DPP-01 : Development of Periodic Table, Period, Group and Block

1. How many periods and vertical columns are there in the long form of the periodic table?
(1) 8, 12 (2) 6, 8 (3) 7, 18 (4) 6, 18

2. The period number in the long form of the periodic table is equal to :
(1) magnetic quantum number of any element of the period.
(2) atomic number of any element of the period.
(3) maximum Principal quantum number of any element of the period.
(4) maximum Azimuthal quantum number of any element of the period.

3. Which one of the following statements related to the modern periodic table is **incorrect** :
(1) The p-block has 6 columns, because a maximum of 6 electrons can occupy all the orbitals in a p-subshell.
(2) The d-block has 8 columns, because a maximum of 8 electrons can occupy all the orbitals in a d-subshell.
(3) Each block contains a number of columns equal to the number of electrons that can occupy that subshell.
(4) The block indicates value of Azimuthal quantum number (ℓ) for the last subshell that received electrons in building up the electronic configuration.

4. The elements in which electrons are progressively filled in 4f-orbital are called :
(1) actinoids (2) transition elements (3) lanthanoids (4) halogens

5. Which of the following electronic configuration represent noble gas ?
(1) ns^2np^6 (2) ns^2np^5 (3) ns^2np^4 (4) ns^2np^3

6. Which of the following group of transition metals is called coinage metals ?
(1) Cu, Ag, Au (2) Ru, Rn, Pd (3) Fe, Co, Ni (4) Os, IR, Pt

7. What is the characteristic valence shell electron configuration of 11^{th} group metals ?
(1) $ns^2\ np^6$ (2) $(n-1)d^2\ ns^2$ (3) $nd^9\ ns^2$ (4) $(n-1)d^{10}\ ns^1$

8. Pt, Ni, Au and Ti belongs to :
(1) f-block (2) d-block (3) p-block (4) s-block

9. Which of the following element is a metalloid ?
(1) Bi (2) Sn (3) Ge (4) C

10. An element has atomic number 37. The block and group of this element are respectively :
(1) s and 1^{st} (2) p and 17^{th} (3) s and 2^{nd} (4) p and 13^{th}

11. Atomic number of Ag is 47. In the same group, the atomic numbers of elements placed above and below Ag in Long form of periodic table will be :
(1) 29, 65 (2) 39, 79 (3) 29, 79 (4) 39, 65

12. Which of the following statements is not correct regarding hydrogen :
(1) It resembles halogens in some properties.
(2) It resembles alkali metals in some properties.
(3) It can be placed in 17^{th} group of Modern periodic table.
(4) It cannot be placed in 1^{st} group of Modern periodic table.

13. In modern periodic table, the element with atomic number Z = 118 will be :
(1) Uuo ; Ununoctium ; alkaline earth metal (2) Uno ; Unniloctium ; transition metal
(3) Uno ; Unniloctium ; alkali metal (4) Uuo ; Ununoctium ; noble gas

DPP-02 : Shielding Effect & Z_{eff}

1. The order of screening effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is :
(1) s > p > d > f (2) f > d > p > s (3) p < d < s > f (4) f > p > s > d

2. Which of the following is generally true regarding effective nuclear charge (Z_{eff}) :
(1) It increases on moving left to right in a period.
(2) It remains almost constant on moving top to bottom in a group.
(3) For isoelectronic species, as Z increases, Z_{eff} decreases.
(4) Both (1) and (2).

3. From the given set of species, point out the species from each set having highest Z_{eff}
(a) O^{2-}, F^-, Na^+ (b) Li, Be, C (c) He, Li^+, H^-

	a	b	c		a	b	c
(1)	Na^+	C	Li^+	(2)	O^{2-}	Li	H^-
(3)	F^-	Na	He	(4)	Na^+	Be	He

DPP-03 : Atomic and Ionic Radius

1. Select correct statement about radius of an atom :
(1) Values of Vander waal's radii is larger than those of covalent radii because the Vander waal's forces are much weaker than the forces operating between atoms in a covalently bonded molecule.
(2) The metallic radii is smaller than the Vander waal's radii, since the bonding forces in the metallic crystal lattice are much stronger than the Vander waal's forces.
(3) Both (1) & (2)
(4) None of these

2. The atom larger in size as compared to oxygen is :
(1) F (2) He (3) Ne (4) none of these

3. Which of the following has the largest ionic radius ?
(1) Na^+ (2) Cs^+ (3) Ca^+ (4) Mg^+

4. Which one of the following is the smallest in size ?
(1) N^{3-} (2) O^{2-} (3) F^- (4) Na^+

5. Which has smallest size ?
(1) Na^+ (2) Mg^{2+} (3) Ne (4) O^{2-}

6. In which pair, the second atom is larger than first :
(1) Br, Cl (2) Na, Mg (3) Sr, Ca (4) N,P

7. Which of the following order of radii is correct ?
(1) Li < Be < Mg (2) $O^{+} < O^{2-} < N^{3-}$ (3) O < F < Ne (4) $Na^{+} > F^{-} > O^{2-}$

