Q1 - 2024 (04 Apr Shift 1)

Number of elements from the following that CANNOT form compounds with valencies which match with their respective group valencies is _____.

B, C, N, S, O, F, P, Al, Si

(1) 7

(2) 3

(3) 5

(4) 6

Q2 - 2024 (04 Apr Shift 1)

The correct order of first ionization enthalpy values of the following elements is :

(A) O

(B) N

(C) Be

(D) F

(E) B

Choose the correct answer from the options given below :

(1) $E < C < A < B < D$

(2) $C < E < A < B < D$

(3) $B < D < C < E < A$

(4) $A < B < D < C < E$

Q3 - 2024 (04 Apr Shift 2)

The correct order of the first ionization enthalpy is

(1) $Al > Ga > Tl$

(2) $Ga > Al > B$

(3) $Tl > Ga > Al$

(4) $B > Al > Ga$

Q4 - 2024 (04 Apr Shift 2)

Given below are two statements :

Statement I : The correct order of first ionization enthalpy values of Li, Na, F and Cl is $Na < Li < Cl < F$.

Statement II : The correct order of negative electron gain enthalpy values of Li, Na, F and Cl is $Na < Li < F < Cl$

In the light of the above statements, choose the correct answer from the options given below :

(1) Statement I is true but Statement II is false

(2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are false

(4) Both Statement I and Statement II are true

Q5 - 2024 (05 Apr Shift 1)

Given below are two statements :

Statement I : In group 13, the stability of +1 oxidation state increases down the group. Statement II : The atomic size of gallium is greater than that of aluminium. In the light of the above statements, choose the most appropriate answer from the options given below :

(1) Both Statement I and Statement II are correct

(2) Statement I is incorrect but Statement II is correct

(3) Both Statement I and Statement II are incorrect

(4) Statement I is correct but Statement II is incorrect

Q6 - 2024 (05 Apr Shift 1)

The statement(s) that are correct about the species O^{2-}, F^{-}, Na^{+} and Mg^{2+}.

(A) All are isoelectronic

(B) All have the same nuclear charge

(C) O^{2-} has the largest ionic radii

(D) Mg^{2+} has the smallest ionic radii

Choose the most appropriate answer from the options given below :

(1) (B), (C) and (D) only

(2) (C) and (D) only

(3) (A), (C) and (D) only

(4) (A), (B), (C) and (D)

Q7 - 2024 (05 Apr Shift 2)

Given below are two statements :

Statement I : The metallic radius of Na is 1.86 A° and the ionic radius of $Na^{+}$is lesser than 1.86 A°.

Statement II : Ions are always smaller in size than the corresponding elements.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both Statement I and Statement II are false

(2) Statement I is incorrect but Statement II is true

(3) Both Statement I and Statement II are true

(4) Statement I is correct but Statement II is false

Q8 - 2024 (06 Apr Shift 1)

The electron affinity value are negative for

A. $Be \rightarrow Be^{-}$

B. $N \rightarrow N^{-}$

C. $O \rightarrow O^{2-}$

D. $Na \rightarrow Na^{-}$

E. $Al \rightarrow Al^{-}$

Choose the most appropriate answer from the options given below :

(1) D and E only

(2) A, B and C only

(3) A and D only

(4) A, B, D and E only

Q9 - 2024 (06 Apr Shift 1)

Which of the following material is not a semiconductor.

(1) Silicon

(2) Copper oxide

(3) Germanium

(4) Graphite

Q10 - 2024 (08 Apr Shift 1)

Match List I with List II

	List - I		List - II
	(Elements)		(Properties in their respective groups)
A.	Cl, S	I.	Elements with highest electronegativity
B.	Ge, As	II.	Elements with largest atomic size
C.	Fr, Ra	III.	Elements which show properties of both metals and non-metal
D.	F, O	IV.	Elements with highest negative electron gain enthalpy

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III

(2) A-III, B-II, C-I, D-IV

(3) A-IV, B-III, C-II, D-I

(4) A-II, B-III, C-IV, D-I

Q11 - 2024 (08 Apr Shift 2)

Identify the correct statements about p-block elements and their compounds.

(A) Non metals have higher electronegativity than metals.

(B) Non metals have lower ionisation enthalpy than metals.

(C) Compounds formed between highly reactive nonmetals and highly reactive metals are generally ionic.

(D) The non-metal oxides are generally basic in nature.

(E) The metal oxides are generally acidic or neutral in nature.

Choose the correct answer from the options given below :

(1) (B) and (D) only

(2) (A) and (C) only

(3) (D) and (E) only

(4) (B) and (E) only

Q12 - 2024 (09 Apr Shift 1)

Given below are two statements :

Statement (I) : The oxidation state of an element in a particular compound is the charge acquired by its atom on the basis of electron gain enthalpy consideration from other atoms in the molecule.

Statement (II) : $p\pi - p\pi$ bond formation is more prevalent in second period elements over other periods.

