INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 3

Total Marks : 27

Max. Time : 28 min.

Topic : Periodic Table and Periodicity

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Multiple choice objective ('–1' negative marking) Q.5 to Q.6	(4 marks, 4 min.)	[8, 8]
Comprehension ('–1' negative marking) Q.7	(3 marks, 3 min.)	[3, 3]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]

1. For an element 'A', the first ionisation energy will be numerically equal to :
(A) EA of A^+ (B) EA of A^{2+} (C) IE of A^{2+} (D) None of these

2. Which of the following relation is correct if EN value is on Mulliken scale and IP & EA are in eV :
(A) 2 I.P. – E.A. – E.N. = 0 (B) 2 I.P. – E.A. + E.N. = 0
(C) 2 E.N. – I.P. – E.A. = 0 (D) E.N. – I.P. – E.A. = 0

3. The five successive ionisation energies of an element 'X' are 800, 1427, 2658, 25024 and 32824 KJ $mole^{-1}$ respectively. The valency of 'X' is :
(A) 1 (B) 2 (C) 3 (D) 4

4. Number of elements which has value of electronegative is less than 3.
H, N, Li, B, O, P, F
(A) 3 (B) 4 (C) 5 (D) 6

5.* Which of the following statements are correct :
(A) F is the most electronegative and Cs is the most electropositive element in periodic table.
(B) The EN of halogens decreases from F to I.
(C) The E.A. of Cl is higher than that of F, though their EN values are in the reverse order.
(D) The E.A. of noble gases is low.

6.* For electron affinity of halogens which of the following is correct ?
(A) Br > F (B) F < Cl (C) Br < Cl (D) F < I

7. **Comprehension #**
Read the following comprehension carefully and answer the questions (a) to (c).
The properties of the elements (atomic/ionic radii, electron gain enthalpy, ionization enthalpy, electronegativity, valency, oxidising/reducing power, acid/base character, etc.) which are directly or indirectly related to their electronic configurations are called periodic properties. These properties show a regular gradation on moving from left to right in a period or from top to bottom in a group. Down a group, the atomic/ionic radii, metallic character and reducing character increases while ionization enthalpy and electronegativity decreases. Along a period from left to right, atomic/ionic radii and metallic character decreases while ionization enthalpy, electronegativity, non-metallic character and oxidising power increases. However, electron gain enthalpy becomes less negative down a group but more negative along a period. In contrast, inert gases have positive electron gain enthalpies which do not show any regular trend.

(a). Which of the following isoelectronic ions has the lowest first ionization enthalpy :
(A) K^+ (B) Ca^{2+} (C) Cl^- (D) S^{2-}

(b). The outermost electronic configuration of the most electronegative element is :
(A) $ns^2\ np^3$ (B) $ns^2\ np^4$ (C) $ns^2\ np^5$ (D) $ns^2\ np^6$

(c). Amongst the following elements (whose electronic configurations are given below), the one having the highest ionization enthalpy is :
(A) [Ne] $3s^2\ 3p^1$ (B) [Ne] $3s^2\ 3p^3$ (C) [Ne]$3s^2\ 3p^2$ (D) [Ar] $3d^{10}\ 4s^2\ 4p^3$

8. Among the elements with atomic numbers 9,12, 36, identify by atomic number, an element which is :
(a) highly electronegative (b) an inert gas (c) highly electropositive

Answer Key

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1.	(A)	**2.**	(C)	**3.**	(C)		**4.**	(B)			
5.*	(A,B,C,D)	**6.***	(B,C)	**7.**	**(a).**	(D)	**(b).**	(C)	**(c).**	(B)	

8. (a) $_{9}F$ (b) $_{36}Kr$ (c) $_{12}Mg$

Hints & Solutions

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1. $A \underset{E.A=I.E}{\overset{I.E}{\rightleftharpoons}} A^{\oplus}$

2. $EN = \frac{I.P. + E.A.}{2}$

3. $\because$ Here $I.E._4 >> IE_3$ $\therefore$ After removed of $3e^{\ominus}$ element obtain noble gas configuration.

4. Li, B, P, H

6.* Electron affinity is the measure of the ease with which an atom receives the additional electron in its valence shell in gaseous phase.
Generally down the group, the electron affinity decreases due to increase in atomic size.

7. **(a).** Z_{eff} for $S^{2\ominus}$ is least. **(b).** $F \rightarrow 1s^2\ 2s^2\ 2p^5$

8. (a) $_{9}F$ (b) $_{36}Kr$ (c) $_{12}Mg$