PERIODIC TABLE

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) B < D < C < E < A

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

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

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

2. 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 incorrect

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

(3) Both **Statement I** and **Statement II** are correct

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

3. Match **List I** with **List II**.

List-I (Elements)		**List-II (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-III, C-IV, D-I

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

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

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

4. The electron affinity value are negative for :

A. Be → Be^-

B. N → N^-

C. O → O^{2-}

D. Na → Na^-

E. Al → Al^-

Choose the most appropriate answer from the options given below :

(1) D and E only

(2) A, B, D and E only

(3) A and D only

(4) A, B and C only

5. 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) (A), (B), (C) and (D)

(3) (C) and (D) only

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

6. 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) **Statement I** is correct but **Statement II** is false

(2) Both **Statement I** and **Statement II** are true

(3) Both **Statement I** and **Statement II** are false

(4) **Statement I** is incorrect but **Statement II** is true

7. 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) Both Statement I and Statement II are true

(2) Both Statement I and Statement II are false

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

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

8. In case of isoelectronic species the size of F^-, Ne and Na^+ is affected by:

(1) Principal quantum number (n)

(2) None of the factors because their size is the same

(3) Electron-electron interaction in the outer orbitals

(4) Nuclear charge (z)

9. Given below are two statements :

Statement (I) : Both metal and non-metal exist in p and d-block elements.

Statement (II): Non-metals have higher ionisation enthalpy and higher electronegativity than the metals.

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

(1) Both Statement I and Statement II are false

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

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

(4) Both Statement I and Statement II are true

10. The correct sequence of electron gain enthalpy of the elements listed below is

A. Ar

B. Br

C. F

D. S

Choose the ***most appropriate*** from the options given below:

(1) C > B > D > A

(2) A > D > B > C

(3) A > D > C > B

(4) D > C > B > A

11. Consider the following elements.

Group ↓ A'B' → Period
C'D'

Which of the following is/are true about A', B', C' and D' ?

A. Order of atomic radii: $B' < A' < D' < C'$

B. Order of metallic character $B' < A' < D' < C'$

C. Size of the element : $D' < C' < B' < A'$

D. Order of ionic radii : $B'^{+} < A'^{+} < D'^{+} < C'^{+}$

Choose the correct answer from the options given below :

1. A only

2. A, B and D only

3. A and B only

4. B, C and D only

12. If IUPAC name of an element is "Unununnium" then the element belongs to nth group of periodic table. The value of n is _____.

13. Match List-I with List-II.

List-I (Species)		**List-II (Electronic distribution)**	
(A)	Cr^{+2}	(I)	$3d^8$
(B)	Mn^{+}	(II)	$3d^3 4s^1$
(C)	Ni^{+2}	(III)	$3d^4$
(D)	V^{+}	(IV)	$3d^5 4s^1$

Choose the correct answer from the options given below:

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

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

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

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

14. Given below are the two statements: one is labeled as Assertion (A) and the other is labeled as Reason (R).

Assertion (A): There is a considerable increase in covalent radius from N to P. However from As to Bi only a small increase in covalent radius is observed.

Reason (R): covalent and ionic radii in a particular oxidation state increases down the group.

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

(1) (A) is false but (R) is true

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are true and (R) is the correct explanation of (A)

15. Given below are two statements:

Statement – I: Along the period, the chemical reactivity of the element gradually increases from group 1 to group 18.

Statement – II: The nature of oxides formed by group 1 element is basic while that of group 17 elements is acidic.

In the the light above statements, choose the most appropriate from the questions given below:

(1) Both statement I and Statement II are true.

(2) Statement I is true but Statement II is False.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II is false.

16. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**:

Assertion A: The first ionisation enthalpy decreases across a period.

Reason R: The increasing nuclear charge outweighs the shielding across the period.

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

(1) Both A and R are true and R is the correct explanation of A

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are true but R is NOT the correct explanation of A

17. Given below are two statements:

Statement I: Fluorine has most negative electron gain enthalpy in its group.

Statement II: Oxygen has least negative electron gain enthalpy in its group.

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

(1) Both Statement I and Statement II are true

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

(3) Both Statement I and Statement II are false

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

18. The element having the highest first ionization enthalpy is

(1) Si

(2) Al

(3) N

(4) C

19. Total number of ions from the following with noble gas configuration is _____.

Sr^{2+} (Z = 38), Cs^{+} (Z = 55), La^{2+} (Z = 57)

Pb^{2+} (Z = 82), Yb^{2+} (Z = 70) and

Fe^{2+} (Z = 26)

20. Element not showing variable oxidation state is :

(1) Bromine

(2) Iodine

(3) Chlorine

(4) Fluorine

21. Which of the following electronic configuration would be associated with the highest magnetic moment ?

(1) [Ar] $3d^7$

(2) [Ar] $3d^8$

(3) [Ar] $3d^3$

(4) [Ar] $3d^6$

22. Given below are two statements :

Statement (I) : The 4f and 5f - series of elements are placed separately in the Periodic table to preserve the principle of classification.