8. Among Cl^{-}, F^{-} Br^{-} and I^{-} the correct order of increasing atomic radii is :
(1) $I^{-} > F^{-} > Cl^{-} > Br^{-}$ (2) $I^{-} > Br^{-} > Cl^{-} > F^{-}$ (3) $F^{-} > Br^{-} > Cl^{-} > I^{-}$ (4) $F^{-} > Cl^{-} > Br^{-} > I^{-}$

9. The size of isoelectronic species O^{-2} , F^{-} and Na^{+} is affected by :
(1) nuclear charge (Z)
(2) valence principal quantum number (n)
(3) electron-electron interaction in the outer orbitals
(4) none of the factors because their size is the same.

10. Atomic radii of F & Ne in Angstrom are respectively given by :
(1) 0.72, 1.60 (2) 1.60, 1.60 (3) 0.72, 0.72 (4) 1.60, 0.72.

11. Match the correct atomic radius with the element :

S.No.	**Element**	**Code**	**Atomic radius (pm)**
(i)	Be	(p)	74
(ii)	C	(q)	88
(iii)	O	(r)	111
(iv)	B	(s)	77
(v)	N	(t)	66

(1) (i) – r, (ii) – q, (iii) – t, (iv) – s, (v) – p (2) (i) – t, (ii) – s, (iii) – r, (iv) – p, (v) – q
(3) (i) – r, (ii) – s, (iii) – t, (iv) – q, (v) – p (4) (i) – t, (ii) – p, (iii) – r, (iv) – s, (v) – q

12. Match list – I with list – II and select the correct answer using the codes given below –

List – I	List – II
Ion	Radius
(I) Li^{+}	(1) 216
(II) Na^{+}	(2) 195
(III) Br^{-}	(3) 60
(IV) I^{-}	(4) 95

Codes :

	I	II	III	IV		I	II	III	IV
(1)	a	b	d	c	(2)	b	c	a	d
(3)	c	d	b	a	(4)	d	c	b	a

13. Which of the following order of atomic / ionic radius is not correct ?
(1) F < Cl < Br < I (2) $Y^{3+} > Sr^{2+} > Rb^{+}$ (3) Nb ≈ Ta (4) Li > Be > B

DPP-04 : Ionisation Energy

1. Which one of the following statements is incorrect in relation to ionisation enthalpy ?
(1) Ionization enthalpy increases for each successive electron.
(2) The greatest increase in ionization enthalpy is experienced on removal of electron from core of noble gas configuration.
(3) End of valence electrons is marked by a big jump in ionization enthalpy.
(4) Removal of electron from orbitals bearing lower n value is easier than from orbitals having higher n value.

2. The first ionisation enthalpies (in eV) of N & O are respectively given by :
(1) 14.6, 13.6 (2) 13.6, 14.6 (3) 13.6, 13.6 (4) 14.6, 14.6

3. The set representing the correct order for first ionisation potential is :
(1) K > Na > Li (2) Be > Mg > Ca (3) B > C > N (4) Ge > Si > C

4. The first ionisation enthalpies of Na, Mg, Al and Si are in the order :
(1) Na < Mg > Al < Si (2) Na > Mg > Al > Si (3) Na < Mg < Al < Si (4) Na > Mg > Al < Si

5. Which electronic configuration of neutral atoms will have the highest first ionisation energy ?
(1) $1s^2\ 2s^2\ 2p^4$ (2) $1s^2\ 2s^2\ 2p^3$ (3) $1s^2\ 2s^2\ 2p^2$ (4) $1s^2\ 2s^2\ 2p^1$

6. The first ionization energy is smallest for the atom with electronic configuration :
(1) $ns^2\ np^6$ (2) $ns^2\ np^4$ (3) $ns^2\ np^5$ (4) $ns^2\ np^3$

7. The first ionisation energy will be maximum for :
(1) Be (2) He (3) Li (4) Fe

8. Which of the following has maximum ionization enthalpy.
(1) P (2) N (3) As (4) ,Sb

9. Which among the following elements have lowest value of IE^1 ?
(1) Pb (2) Sn (3) Si (4) C

10. The second ionization energies of elements are always higher than their first ionization energies because :
(1) the cation is smaller than its parent atom.
(2) it is easier to remove electron from cation.
(3) ionization is an endothermic process.
(4) cation formed always have stable half filled or completely filled valence shell electron configuration.

