

CHM 1005 MidTerm #1 Solutions

1.

-4 for wrong # of  $n^0$   
-4 for wrong # of  $p^+$

-3 if  $e^-$ s included in part a.

20

1.a)  $^{65}_{29}\text{Cu}$  nucleus:  $29p^+$  &  $(65-29) = 36n^0$

$$29p^+ (1.6725 \times 10^{-27} \text{ kg}) = 4.85025 \times 10^{-26} \text{ kg}$$

$$+ 36n^0 (1.675 \times 10^{-27} \text{ kg}) = 6.030 \times 10^{-26} \text{ kg}$$

a) =  $10.880 \times 10^{-26} \text{ kg}$   
=  $1.0880 \times 10^{-25} \text{ kg}$

-2 if no UNITS.

$10.88025 \times 10^{-26} \text{ kg}$

-1 for a calc or rounding error

1/5 if 4 sig figs.  
5/5 if 5 or 6 sig figs.  
0 any other number of S.F.

1.b) add the electrons!

$29e^- (9.11 \times 10^{-31} \text{ kg})$

-4: wrong # of  $e^-$ s

$10.88025 \times 10^{-26} \text{ kg}$

$0.0026419 \times 10^{-26} \text{ kg}$

$10.8828919 \times 10^{-26}$

b) =  $1.0882 \times 10^{-26} \text{ kg}$

1/5 if 3 S.F.

5/5 if 5 or 6 S.F.

Otherwise.

20

2.a)  $E = R_H (1/n_1^2 - 1/n_2^2)$

=  $(2.18 \times 10^{-18} \text{ J})(1/6^2 - 1/2^2)$

=  $(2.18 \times 10^{-18} \text{ J})(-0.22222)$

=  $-4.84 \times 10^{-19} \text{ J}$

-3 if calc. error

-4 if not either emitted or the word EMITTED/RELEASED.

-3 if No units

-1 sig figs

-2 if eye in calculation but not in a word statement.

b)  $(-4.84444 \times 10^{-22} \text{ J})(6.02 \times 10^{23} / \text{mol})$

=  $-291.635 \text{ kJ/mol} = -292 \text{ kJ/mol}$

-3 if NO UNITS

-1 sig figs

-1 rounding error

-2 if not  $\div 1000$

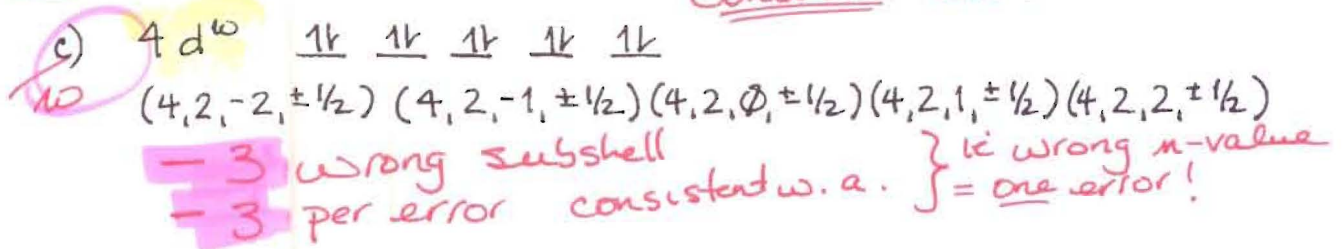
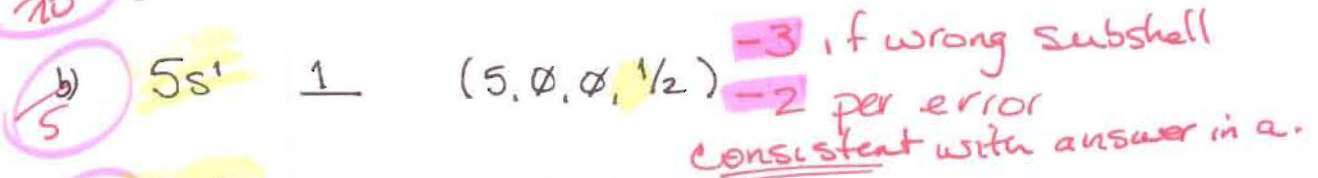
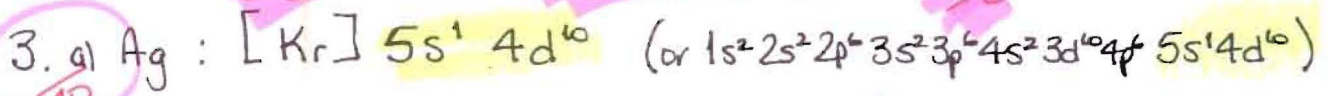
-2 if not  $\times 6.02 \times 10^{23}$