Statement (II) :S-block elements can be found in pure form in nature. In the light of the above statements, choose the most appropriate answer from the options given below :

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

(2) Both Statement I and Statement II are true

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

(4) Both Statement I and Statement II are false

SOLUTIONS

1. Ans. (2)

Sol. Correct order of I^{st} IE

$Li < B < Be < C < O < N < F < Ne$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$E < C \quad < \quad A < B < D$

2. Ans. (4)

Sol. 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.

3. Ans. (3)

Sol. Elements with highest electronegativity → F, O

Elements with largest atomic size → Fr, Ra

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

Elements with highest negative electron gain enthalpy → Cl, S

4. Ans. NTA (1)
Allen (4)

Sol. (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) $A + e^- \rightarrow A^-$ E.A = +ive

Ans. A, B and C only

5. Ans. (4)

Sol.

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

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

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

6. Ans. (1)

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

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

So statement (II) is incorrect.

7. Ans. (1)

Sol.. (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

8. Ans. (4)

Sol. In F^-, Ne, Na^+ all have $1s^2$, $2s^2$, $2p^6$ configuration. They have different size due to the difference in nuclear charge.

9. Ans. (2)

Sol. **I.** In p-Block both metals and non metals are present but in d-Block only metals are present.

II. EN and IE of non metals are greater than that of metals

I-False, **II**-True

10. Ans. (2)

Sol.

Element	$\Delta_{eg}H$(kJ/mol)
F	–333
S	–200
Br	–325
Ar	+96

11. Ans. (2)

Sol. In general along the period from left to right, size decreases and metallic character decrease.

In general down the group, size increases and metallic character increases.

$B' < A'(\text{size}) \quad C' > A'(\text{size})$

$D' < C'(\text{size}) \quad D' > B'(\text{size})$

$B' < A'(\text{metallic character})$

$D' < C'(\text{metallic character})$

$B'^{+} < A'^{+}(\text{size})$

$D'^{+} < C'^{+}(\text{size})$

$\therefore$ C statement is incorrect.

12. Ans. (11)

Sol. 111 belongs to 11^{th} group

13. Ans. (2)

Sol. $_{24}Cr \rightarrow [Ar]\ 3d^5 4s^1$; $Cr^{2+} \rightarrow [Ar]\ 3d^4$

$_{25}Mn \rightarrow [Ar]\ 3d^5 4s^2$; $Mn^{+} \rightarrow [Ar]\ 3d^5 4s^1$

$_{28}Ni \rightarrow [Ar]\ 3d^8 4s^2$; $Ni^{2+} \rightarrow [Ar]\ 3d^8$

$_{23}V \rightarrow [Ar]\ 3d^3 4s^2$; $V^{+} \rightarrow [Ar]\ 3d^3 4s^1$

14. Ans. (2)

Sol. According to NCERT,

Statement-I : Factual data,

Statement-II is true.

But correct explanation is presence of completely filled d and f-orbitals of heavier members

15. Ans. (3)

Sol. Chemical reactivity of elements decreases along the period therefore statement – I is false.

Group – 1 elements from basic nature oxides while group – 17 elements form acidic oxides therefore statement – II is true.

16. Ans. (3)

Sol. First ionisation energy **increases** along the period.

Along the period Z increases which outweighs the shielding effect

17. Ans. (4)

Sol. Statement-1 is false because chlorine has most negative electron gain enthalpy in its group.

18. Ans. (3)

Sol. Al < Si < C < N ; IE_1 order.

19. Ans. (2)

Sol. Noble gas configuration = $ns^2\ np^6$

$[Sr^{2+}] = [Kr]$

$[Cs^{+}] = [Xe]$

$[Yb^{2+}] = [Xe]\ 4f^{14}$

$[La^{2+}] = [Xe]\ 5d^1$

$[Pb^{2+}] = [Xe]\ 4f^{14}\ 5d^{10}\ 6s^2$

$[Fe^{2+}] = [Ar]\ 3d^6$

20. Ans. (4)

Sol. Fluorine does not show variable oxidation state.

21. Ans. (4)

Sol.

	$3d^7$	$3d^8$	$3d^3$	$3d^6$
No. of unpaired e^-	3	2	3	4
Spin only Magnetic moment	$\sqrt{15}$ BM	$\sqrt{8}$ BM	$\sqrt{15}$ BM	$\sqrt{24}$ BM

22. Ans. (3)

Sol. s-block elements are highly reactive and found in combined state.