

3. Classification of Elements and Periodicity in Properties – Multiple Choice Questions

1. Extended or Long Form of Periodic Table

- Which of these does not reflect the periodicity of the elements
(a) Bonding behaviour (b) Electronegativity
(c) Ionisation energy (d) Neutron/proton ratio
- The element californium belongs to the family
(a) Actinide series (b) Alkali metal family
(c) Alkaline earth family (d) Lanthanide series
- Mendeleev's periodic law is based on
(a) Atomic weight (b) Atomic number
(c) Number of neutrons (d) None of the above
- Which of the following pairs has both members from the same period of the periodic table
(a) Na – Ca (b) Na – Cl
(c) Ca – Cl (d) Cl – Br
- Diagonal relationship is shown by
(a) Elements of first period
(b) Elements of second period
(c) Elements of third period
(d) Both (b) and (c)
- Chemical property of Li and Mg are similar because
(a) These belong to same group
(b) Both ionisation potential is same
(c) Shows diagonal relationship
(d) Both electron affinity is same
- On going left to right in a period, in transition metals, their atomic volumes
(a) Decrease (b) Increase
(c) Remain same (d) None of these of correct
- Which pair of atomic numbers represents s - block elements
(a) 7, 15 (b) 6, 12
(c) 9, 17 (d) 3, 12
- Which one of the following is a 'd - block element'
(a) Gd (b) Hs
(c) Es (d) Cs
- The element with atomic number 117 if discovered would be placed in
(a) Noble gas family (b) Alkali family
(c) Alkaline earth family (d) Halogen family
- Astatine is a
(a) Halogen (b) Rare earth element
(c) Alkaline earth metal (d) None of these
- Which is metalloid
(a) Pb (b) Sb
(c) Bi (d) Zn
(e) Mg
- Which of the following is metalloid
(a) Pb (b) Zn
(c) As (d) None of these
- The electronic configuration of four elements are
(1) [Xe]6s¹ (2) [Xe]4f¹⁴5d¹6s²
(3) [Ar]4s²4p⁵ (4) [Ar]3d⁷4s²
Which one of the following statements about these elements is NOT correct
(a) 1 is a strong reducing agent
(b) 2 is a d-block element
(c) 3 has high electron affinity
(d) 4 shows variable oxidation state
(e) The compound formed between 1 and 3 is ionic
- Elements in which 4f orbitals are progressively filled are called as
(a) Transition elements (b) Lanthanides
(c) Actinides (d) Inert gases
- From which of the following the hydration energy of Mg²⁺ is larger
(a) Na⁺ (b) Al³⁺
(c) Be²⁺ (d) Cr³⁺
- The following is the correct increasing order of the ionic radii
(a) Li⁺ < Mg²⁺ < K⁺ < Al³⁺ (b) Al³⁺ < Li⁺ < Mg²⁺ < K⁺
(c) Al³⁺ < Mg²⁺ < K⁺ < Li⁺ (d) K⁺ < Al³⁺ < Mg²⁺ < Li⁺

