



INDIAN SCHOOL AL WADI AL KABIR

Class: XI	DEPARTMENT: SCIENCE 2020-21 SUBJECT: CHEMISTRY	Date of completion: I week of September, 2020
Worksheet No:05 with answers	TOPIC: CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

MULTIPLE CHOICE QUESTIONS

- Nomenclature of elements with atomic number 107 is
 - Unnilseptium
 - Unnilennium
 - Ununseptium
 - Unnilbium
- General outer electronic configuration of *f* block elements is $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$
 - $(n-2)f^{1-14}(n-1)d^{10}ns^2$
 - $(n-2)f^{1-10}(n-1)d^{0-1}ns^2$
 - $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$
 - $(n-2)f^{1-14}(n-1)d^{0-1}np^2$
- Group 16 elements are also called
 - halogens
 - noble gases
 - Representative Elements
 - chalcogens
- Which of the following is not a transition element?
 - Fe
 - Cu
 - Zn
 - Ni
- The correct decreasing order of atomic size is
 - $Br > F > Cl$
 - $Cl > F > Br$
 - $F > Br > Cl$
 - $Br > Cl > F$
- Which of the following elements has the highest first ionization energy?
 - Hydrogen
 - Helium
 - Lithium
 - Beryllium

7. The element with highest negative first electron gain enthalpy is
(i) Hydrogen (ii) Fluorine
(iii) Chlorine (iv) Oxygen
8. Maximum covalency of boron is
(i) 4 (ii) 6
(iii) 8 (iv) 2
9. Which of the following elements has the highest second ionization energy?
(i) Calcium (ii) Magnesium
(iii) Sodium (iv) Potassium
10. Which of the following ions is isoelectronic with Na^+ ?
(i) Ca^{2+} (ii) K^+
(iii) F^- (iv) S^{2-}

Read the given passage and answer the questions that follow:

A quantitative measure of the tendency of an element to lose electron is given by its Ionization Enthalpy. It represents the energy required to remove an electron from an isolated gaseous atom (X) in its ground state. The ionization enthalpy is expressed in units of kJ mol^{-1} . We can define the second ionization enthalpy as the energy required to remove the second most loosely bound electron

11. Write an equation for the first ionization of element X.
12. On moving down the group, first ionization energy decreases. Why?
13. Second ionization energy of an element is always greater than the first. Why?
14. Is ionization an endothermic or exothermic process?
15. Name the element having the highest first ionization energy.

Assertion – Reason Questions

16. **Assertion:** Fluorine is more electronegative than chlorine.

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Reason: Across the period, electronegativity decreases.

- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

- b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
c) Assertion is correct, but reason is wrong statement.
d) Assertion is wrong, but reason is correct statement.
- 17. Assertion:** Ca^{2+} and Cl^- are isoelectronic species. **1**
Reason: Both Ca^{2+} and Cl^- ions contain same number of electrons.
- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
c) Assertion is correct, but reason is wrong statement.
d) Assertion is wrong, but reason is correct statement.
- 18. Assertion:** Noble gases exhibit very low chemical reactivity. **1**
Reason: All the orbitals in the valence shell of the noble gases are completely filled by electrons and it is very difficult to alter this stable arrangement by the addition or removal of electrons
- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
c) Assertion is correct, but reason is wrong statement.
d) Assertion is wrong, but reason is correct statement
- 19. Assertion:** The p-Block Elements comprise those belonging to Group 13 to 18. **1**
Reason: Last electron of elements of Group 13 to 18 enters into the d orbital.
- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
c) Assertion is correct, but reason is wrong statement.
d) Assertion is wrong, but reason is correct statement
- 20. Assertion:** First ionization enthalpy of beryllium is slightly less than that of boron. **1**
Reason: In beryllium, the electron removed during the ionization is an s-electron whereas the electron removed during ionization of boron is a p-electron. The penetration of a 2s-electron to the nucleus is more than that of a 2p-electron.
- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

- b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
 c) Assertion is correct, but reason is wrong statement.
 d) Assertion is wrong, but reason is correct statement.

