INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 7

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.5	(3 marks, 3 min.)	[15, 15]
Multiple choice objective ('–1' negative marking) Q.6 to Q.7	(4 marks, 4 min.)	[8, 8]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]

1. If the value of IE_1 for He-atom is 24.6 eV, then the energy required for the reaction :

$He(g) \longrightarrow He^{2+}(g) + 2e^-$ is :

(A) 79 eV (B) 38.2 eV

(C) 147 eV (D) Cannot be determined since data is insufficient.

2. Which of the following is the strongest oxy-acid among the following :

(A) H_2SO_4 (B) H_3PO_4 (C) $HClO_4$ (D) H_2SiO_3

3. Which of the following is the anhydride of Nitric acid (HNO_3) :

(A) NO_2 (B) N_2O_3 (C) N_2O_5 (D) N_2O

4. Which of the following statement is incorrect ?

(A) Oxide of aluminium (Al_2O_3), and arsenic (As_2O_3) are amphoteric.

(B) Oxide of chlorine (Cl_2O_7) is less acidic than oxide of nitrogen (N_2O_5).

(C) Oxide of carbon (CO_2) is more acidic than oxide of silica (SiO_2).

(D) The correct increasing order of basic character of various oxides is $H_2O < CuO < MgO < CaO$.

5. Which of the following is the **INCORRECT** order of acidic strength :

(A) $H_2O < H_2S < H_2Se < H_2Te$ (B) $HIO_4 < HBrO_4 < HClO_4$

(C) $HNO_2 < HNO_3$ (D) $HI < HBr < HCl < HF$

6.* Select equations having endothermic step :

(A) $S^-(g) + e^-(g) \longrightarrow S^{2-}(g)$ (B) $Ne(g) + e^-(g) \longrightarrow Ne^-(g)$

(C) $N(g) + e^-(g) \longrightarrow N^-(g)$ (D) $Al^{2+}(g) \longrightarrow Al^{3+}(g) + e^-(g)$

7.* Which is correct order for the properties specified ?

(A) I < Br < Cl < F (oxidising character)

(B) K > Mg > Al > B (metallic character)

(C) C < O < N < F (Non-metallic character)

(D) Li > Na > K > Rb > Cs (chemical reactivity)

8. The ionisation potentials of atoms A and B are 400 and 300 kcal mol^{-1} respectively. The electron affinities of these atoms are 80.0 and 85.0 kcal mol^{-1} respectively. Prove that which of the atoms have higher electronegativity

Answer Key

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

8. A = 3.84 ; B = 3.08 Therefore A has higher electronegativity.

Hints & Solutions

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1. $E_{required} = IE_1 + IE_2 = 24.6 + 13.6\,(2)^2 = 79$ eV

After removal of one electron , He atom follows Bohr model.So, $IE_2 = 13.6\,Z^2$ eV

2. Order of acidic strength : $H_2SiO_3 < H_3PO_4 < H_2SO_4 < HClO_4$

On moving L → R in a period, EN ↑. So, acidic strength increases.

3. $2HNO_3 \longrightarrow N_2O_5 + H_2O$

So, N_2O_5 is the anhydride of HNO_3.

4. (B) $\overset{+7}{Cl_2}O_7$ having higher oxidation state is more acidic than $\overset{+5}{N_2}O_5$ having lower oxidation state.

5. (D) HI > HBr > HCl > HF

6.* (A) $S^-(g) \longrightarrow S^{2-}(g)$; $\Delta H_{e.g.}$ = (+) ve because of electrostatic repulsion.

(B) $Ne\,(g) + e^-\,(g) \longrightarrow Ne^-\,(g)$; $\Delta H_{e.g.}$ = (+) ve because of stable completely filled electron configuration.

(C) $N(g) \longrightarrow N^-\,(g)$; $\Delta H_{e.g.}$ = (+) ve because of stable half filled electron configuration.

(D) $Al^{2+}(g) \longrightarrow Al^{3+}(g)$; $\Delta H_{I.E.}$ = (+) ve because of the removal of electron from cation.

7.* (C) C < N < O< F (Non-metallic character)

(D) Correct order is Li < Na < K < Rb < Cs. The chemical reactivity increases down the group with decreasing ionisation energy. Although Li has highest negative reduction potential but it's reactivity with water is lowest on account of its higher ionisation energy

8. Electronegativity of A = $\frac{400+80}{62.5\times 2} = 3.84$

Electronegativity of B = $\frac{300+85}{62.5\times 2} = 3.08$

Ans. Electronegativity of A = 3.84 ; electronegativity of B = 3.08. Therefore A has higher electronegativity.