18. Which two elements in the periodic table would you expect to combine in the most violent fashion
- (a) *H* and *O* (b) *Cl* and *F*
 (c) *Mg* and *N* (d) *P* and *O*
 (e) *Cs* and *F*
19. Which one of the elements is most metallic
- (a) *P* (b) *As*
 (c) *Sb* (d) *Bi*
20. Which one of the following is the correct decreasing order of boiling point
- (a) $H_2O > H_2S > H_2Se > H_2Te$
 (b) $H_2Te > H_2Se > H_2S > H_2O$
 (c) $H_2O > H_2Te > H_2Se > H_2S$
 (d) $H_2Te > H_2O > H_2Se > H_2S$
21. Which of the following is not an actinoid
- (a) Curium ($Z = 96$) (b) Californium ($Z = 98$)
 (c) Uranium ($Z = 92$) (d) Terbium ($Z = 65$)
22. The statement that is not correct for periodic classification of elements is
- (a) The properties of elements are periodic function of their atomic numbers
 (b) Non-metallic elements are less in number than metallic elements
 (c) For transition elements, the 3*d*-orbitals are filled with electrons after 3*p*-orbitals and before 4*s*-orbital
 (d) The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period
23. The period number in the long form of the periodic table is equal to
- (a) Magnetic quantum number of any element of the period
 (b) Atomic number of any element of the period
 (c) Maximum principal quantum number of any element of the period
 (d) Maximum azimuthal quantum number of any element of the period
24. Lithium shows similarities to magnesium in its chemical behaviour because
- (a) Similar size, same electronegativity and lower polarizing power
 (b) Similar size, greater electronegativity and similar polarizing power
 (c) Similar size, same electronegativity and similar high polarizing power
 (d) None of these
25. Cause of diagonal relationship is
- (a) Similar electronic configuration of the elements
 (b) Similar e/r ratio of the elements
 (c) Same number of valency electrons in the elements
 (d) Same atomic weights of the elements
26. Which of the following has minimum melting point
- (a) *CsF* (b) *HCl*
 (c) *HF* (d) *LiF*
27. An element *X* belongs to fourth period and fifteenth group of the periodic table. Which of the following statements is true
- (a) It has a completely filled *s*-orbital and a partially filled *d*-orbital
 (b) It has completely filled *s* and *p*-orbitals and a partially filled *d*-orbital
 (c) It has completely filled *s* and *p*-orbitals and a half filled *d*-orbitals
 (d) It has a half filled *p*-orbital and completely filled *s* and *d*-orbitals
28. The formation of oxide ion $O^{2-}(g)$, from oxygen atom requires first an exothermic and then an endothermic step as shown below
- $$O(g) + e^- \rightarrow O^-(g); \Delta H^\ominus = -141 \text{ kJ mol}^{-1}$$
- $$O^-(g) + e^- \rightarrow O^{2-}(g); \Delta H^\ominus = +780 \text{ kJ mol}^{-1}$$
- Thus, process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon. It is due to the fact that
- (a) Oxygen is more electronegative
 (b) Addition of electron in oxygen results in larger size of the ion
 (c) Electron repulsion outweighs the stability gained by achieving noble gas configuration
 (d) O^- ion has comparatively smaller size than oxygen atom
29. Electronic configuration of four elements *A*, *B*, *C*, and *D* is given below
- A. $1s^2 2s^2 2p^6$ B. $1s^2 2s^2 2p^4$
 C. $1s^2 2s^2 2p^6 3s^1$ D. $1s^2 2s^2 2p^5$
- Which of the following is the correct order of increasing tendency to gain electron
- (a) $A < C < B < D$ (b) $A < B < C < D$
 (c) $D < B < C < A$ (d) $D < A < B < C$

30. Among NH_3 , BCl_3 , Cl_2 and N_2 the compound that does not satisfy the octet rule is

- (a) NH_3 (b) BCl_3
(c) Cl_2 (d) N_2

2. Atomic and Ionic Radii

1. In which of the following pairs the difference between the covalent radii of the two metals is maximum

- (a) K, Ca (b) Mn, Fe
(c) Co, Ni (d) Cr, Mn

2. Which of the following statement is correct with respect to the property of elements with an increase in atomic number in the carbon family (group 14)

- (a) Atomic size decrease
(b) Ionisation energy increase
(c) Metallic character decrease
(d) Stability of +2 oxidation state increase

3. In the periodic table going down in fluorine group

- (a) Reactivity will increase
(b) Electronegativity will increase
(c) Ionic radius will increase
(d) Ionisation potential will increase