Question – Answer Type:

21. Write the general outer electronic configuration of *d* block elements? 1
22. State modern periodic law 1
23. Write the IUPAC name and symbol of the element with atomic number 115. 1
24. What are transuranium Elements? 1
25. Define electron gain enthalpy 1
26. What are isoelectronic species. Give any 4 examples. 2
27. Define: 2
- i) Electronegativity
 ii) Ionization Enthalpy
28. Which of the following species will have the larger size? Give reason. 2
- i) K or K⁺
 i) Cl or Cl⁻
29. Give reason: 3
- i) Ionization enthalpy of O is less than that of N.
 ii) [AlF₆]³⁻ is known but [BF₆]³⁻ is not.
 iii) Electron gain enthalpy of F is less negative than that of Cl.
30. The first ($\Delta_i H_1$) and the second ($\Delta_i H_2$) ionization enthalpies (in kJ mol⁻¹) and the ($\Delta_{eg}H$) electron gain enthalpy (in kJ mol⁻¹) of a few elements are given below:

Elements	ΔH_1	ΔH_2	$\Delta_{eg}H$
I	520	7300	-60
II	419	3051	-48
III	1681	3374	-328
IV	1008	1846	-295
V	2372	5251	+48
VI	738	1451	-40

Which of the above elements is/are likely to be:

- (a) the least reactive element.
 (b) the more reactive group one metal. .
 (c) the reactive non-metals.
 (d) the metal which can form a stable binary halide of the formula MX₂(X=halogen).
 (e) the metal which can form a predominantly stable covalent halide of the formula MX (X=halogen)?

ANSWERS

1. (i)
2. (iii)
3. (iv)
4. (iii)
5. (iv)
6. (ii)
7. (iii)
8. (i)
9. (iii)
10. (iii)
11. $X_{(g)} \rightarrow X^+_{(g)} + e$
12. Atomic size increases, Number of shells increases, shielding effect increases.
13. In second ionization, electron is removed from a positive ion which contains more proton than electrons. Hence, electrons are strongly attracted by the nucleus.
14. Endothermic process.
15. Helium
16. b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
17. a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
18. a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
19. c) Assertion is correct, but reason is wrong statement.
20. d) Assertion is wrong, but reason is correct statement.
21. $(n-1)d^{1-10}ns^{0-2}$
22. The physical and chemical properties of the elements are periodic functions of their atomic numbers
23. Ununpentium (Unp)
24. The elements after uranium are called Transuranium Elements.
25. When an electron is added to a neutral gaseous atom to convert it into a negative ion, the enthalpy change accompanying the process is defined as the

Electron gain enthalpy

26. Atoms and ions which contain the same number of electrons are called isoelectronic species.
Eg: - O^{2-} , F^- , Na^+ , Mg^{2+} etc.
27. i) The ability of an atom in a chemical compound to attract shared electrons to itself is called electronegativity
ii) The energy required to remove an electron from an isolated gaseous atom in its ground state is called ionization energy.
28. i) K is larger than K^+ .
 K^+ contains 18 electrons and 19 protons whereas K contains 19 electrons and 19 protons. Also, K^+ has one shell less. Therefore, electrons are strongly attracted in K^+
ii) Cl^- is larger than Cl .
 Cl^- contains 18 electrons and 17 protons whereas Cl contains 17 electrons and 17 protons. Therefore, electrons are strongly attracted in Cl^-
29. i) In nitrogen atom, three 2p-electrons reside in different atomic orbitals whereas in the oxygen atom, two of the four 2p-electrons must occupy the same 2p-orbital resulting in an increased electron-electron repulsion. Hence, it is easier to remove the fourth 2p-electron from oxygen than it is, to remove one of the three 2p-electrons from nitrogen.
ii) Due to the absence of d orbitals, maximum covalency of Boron is 4.
iii) Adding an electron to the 2p-orbital in fluorine leads to greater repulsion than adding an electron to the larger 3p-orbital in chlorine.
30. a) V
b) II
c) III and IV
d) VI
e) I

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