In the light of the above statements, choose the most appropriate answer from the options given below :

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are incorrect

(3) Statement I is incorrect but Statement II is correct

(4) Statement I is correct but Statement II is incorrect

Q13 - 2024 (09 Apr Shift 2)

Match List I with List II

	List - I		List - II
A.	Melting Point [K]	I.	T1 > In > Ga > A1 > B
B.	Ionic Radius $\left[M^{+3}/pm\right]$	II.	B > T1 > A1 ≈ Ga > In
C.	$\Delta_i H_1 \left[\text{ kJ mol}^{-1}\right]$	III.	T1 > In > A1 > Ga > B
D.	Atomic Radius [pm]	IV.	B > A1 > T1 > In > Ga

Choose the correct answer from the options given below:

(1) A-II, B-III, C-IV, D-I

(2) A-IV, B-I, C-II, D-III

(3) A-I, B-II, C-III, D-IV

(4) A-III, B-IV, C-I, D-II

Answer Key

Q1 (2) **Q2** (1) **Q3** (3) **Q4** (4)

Q5 (4) **Q6** (3) **Q7** (4) **Q8** (2)

Q9 (4) **Q10** (3) **Q11** (2) **Q12** (3)

Q13 (2)

Q1

N, O, F can't extend their valencies upto their group number due to the non-availability of vacant 2 d like orbital.

Q2

Correct order of $I^{st}IE$

$$\begin{array}{ccccccccccc} Li & < & B & < & Be & < & C & < & O & < & N & < & F & < & Ne \\ & & \downarrow & & \downarrow & & & & \downarrow & & \downarrow & & \downarrow & & \\ & & E & < & C & & < & & A & < & B & < & D & & \end{array}$$

Q3

(i) due to lanthanide contraction $T\ell$ has more I.E. as compared to Ga and $A\ell$

(ii) due to scandide contraction Ga has more I.E. as compared to $A\ell$

Q4

(i)

	Na	<	Li	<	Cl	<	F
	↓		↓		↓		↓
$I.E._1$ in kJ/mol	496		520		1256		1681

(ii)

	Na	<	Li	<	F	<	Cl
	↓		↓		↓		↓
$\Delta_{eg}H$ in kJ/mol	–53		–60		–328		–349

Q5

Statement I : Number of $d\&$ f electrons, increases down the group and due to poor shielding of $d\&f$ e^-, stability of lower oxidation states increases down the group

Statement II : The atomic size of aluminium is greater than that of gallium.

Q6

	O^{-2}	F^{-}	Na^{+}	Mg^{+2}
(No. of e^{-})	10	10	10	10

(Ionic radius) $O^{-2} > F^{-} > Na^{+} > Mg^{+2}$

Zeff $O^{-2} < F^{-} < Na^{+} < Mg^{+2}$

Q7

$r_{Na} > r_{Na^{+}}$

So, Statement (I) is correct but size of anions are greater than size of neutral atoms.

So statement (II) is incorrect.

Q8

(A) $Be + e^{-} \rightarrow Be^{-}$, E.A $= -$ ive

(B) $N + e^{-} \rightarrow N^{-}$ E.A =-ive

(C) $O + e^{-} \rightarrow O^{-}$

$O^{-} + e^{-} \rightarrow O^{-2}$ E.A $= -$ ive

(D) $Na + e^{-} \rightarrow Na^{-}$ E.A $= +$ ive

(E) $A\ell + e^{-} \rightarrow A\ell^{-}$ E.A $= +$ ive

Q9

Graphite is conductor

Q10

Elements with highest electronegativity $\rightarrow F, O$

Elements with largest atomic size $\rightarrow Fr, Ra$

Elements which shows properties of both metal and non-metals i.e. metalloids $\rightarrow$ Ge, As

Elements with highest negative electron gain enthalpy $\rightarrow Cl, S$

Q11

As electronegativity increases non-metallic nature increases.

Along the period ionisation energy increases.

High electronegativity difference results in ionic bond formation.

Oxides of metals are generally basic and that of non-metals are acidic in nature.

Q12

Oxidation state of an element in a particular compound is defined by the charge acquired by its atom on the basis of electronegativity consideration from other atoms in molecule.

Q13

Melting point : $\mathrm{B} > \mathrm{A}\ell > \mathrm{T}\ell > \mathrm{In} > \mathrm{Ga}$

Ionic radius $\left(\mathrm{M}^{+3}/\mathrm{pm}\right)$: $\mathrm{T}\ell > \mathrm{In} > \mathrm{Ga} > \mathrm{A}\ell > \mathrm{B}$

$(\Delta_{\mathrm{IE}}\mathrm{H})_1\left[\frac{\mathrm{kJ}}{\mathrm{mol}}\right]$: $\mathrm{B} > \mathrm{T}\ell > \mathrm{A}\ell \approx \mathrm{Ga} > \mathrm{In}$

Atomic radius (in pm) : $\mathrm{T}\ell > \mathrm{In} > \mathrm{A}\ell > \mathrm{Ga} > \mathrm{B}$