4. Which is smallest in size

- (a) O^{2-} (b) C^{4-}
(c) F^- (d) N^{3-}

5. Of the following, the one with largest size is

- (a) Cl^- (b) Ar
(c) K^+ (d) Ca^{2+}

6. Which of the following is the correct order of atomic radii

- (a) $F < Li < Na < K$ (b) $F > K > Na > Li$
(c) $Na > K > F > Li$ (d) $Li > Na > K > F$

7. Which of the following has the largest ionic radius

- (a) Na^+ (b) Ni^+
(c) Cs^+ (d) Mg^{+2}

8. Which of the following has smallest size

- (a) Mg^{2+} (b) Na^+
(c) Al^{3+} (d) Si^{4+}

9. Consider the isoelectronic species, Na^+ , Mg^{2+} , F^- and O^{2-} . The correct order of increasing length of their radii is

- (a) $F^- < O^{2-} < Mg^{2+} < Na^+$ (b) $Mg^{2+} < Na^+ < F^- < O^{2-}$
(c) $O^{2-} < F^- < Na^+ < Mg^{2+}$ (d) $O^{2-} < F^- < Mg^{2+} < Na^+$

10. The ionic radii (\AA) of C^{4-} and O^{2-} respectively are 2.60 and 1.40. The ionic radius of the isoelectronic ion N^{3-} would be

- (a) 2.6 (b) 1.71
(c) 1.4 (d) 0.95

11. The ionic conductance of following cation in a given concentration are in the order

- (a) $Li^+ < Na^+ < K^+ < Rb^+$ (b) $Li^+ > Na^+ > K^+ > Rb^+$
(c) $Li^+ < Na^+ > K^+ > Rb^+$ (d) $Li^+ = Na^+ < K^+ < Rb^+$

12. The correct order of increasing radii of the ions Br^- , F^- , O^{2-} and S^{2-} is as follows

- (a) $Br^- < F^- < O^{2-} < S^{2-}$ (b) $S^{2-} < O^{2-} < F^- < Br^-$
(c) $F^- < O^{2-} < S^{2-} < Br^-$ (d) $F^- < Br^- < O^{2-} < S^{2-}$

13. Which of the following sets will have highest hydration enthalpy and highest ionic radius

- (a) Na and Li (b) Li and Rb
(c) K and Na (d) Cs and Na

14. Which statement is correct

- (a) For potassium, the atomic radius < ionic radius; but for bromine, the atomic radius > ionic radius
(b) For potassium and bromine both, the atomic radii > ionic radii
(c) For potassium and bromine both, the atomic radii < ionic radii
(d) For potassium, the atomic radius > ionic radius but for bromine, the atomic radius < ionic radius

15. Which one of the following should be most stable

- (a) H_2^+ (b) H^+
(c) H (d) H^-

16. The trivalent ion having largest size in lanthanide series is

- (a) Ti (b) Zr
(c) Hf (d) La

17. Among the following, the most basic oxide is

- (a) Al_2O_3 (b) SiO_2
(c) P_2O_5 (d) Na_2O

18. Among the element *Li, N, C* and *Be*, one with the largest atomic radius is

- (a) *Li* (b) *N*
(c) *C* (d) *Be*

3. Ionisation Energy

- The ionisation energy of nitrogen is more than that of oxygen because
 - Nitrogen has half filled *p*-orbitals
 - Nitrogen is left to the oxygen in the same period of the periodic table
 - Nitrogen contains less number of electrons
 - Nitrogen is less electronegative
- The first ionisation energy of boron is less than that of beryllium because
 - Boron has higher nuclear charge
 - Atomic size of boron is more than that of beryllium
 - Boron has only one electron in *p*-sub-shell
 - Atomic size of boron is less than that of beryllium
- Ionisation energy is highest for
 - Noble gases
 - Platinum metals
 - Transition elements
 - Inner-transition elements
- The screening effect of inner electrons of the nucleus causes
 - A decrease in the ionisation potential
 - An increase in the ionisation potential
 - No effect on the ionisation potential
 - An increase in the attraction of the nucleus to the electrons
- The correct order of ionisation energy of *C, N, O, F* is
 - $F < N < C < O$
 - $C < N < O < F$
 - $C < O < N < F$
 - $F < O < N < C$
- The successive ionisation energy values for an element *X* are given below
 - 1st ionisation energy = 410 kJ mol⁻¹
 - 2nd ionisation energy = 820 kJ mol⁻¹
 - 3rd ionisation energy = 1100 kJ mol⁻¹
 - 4th ionisation energy = 1500 kJ mol⁻¹
 - 5th ionisation energy = 3200 kJ mol⁻¹
 Find out the number of valence electron for the atom, *X*
 - 4
 - 3
 - 5
 - 2
 - 1