-2 if not either emitted

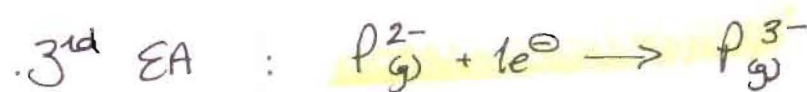
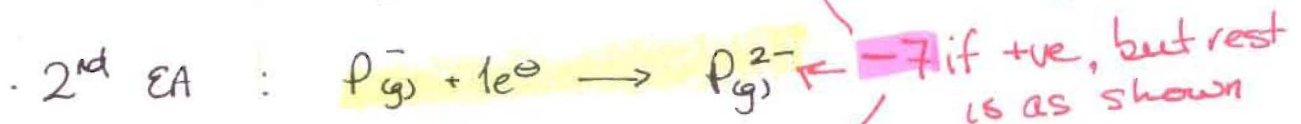
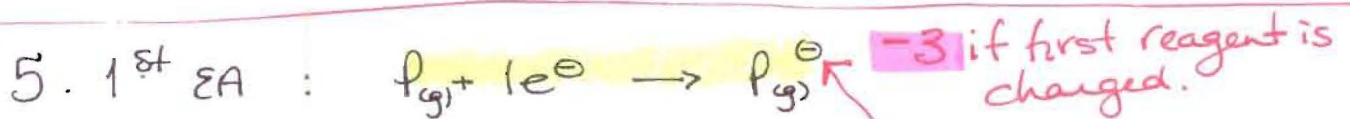
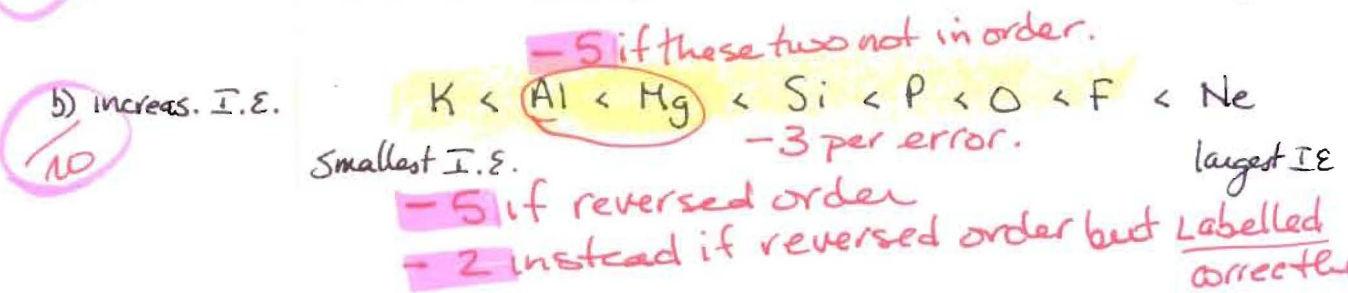
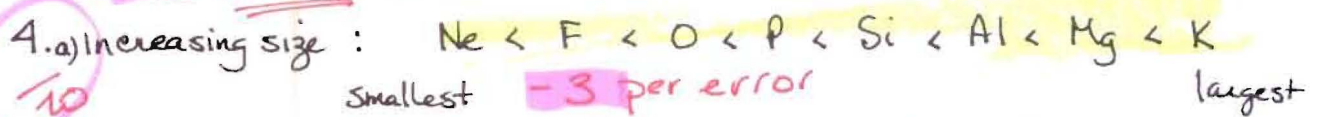
or the word EMITTED

or RELEASED

CHEM 1005 <sup>wrong Noble gas</sup> Mid Term #1. Solutions



-5 if reversed order  
 -2 instead if reversed order but labelled correctly.



-10 if ionization shown (i.e.  $X_{(g)} \rightarrow 1e^- + X_{(g)}^+$ )

-8 if more than 1  $e^-$  in any reaction.

-3 if (g) for gas not shown (~~deduct~~ deduct if it was only forgotten once)