ Pn$

$Cd \rightarrow 2$

$Ag \rightarrow 2(1) \rightarrow 2$

$Ge \rightarrow 4(4) \rightarrow 16$

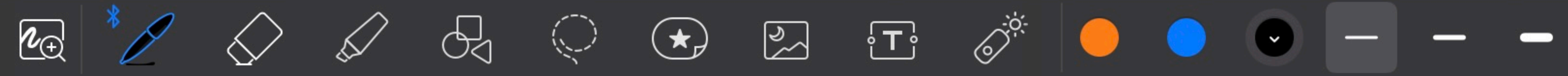
$Ga \rightarrow 2(3) \rightarrow 6$

$Se \rightarrow 4(6) \rightarrow 24$

$P \rightarrow 2(5) \rightarrow 10$

$$\frac{2+2+16+6+24+10}{15}$$

$= 4.9$



10. Tetrahedral tetrahedral structure.

(A⁺). CuInSe

11. CdTe \rightarrow Tetrahedral semi.

(S).

12. (D⁹). GaAs

13. (B⁹) $\lambda = 785\text{nm}$

14. GaAs, $E_g = 1.42\text{eV}$. (B⁹)