7. Arrange *S, P, As* in order of increasing ionisation energy

- (a) $S < P < As$ (b) $P < S < As$
(c) $As < S < P$ (d) $As < P < S$

8. Highest ionisation energy stands for

- (a) *He* (b) *C*
(c) *N* (d) *H*

9. In view of their low ionisation energies the alkali metals are

- (a) Weak oxidising agents (b) Strong reducing agents
(c) Strong oxidising agents (d) Weak reducing agents

10. Which of the following has minimum ionisation energy

- (a) *Ge* (b) *Se*
(c) *As* (d) *Br*

11. If the *IP* of *Na* is 5.48 eV, the ionisation potential of *K* will be

- (a) Same as that of *Na* (b) 5.68 eV
(c) 4.34 eV (d) 10.88 eV

12. Which of the following has the highest first ionisation energy

- (a) *Li* (b) *Be*
(c) *B* (d) *C*

13. In a given shell, the order of screening effect is

- (a) $s > p > d > f$ (b) $f > d > p > s$
(c) $p < d < s < f$ (d) $d > f < s > p$
(e) $f > p > s > d$

14. Among the following, the third ionisation energy is highest for

- (a) Magnesium (b) Boron
(c) Beryllium (d) Aluminium

15. Generally, the first ionisation energy increases along a period. But there are some exceptions. One which is NOT an exception is

- (a) *N* and *O* (b) *Na* and *Mg*
(c) *Mg* and *Al* (d) *Be* and *B*

16. Amongst *Be, B, Mg* and *Al* the second ionization potential is maximum for

- (a) *B* (b) *Be*
(c) *Mg* (d) *Al*

17. Which of the following is not the correct increasing order of ionisation energy

- (a) $Cl^- < Ar < K^+$ (b) $Au < Ag < Cu$
(c) $Cs < Rb < K$ (d) $K < Ca < Sc$

18. Which of the following species has the highest ionisation potential

- (a) Li^+ (b) Mg^+
(c) Al^+ (d) Ne

19.

Column I

Column II

- (A) He (i) High electron affinity
(B) Cl (ii) Most electropositive element
(C) Ca (iii) Strongest reducing agent
(D) Li (iv) Highest ionization energy

The correct match of contents in **Column I** with those in **Column II** is

- (a) A-iii, B-i, C-ii, D-iv
(b) A-iv, B-iii, C-ii, D-i
(c) A-ii, B-iv, C-i, D-iii
(d) A-i, B-ii, C-iii, D-iv
(e) A-iv, B-i, C-ii, D-iii

20. The one electron species having ionization energy of 54.4 eVs

- (a) Be^{+2} (b) Be^{+3}
(c) He^+ (d) H

21. Amongst the following elements whose electronic configuration are given below, the one having the highest ionisation enthalpy is

- (a) $[\text{Ne}]3s^23p^1$ (b) $[\text{Ne}]3s^23p^3$
(c) $[\text{Ne}]3s^23p^2$ (d) $[\text{Ar}]3d^{10}4s^24p^3$