11. Which of the following orders are correct for the ionization energies ?
(i) Ba < Sr < Ca (ii) $S^{2-} < S < S^{2+}$ (iii) C < O < N (iv) Mg < Al < Si
(1) i, ii and iv (2) i, iii and iv (3) i, ii and iii (4) i, ii, iii and iv

12. Which represents alkali metals (i.e. 1st group metals) based on $(IE)_1$ and $(IE)_2$ values (in kJ/mol) ?

		$(IE)_1$	$(IE)_2$			$(IE)_1$	$(IE)_2$
(1)	X	500	1000	(2)	Y	600	2000
(3)	Z	550	7500	(4)	M	700	1400

13. Which of the following relation is correct with respect to first (I) and second (II) ionization enthalpies of potassium and calcium ?
(1) $I_{Ca} > II_K$ (2) $I_K > I_{Ca}$ (3) $II_{Ca} > II_K$ (4) $II_K > II_{Ca}$

14. Strongest reducing agent is :
(1) K (2) Mg (3) Al (4) Ba

DPP-05 : Electron gain enthalpy (Electron affinity)

1. Electron affinity is a :
(1) Relative strength to attract the shared electron pair
(2) Necessary energy required to remove the electron from the ultimate orbit
(3) Energy released when an electron is added to the outermost shell
(4) Energy released when an electron is added to the inner shell

2. Second electron effinity of an element is :
(1) Always exothermic (2) Endothermic for few elements
(3) Exothermic for few elements (4) Always endothermic

3. The correct order of electron affinity is :
(1) Be < B < C < N (2) Be < N < B < C (3) N < Be < C < B (4) N < C < B < Be

4. For electron affinity of halogens which of the following is correct ?
(1) Br > F (2) F > Cl (3) Br < Cl (4) $F^- > I$

5. In which case the energy released is minimum?
(1) $Cl \rightarrow Cl^-$ (2) $P \rightarrow P^-$ (3) $N \rightarrow N^-$ (4) $C \rightarrow C^-$

6. Which of the following will have the most negative electron gain enthalpy and which the least negative ?
(1) F, Cl (2) Cl, F (3) S, Cl (4) Cl, P

7. Element having maximum electron affinity is :
(1) Fluorine (2) Chlorine (3) Bromine (4) Iodine

8. Among halogens, the correct order of amount of energy released in electron gain (electron gain enthalpy) is:
(1) F > Cl > Br > I (2) F < Cl < Br < I (3) F < Cl > Br > I (4) Cl > Br > F > I

9. Which of the following will have the most negative electron gain enthalpy and which the least negative ? F, P, S, Cl.
(1) P, Cl (2) Cl, F (3) Cl, S (4) Cl, P

10. The order of electron gain enthalpy (magnitude) of O, S and Se is :
(1) O > S > Se (2) S > Se > O (3) Se > S > O (4) S > O > Se

11. Electronic configurations of four elements A, B, C and D are given below :
(i) $1s^2 2s^2 2p^6$ (ii) $1s^2 2s^2 2p^4$ (iii) $1s^2 2s^2 2p^6 3s^1$ (iv) $1s^2 2s^2 2p^5$
Which of the following is the correct order of increasing tendency to gain electron :
(1) (i) < (iii) < (ii) < (iv) (2) (i) < (ii) < (iii) < (iv) (3) (iv) < (ii) < (iii) < (i) (4) (iv) < (i) < (ii) < (iii)

12. Which of the following statement is correct ?
(1) Electron gain enthalpy may be positive for some elements.
(2) Second electron gain enthalpy always remains positive for all the elements.
(3) $\Delta_{eg}H(K^+) = -$ IE (K)
(4) All of these

DPP-06 : Electronegativity

1. Following the Mulliken scale, what parameters are required to evaluate electronegativity ?
(1) Only electronegativity (2) Only electron affinity
(3) Electron affinity and ionization energy (4) Ionic potential and electronegativity

2. The electronegativity values of C,N,O and F :
(1) increase from carbon to fluorine.
(2) decrease from carbon to fluorine.
(3) increase up to oxygen and is minimum at fluorine.
(4) is minimum at nitrogen and then increase continuously.

