BCM SCHOOL BASANT AVENUE DUGRI road Ludhiana

Chemistry Assignment

Ch- Periodic classification of elements and Chemical Bonding

Class XI

Q1. Which will not show intramolecular H- bonding

(a) Salicylic acid
(b) P- Nitro phenol
(c) O- Nitro phenol
(d) Salicyldehyde

Q2: The formation of the oxide ion, $0^{2-}(g)$, from oxygen atom requires first an exothermic and then an endothermic step as shown below:
$O(g) + e^- \rightarrow 0^-(g)$, $\Delta H = -141$ kJ mol^{-1}
$0^-(g) + e^- \rightarrow O^2(g)$, $\Delta H = +780$ kJ mol^{-1}
Thus process of formation of O^{2-} ion in gas phase is unfavorable even though O^{2-} is isoelectronic with neon. It is due to the fact that:

(a) Oxygen is more electronegative.
(b) Addition of electron in oxygen results in larger size of the ion.
(c) Electron repulsion outweighs the stability gained by achieving noble gas configuration.
(d) 0^- ion has comparatively smaller size than oxygen atom.

Q3.The electronic configuration of the element which is just above the element with atomic number 43 in the same group is_____ .

(a) 1s2 2s2 2p6 3s2 3p6 3d5 4s2

(b) 1s2 2s2 2p6 3 s2 3p6 3d5 4s3 4p6

c) 1s2 2s2 2p6 3s2 3p6 3d5 4s2

(d) ls2 2s2 2p6 3s2 3p6 3d74s2

Q 4: Which of the following will not have bond order 2.5

(a) O_2^-
(b) O_2^+
(c) N_2^+
(d) C_2^-

Q5: Anything that influences the valence electrons will affect the chemistry of the element. Which one of the following factors does not affect the valence shell?

(a) Valence principal quantum number (n)

(b) Nuclear charge (Z)

(c) Nuclear mass

(d) Number of core electrons.

Q6. Which of the following is arranged in order of increasing radius?

(a) K+ (aq) < Na+ (aq) < Li+ (aq)

(b) K+ (aq) > Na+ (aq) > Zn2+ (aq)

(c) K+ (aq) > Li+ (aq) > Na+ (aq)

(d) Li+ (aq) < Na+ (aq) < K+ (aq)

Q7. Among the following elements, which has the least electron affinity?

(a) Phosphorous

(b) Oxygen

(c) Sulphur

(d) Nitrogen

Q8. In halogens, which of the following, increases from iodine to fluorine?

(a) Bond length

(b) Electronegativity

c) The ionization energy of the element

(d) Oxidizing power

Q9. Diagonal relationships are shown by

(a) Be and Al

(b) Mg and Al

(c) Li and Mg

(d) B and P

Q10. Which of the following species are not known?

(a) AgOH

(b) PbI_4

(c) PI_5

(d) SH_6

e) All of the above

Q11 Which one of the following is isoelectronic with Ne?

(a) N^{3-}

(b) Mg^{2+}

(c) Al^{3+}

(d)all of the above

Q12.Which element has smallest size?

(a) B

(b) N

(c) Al

(d) P

Directions: The following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

A) Both A and R are true, and R is the correct explanation of A.

b) Both A and R are true, and R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true

e) Both A and R are false

13. Assertion : Bond Angle in NH3 is lesser than in water.

Reason: In ammonia there are 1 lone pair but in water there are 2 lone pairs

14. Assertion : Smaller the size of an atom greater is the electronegativity.

Reason : Electronegativity refers to the tendency of atom so share electrons with other atom.

15. Assertion : Atomic number of the element ununbium is 112.

Reason : Name for digits 1 and 2 is un- and bi-respectively in latin words.

16. Assertion : Hydrogen can be placed in group 1.
Reason : Hydrogen can gain an electron to achieve a noble gas arrangement

17. Assertion :Second ionization enthalpy will be higher the first ionization enthalpy.

Reason : Ionization enthalpy is a quantitative measure of the tendency of an element to lose electron.

18: Assertion : Helium is placed in group 18 along with p-block elements.

Reason : It shows properties similar to p-block elements.

19. Assertion : Electron gain enthalpy can be exothermic or endothermic.

Reason : Electron gain enthalpy provides a measure of the ease with which an atom adds an electron to form anion.

20: Assertion (A) : Metallic character increases down the group.

Reason (R) : Elements in the Periodic Table are arranged in six horizontal rows called periods.

21. Assertion: The melting and boiling point of metal decreases on going down the group.

Reason:The melting and boiling point of non metalincreases on going down the group.

22. Assertion: Boiling point of water is greater than HF.

Reason: F forms stronger Hydrogen bond than Oxygen.