22. The second ionisation potential of an element M is the energy required to

- (a) Remove one mole of electron from one mole of gaseous anion
(b) Remove one mole of electron from one mole of gaseous cation of the element
(c) Remove one mole of electron from one mole of monovalent gaseous cation of the element
(d) Remove 2 moles of electrons from one mole of gaseous atoms

23. The first ionisation energy of oxygen is less than that of nitrogen. Which of the following is the correct reason for this observation

- (a) Lesser effective nuclear charge of oxygen than nitrogen
(b) Lesser atomic size of oxygen than nitrogen
(c) Greater inter-electron repulsion between two electrons in the same p orbital counter balances the increase in effective nuclear charge on moving from nitrogen to oxygen
(d) Greater effective nuclear charge of oxygen than nitrogen
(e) Higher electronegativity of oxygen than nitrogen

24. Which of the following relation is correct with respect to first (I) and second (II) ionisation potentials of sodium and magnesium

- (a) $I_{\text{Mg}} = II_{\text{Na}}$ (b) $I_{\text{Na}} > I_{\text{Mg}}$
(c) $II_{\text{Mg}} > II_{\text{Na}}$ (d) $II_{\text{Na}} > II_{\text{Mg}}$

25. The decreasing order of the first ionization energy (in kJ mol^{-1}) of He , Mg and Na is $\text{He} > \text{Mg} > \text{Na}$. The increasing order of the 2nd ionization energy (in kJ mol^{-1}) of these elements will be

- (a) $\text{Na} < \text{Mg} < \text{He}$ (b) $\text{Mg} < \text{Na} < \text{He}$
(c) $\text{Mg} < \text{He} < \text{Na}$ (d) $\text{Na} < \text{He} < \text{Mg}$

26. The correct decreasing order of first ionisation enthalpies of five elements of the second period is

- (a) $\text{Be} > \text{B} > \text{C} > \text{N} > \text{F}$ (b) $\text{N} > \text{F} > \text{C} > \text{B} > \text{Be}$
(c) $\text{F} > \text{N} > \text{C} > \text{Be} > \text{B}$ (d) $\text{N} > \text{F} > \text{B} > \text{C} > \text{Be}$
(e) $\text{F} > \text{C} > \text{N} > \text{B} > \text{Be}$

27. For one of the element various successive ionization enthalpies (in kJ mol^{-1}) are given below

	1 st	2 nd	3 rd	4 th	5 th
I.E	577.5	1810	2750	11,580	14,820

The element is

- (a) Al (b) Si
(c) Mg (d) P

28. The first ($\Delta_i H_1$) and second ($\Delta_i H_2$) ionisation enthalpies (in kJ mol^{-1}) and the electron gain enthalpy ($\Delta_{eg} H$) (in kJ mol^{-1}) of the elements I, II, III, IV and V are given below

Element	$\Delta_i H_1$	$\Delta_i H_2$	$\Delta_{eg} H$
I	520	7300	-60
II	419	3051	-48
III	1681	3374	-328
IV	1008	1846	-295
V	2372	5251	+48

The most reactive metal and the least reactive non-metal of these are respectively

- (a) I and V (b) V and II
(c) II and V (d) IV and V
(e) V and III

29. Among halogens, the correct order of amount of energy released in electron gain (electron gain enthalpy) is

- (a) $\text{F} > \text{Cl} > \text{Br} > \text{I}$ (b) $\text{F} < \text{Cl} < \text{Br} < \text{I}$
(c) $\text{F} < \text{Cl} > \text{Br} > \text{I}$ (d) $\text{F} < \text{Cl} < \text{Br} < \text{I}$

30. The first ionization enthalpies for three elements are 1314, 1680 and 2080 kJ mol^{-1} , respectively. The correct sequence of the element is

- (a) O, F and Ne (b) F, O and Ne
(c) Ne, F and O (d) F, Ne and O

31. The electronic configuration of an element with the largest difference between the 1st and 2nd ionization energies is