3. The electronegativity of the following elements increases in the order :
(1) C < N < Si < P (2) N < Si, < C < P (3) Si < P < C < N (4) P < Si < N < C

4. The correct set of decreasing order of electronegativity is :
(1) Li, H, Na (2) Na, H, Li (3) H, Li, Na (4) Li, Na, H

5. Increasing order of electronegativity left to right is :
(1) Bi < P < S < Cl (2) P < Bi < S < Cl (3) C > F > N > O (4) F > N > O > C

6. The outer most electronic configuration of the most electronegative atom is :
(1) $ns^2 np^5$ (2) ns^2np^6 (3) ns^2np^4 (4) ns^2np^3

7. Which of the following is affected by the stable electron configuration of an atom ?
(1) Electronegativity (2) Ionisation enthalpy (3) Electron gain enthalpy
Correct answer is :
(1) only electronegativity
(2) only ionisation enthalpy
(3) both electron gain enthalpy and ionisation enthalpy
(4) all of the above

8. The electronegativity values of C,N,O and F on Pauling scale :
(1) decrease from carbon to fluorine.
(2) increase from carbon to fluorine.
(3) increase upto oxygen and then decrease upto fluorine.
(4) decrease from carbon to nitrogen and then increase continuously.

9. Correct order of electronegativity of N, P, C and Si on Pauling scale is :
(1) N > P > C > Si (2) C > Si > N > P (3) N < P < C < Si (4) N > C > P > Si

10. The correct order of electronegativity on Pauling scale is :
(1) F > Cl > O > S (2) Li > Na > K > Rb > Cs
(3) Be < B < N < C (4) Both (1) and (2)

11. Which of the following is most electronegative element.
(1) Li (2) Mg (3) H (4) Na

DPP-07 : Oxidation states & Inert pair effect

1. The atomic number of an element which can not show the oxidation state of +3 is-
(1) 13 (2) 32 (3) 33 (4) 17

2. The most common oxidation state of an element is –2. The number of electrons present in its outer most shell is -
(1) 2 (2) 4 (3) 6 (4) 8

3. Most stable oxidation state of gold is :
(1) + 1 (2) +3 (3) +2 (4) zero

4. Which can have both +ve and –ve oxidation states in their compounds
(1) F (2) I (3) Na (4) Al

5. The oxidation state of nitrogen varies from :
(1) –3 to + 5 (2) 0 to +5 (3) –3 to 1 (4) +3 to +5

6. Which metal exhibtis more than one oxidation states in their compounds
(1) Na (2) Mg (3) Al (4) Fe

7. Electrons of which subshell do not participate in bonding due to inert pair effect ?
(1) 6s (2) 6p (3) 5d (4) 4f

8. Thallium shows different oxidation states because :
(1) of its high reactivity (2) of inert pair of electrons
(3) of its amphoteric nature (4) its is a transition metal

9. In which of the following elements, + 3 oxidation state is more stable than + 5 ?
(1) P (2) As (3) N (4) Bi

10. Which of the following is correct order of stability :
(1) $Tl^{3+} > Bi^{3+}$ (2) $PbO_2 > PbO$ (3) $BiI_5 < BiF_5$ (4) $Sn^{2+} = Ge^{2+}$

ANSWER KEY

DPP-01

1.	(3)	**2.**	(3)	**3.**	(2)	**4.**	(3)	**5.**	(1)	**6.**	(1)	**7.**	(4)
8.	(2)	**9.**	(3)	**10.**	(1)	**11.**	(3)	**12.**	(4)	**13.**	(4)		

DPP-02

1.	(1)	**2.**	(4)	**3.**	(1)								

DPP-03

1.	(3)	**2.**	(3)	**3.**	(2)	**4.**	(4)	**5.**	(2)	**6.**	(4)	**7.**	(2)
8.	(2)	**9.**	(1)	**10.**	(1)	**11.**	(3)	**12.**	(3)	**13.**	(2)		

DPP-04

1.	(4)	**2.**	(1)	**3.**	(2)	**4.**	(1)	**5.**	(2)	**6.**	(2)	**7.**	(2)
8.	(2)	**9.**	(2)	**10.**	(1)	**11.**	(3)	**12.**	(3)	**13.**	(4)	**14.**	(1)

DPP-05

1.	(3)	**2.**	(4)	**3.**	(2)	**4.**	(3)	**5.**	(3)	**6.**	(4)	**7.**	(2)
8.	(3)	**9.**	(4)	**10.**	(2)	**11.**	(1)	**12.**	(4)				

DPP-06

1.	(3)	**2.**	(1)	**3.**	(3)	**4.**	(3)	**5.**	(1)	**6.**	(1)	**7.**	(3)
8.	(2)	**9.**	(4)	**10.**	(2)	**11.**	(3)						

DPP-07

1.	(2)	**2.**	(3)	**3.**	(4)	**4.**	(2)	**5.**	(1)	**6.**	(4)	**7.**	(1)
8.	(2)	**9.**	(4)	**10.**	(3)								