Case based :

Q 23 :Modern periodic table arranges the elements in the increasing order of atomic number. It has 18 groups and 7 periods. Atomic numbers are consecutive in a period and increases in group in a pattern. Elements are divided into four blocks, s-block,p-block, d-block andf-block based on their electronic configuration. 78% of elements are metals, about 20 elements are non-metals and few elements like B, Si, Ge, As are metalloids. Metallic character increases down the group but decreases along the period from left to right. The physical and chemical properties vary periodically with their atomic numbers.

Periodic trends are observed in atomic size, ionisation enthalpies, electron gain enthalpies, electronegativity and valence. Oxides of metals are basic, some are amphoteric. Non-metals form acidic oxides, some form neutral oxides. S-block elements are soft, highly reactive, do not show variable oxidation states. P-block elements are metals, non-metals as well as metalloids, show variable oxidation states, exist as solids, liquids and gases. d-block elements are metals, form coloured ions, show variable oxidation states, have high melting and boiling points. Lanthanoids and actinoids are f-block elements, form coloured ions. All actinoids are radioactive.

(a) Name the elements which belong to d-block but are not transition metals.

(b) What are representative elements?

(c) What is difference between oxidation states of p-block and d-block elements?

(d) Which group elements are most electropositive and why?

(e) What happens to reactivity down the group 17?

(f) What type of compounds are formed by element belonging to group 14 and third period? Identify the element.

(g) What is formula of compound formed between AI and S

Q24: Study the table 1 and 2 related to electronegativity values along the period 2 and 3 Group 1 and 17 and answer the questions that follow based on these.

Electronegativity Values (on Pauling scale) Across the Periods

Atom (Period II)	Li	Be	B	C	N	O	F
Electronegativity	1.0	1.5	2.0	2.5	3.0	3.5	3.0
Atom (period III)	Na	Mg	AI	Si	P	S	Cl

Electronegativity	0.9	1.2	1.5	1.8	2.1	2.5	3.0

Electronegativity Values (on Pauling scale) Down a Family

Li	1.0	F	4.0
Na	0.9	CI	3.0
K	0.8	Br	2.8
Rb	0.8	I	2.5
Cs	0.7	At	2.2

(a) How does electronegativity varies along a period and why?

(b) Why does K and Rb have same electronegativity although Rb is bigger than K?

C) Why does electronegativity decrease down the group?

(d) Why is CsF most ionic?

€ Why is H- ion bigger than F- ion?

(f) Why is Lil covalent?

(g) Why is CI2 O7 more acidic than Cl2O5?

Q-25 The attractive force which holds the two atoms together is called chemical bond. Covalent bond is formed by equal sharing of electrons. Coordinate bond is formed by unequal sharing of electrons. Ionic bond is formed by transfer of electrons from one atom to another. Octet rule, although very useful but it is not universally applicable. According to valence bond theory, covalent bond is formed by overlapping of half filled atomic orbitals resulting in lowering of energy and more stability. Bond order is the number of bonds between atoms in a molecule. Higher the bond order, more will be stability and bond dissociation enthalpy but smaller bond length. Polarity of covalent bond depends upon difference in electronegativity. Covalent character of bond depends upon polarising power, smaller cation and bigger anions have higher polarising power. VSEPR theory helps to predict shapes of molecules.

(a) Write the, electron dot structure of N_2O.
(b) What are ions present in CsI_3?
(c) Out of CN^+, CN^-, NO, which has highest bond order?
(d) What is correct order of repulsion bp - bp, lp - lp and lp - bp?
(e) Draw the structure of $XeOF_4$ on the basis of VSEPR theory.
(f) Which out of B_2 ,CO, O_2^{2-} and NO^+ are paramagnetic and why?

Q-26 An ionic compound has 3-D crystal lattice in which positive and negative charges are equal. The crystal lattice is stabilised by enthalpy of lattice formation, bond length, bond angle, bond enthalpy, bond order and bond polarity have significant effect on properties of compounds. All the properties of certain compounds cannot be explained by single structure, more than one structure of a compound to explain its property are called resonating structures.
Dipole moment depends upon polarity and shapes of molecules. Shapes of molecules can be determined by VSEPR theory as well as hybridisation sp, Sp^2, Sp^3, Sp^3d, Sp^3d^2 are linear, trigonal planar, tetrahedral, trigonal bipyramidal and octahedral geometery respectively. Hydrogen bond is formed between hydrogen and F, O, N. Intra-molecular H-bonding is within the molecules which is weaker than inter molecular H-bonding, between the

molecules.
(a) Why does CO_2 have zero dipole moment?
(b) What is hybridisation of 'S' in SF_6 and its shape?

(c) Why do all bonds in CO2 & CO_3^{2-} have equal bond length?
(d) Why is o-nitropbenol steam volatile, p-nitropbenol is not?
(e) Wby is bond angle in H_2O is more tban H_2S?
(f) Why is bond σσ stronger than ππ-bond?
(g) Arrange NaCl, NaBr, NaF. NaI in increasing order of ionic character.