ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY
SPECIAL SCHOOL

CHEMISTRY GRADE 9

SECOND SEMISTER GROUP ASSIGNMENT

2016/2024

GENERAL INSTRACTION

- COPY FROM ANOTHER GROUP MAKE YOUR POINT ZERO
- EACH GROUP MEMBER MUST PARTICIPATE EQUALLY
- ANY UNREADEABLE HANDWRITTING MAKE YOUR WORK VALUELESS
- COVER PAGE MUST CONTAIN SCHOOL NAME, GROUP NUMBER WITH SECTION, FULL NAME OF EACH MEMBER, ROLL NUMBER OF STUDENT, DATE OF SUBMISSION

I. ANSWER EACH QUESTION ACCORDINGLY. ALL QUESTIONS HAVE THE SAME POINTS.

1. *What was the basis for the early attempts in classifying the elements? Outline the Contributions of some scientists about in classifying the elements.*
2. *With the aid of an encyclopedia, reference books or other resources, write on:*

   A. J. Dobereiner and Newlands works in organizing the elements.

   - *In your report include the merits and demerits of their works.*
3. *Decide whether the principle of Dobereiner's triad can be applied in the following groups of three elements.*

   a. *Be, Ca, Sr*

   b. *Li, Na, K 2.*
4. *Newlands stated that there was a periodic similarity in properties of every eighth element in his system. However, today we see that for periods 2 and 3, the similarity occurs in every ninth element. What is the reason? Explain.*
5. *Which group of elements was missing from Mendeleev's periodic table as compared to the modern periodic table?*
6. *Why does the first period contain only two elements? Explain using electron configuration (number of subshell electron equal to number of element in a period)*
7. *For the following elements, determine the valence electrons, and identify the sub–shell (s, p, d or f) in which the last electron of each element enters.*

   a. *Nitrogen (atomic number = 7)*

   b. *Sodium (atomic number = 11)*

   c. *Silicon (atomic number = 14)*

   d. *Iron (atomic number = 26)*

   e. *Zinc (atomic number = 30)*

   f. *Krypton (atomic number = 36)*

   g. *Cerium (atomic number = 58*
8. *After studying the given information, identify the elements represented by X, M, and Y.*

   a. *Element X*

   - *Has a relatively high ionization energy.*
   - *Generally forms an ion with a^{-2} charge.*
   - *Has an outermost electron configuration of $3s^2\ 3p^4$.*

   b. *Element M*

   - *Reacts with oxygen to form M_2O.*
   - *Has a very low ionization energy.*
   - *Is in the fourth period of the periodic table.*

c. *Element Y*

- *Is a transition element.*
- *Is used in Ethiopian coinage.*
- *has 10 electrons in the 3d orbital*

9. *Discuss the following concepts.*
   a. *Why does the electron affinity of Cl is higher than that of F?*
   b. *Explain why noble gases have extremely low (almost zero) electron affinities?*
   c. *Explain why halogens have the highest electron affinities?*
10. *What is screening effect? How does it relate to effective nuclear charge?*
11. *What is the relationship between first ionization energy and the metallic properties of elements?*
12. *The following values are given for atomic radii (in Å) of period 2 elements: 0.77, 1.34, 0.69, 0.75, 0.73, 0.82, 0.90, and 0.71. Based on the information given;*
    a. *Fill the table given below with the appropriate values for atomic radii of the elements.*
    b. *Explain the reason for the observed trend.*

Element	Li	Be	B	C	N	O	F	Ne
Atomic radii (Å)								

13. *The following table lists ionization energy values of period 3 elements*

Element	Na	Mg	Al	Si	P	S	Cl	Ar
Ionization energy (kJ/mol)	496	738	578	787	1012	1000	1251	1521

a. *Explain why there is a general increase in the first ionization energy across the period from Na to Ar*

b. *Explain why the first ionization energy of:*

I. *Aluminium is lower than that of magnesium.*

II. *Sulphur is lower than that of phosphorus.*

(Hint: Use sublevel configurations for the elements).

14. *Explain why the first ionization energy of nitrogen is the highest as compared to that of carbon and oxygen.*
15. *Compare the elements fluorine and chlorine with respect to their electronegativity and electron affinity values.*
16. *The element with the electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6$ is a:*

A. *metal* B. *non-metal*

C. metalloid

D. noble gas

17. Which of the following is the correct increasing order of atomic size for the elements: Al, Ar, Na, Si?

A. Si, Na, Al, Ar

C. Na, Al, Si, Ar

B. Ar, Si, Al, Na

D. Al, Si, Ar, Na

18. From the given elements : Na, P, Ca, and Br; which one has the:

A. highest first ionization energy?

B. smallest atomic size?

C. most metallic character?

19. On the basis of electron configuration, explain why atomic size of sodium is larger than that of chlorine?

20. An element with high ionization energy and high electron affinity also tends to have a high value of:

A. Electronegativity

B. atomic size

C. electro positivity

D. metallic character

21. Choose the more metallic element from each pair and explain your reason

A. Sn or Te

B. Si or Sn

C. Br or Te

D. Se or I

22. Choose the element with the higher ionization energy from each pair.

A. Mg or P

B. As or Sb

C. N or Si

23. Name the element in the third period of the periodic table with:

A. two valence electrons

B. a total of three 3p electrons

C. five 3p electrons

D. two 3s electrons and one 3p electron

24. List the number of elements in periods 3 and 4 of the periodic table. Why does each period have a different number of elements?