AP WORKSHEET 7s: Electronic Configuration Summary

1. Complete the table. (5)

Element	Charge on most common ion
Rb	
Cs	
Ga	
Ag	
Se	

2. Define Ionization Energy. (2)

_____

_____

3. Using the metal magnesium as an example, write **two separate** equations to show the first and second ionization energy of magnesium. (Remember state symbols are important as they form part of the definition). (4)

First Ionization _____

Second Ionization _____

4. Which of the following elements (one from each pair) would you expect to have the highest first ionization energy? Explain your answers. (4)

Ca or Be _____

_____

Na or Ar _____

_____

5. Consider the table of the first four ionization energies for element A shown below.

Ionization Energy in kJ/mol	**1st**	**2nd**	**3rd**	**4th**
	578	1817	2745	11580

(i) In which group does A appear on the periodic table? (1) _____

(ii) Predict the formula of the compound that A forms with fluorine. (1) _____

(iii) What is the minimum number of electrons that A must have? (1) _____

6. Arrange the following species in order of **increasing** size. Rb^{+}, Y^{3+}, Br^{-}, Kr, Sr^{2+} and Se^{2-} (1)

SMALLEST **LARGEST**

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7. Are there any atoms for which the second ionization energy is greater than the first? Explain your answer. (2)

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8. Is it possible for two different **atoms** to be isoelectronic? If so give examples. (2)

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9. Is it possible for two different **anions** to be isoelectronic? If so give examples. (2)

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10. Define electron affinity. (2)

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11. Write an equation to summarize the process of **second** electron affinity of oxygen. (Remember state symbols are important as they from part of the definition). (2)

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12. Consider the table of ionization energies for element X shown below.

Ionization Energy in kJ/mol	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
	737	1450	7732	10540	13360	17995

(i) In which group will X be found? (1) _____

(ii) Explain your answer to (i). (2)

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(iii) Predict the formula of X's bromide. (1) _____

13. **Explain carefully** why rubidium tends only to form a +1 ion? (2)

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14. **Explain carefully** why elements in the same group react in similar ways? (1)

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15. How would expect the sizes of the hydrogen ion and the hydride ion to compare with that of the hydrogen atom? (3)

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16. How would expect the sizes of the hydrogen ion and the hydride ion to compare with that of the helium atom? (3)

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17. Identify any isoelectronic species in the following list. Fe^{2+}, Sc^{3+}, Ca^{2+}, F^{-}, Co^{2+}, Co^{3+}, Sr^{2+}, Cu^{+}, Zn^{2+} & Al^{3+}. (4)

_____

18. Arrange the following atoms into order of **increasing** first ionization energy. Sr, Cs, S, F and As. (1)

LOWEST **HIGHEST**

_____

19. Give the electron configurations for the following transition metal ions. (3)

(a) Sc^{3+} _____

(b) Cr^{2+} _____

(c) Ni^{3+} _____