- (a) $1s^2 2s^2 2p^6$ (b) $1s^2 2s^2 2p^6 3s^1$
(c) $1s^2 2s^2 2p^6 3s^2$ (d) $1s^2 2s^2 2p^1$

4. Electron Affinity

1. The process requiring the absorption of energy is

- (a) $F \rightarrow F^-$ (b) $Cl \rightarrow Cl^-$
(c) $O \rightarrow O^{2-}$ (d) $H \rightarrow H^-$

2. Which one of the following statements is false

- (a) The electron affinity of chlorine is less than that of fluorine
(b) The electronegativity of fluorine is more than that of chlorine
(c) The electron affinity of bromine is less than that of chlorine
(d) The electronegativity of chlorine is more than that of bromine

3. The electron affinity for the inert gases is

- (a) Zero (b) High
(c) Negative (d) Positive

4. The electronic configuration of the element with maximum electron affinity is

- (a) $1s^2, 2s^2, 2p^3$ (b) $1s^2, 2s^2, 2p^5$
(c) $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$ (d) $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$
(e) $1s^2, 2s^2, 2p^6, 3s^1$

5. Which of the following has the least electron affinity in kJ mol^{-1}

- (a) Oxygen (b) Carbon
(c) Nitrogen (d) Boron

6. Which of the following species has the highest electron affinity

- (a) F^- (b) O
(c) O^- (d) Na^+

7. The correct order of electron affinity of B, C, N, O is

- (a) $O > C > N > B$ (b) $B > N > C > O$
(c) $O > C > B > N$ (d) $O > B > C > N$

8. The electron affinities of halogens are $F = 322$, $Cl = 349$, $Br = 324$, $I = 295 \text{ kJ mol}^{-1}$. The higher value for Cl as compared to that of F is due to

- (a) Weaker electron-electron repulsion in Cl
(b) Higher atomic radius of F
(c) Smaller electronegativity of F
(d) More vacant p-subshell in Cl

9. The electron affinity values (in kJ mol^{-1}) of three halogens X, Y and Z are respectively -349 , -333 and -325 . Then X, Y and Z are respectively

- (a) F_2, Cl_2 and Br_2 (b) Cl_2, F_2 and Br_2
(c) Cl_2, Br_2 and F_2 (d) Br_2, Cl_2 and F_2

10. Which of the following pairs show reverse properties on moving along a period from left to right and from top to down in a group

- (a) Nuclear charge and electron affinity
(b) Ionisation energy and electron affinity
(c) Atomic radius and electron affinity
(d) None of these

11. The amount of energy released when 10^6 atoms of iodine in vapour state are converted to I^- ions is $4.9 \times 10^{-13} \text{ J}$. What will be electron affinity of iodine in eV per atom

- (a) 2.0 (b) 2.5
(c) 2.75 (d) 3.06

5. Electronegativity

1. Between HF, HCl, HBr and HI, HF has the highest ionic character because

- (a) F has the highest electron affinity
(b) In HF, electronegativity difference is highest
(c) F^- ion has the highest value of ionic radius
(d) Atomic orbitals of H and F have almost similar energy

2. An atom with high electronegativity has

- (a) Large size (b) High ionisation potential
(c) Low electron affinity (d) Low ionisation potential

3. 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) $ns^2 np^6$

4. Which of the following is second most electronegative element
(a) Chlorine (b) Oxygen
(c) Sulphur (d) Fluorine
5. Most electronegative element is
(a) Al (b) C
(c) Si (d) Be
6. Which one of the following has the highest electronegativity
(a) Br (b) Cl
(c) P (d) Si
7. Arrange F, Cl, O, N in the decreasing order of electronegativity
(a) $O > F > N > Cl$ (b) $F > N > Cl > O$
(c) $Cl > F > N > O$ (d) $F > O > N > Cl$
8. The chemical elements are arranged in the order of increasing electronegativities in the sequence
(a) P, Si, Se, Br, N (b) Si, Se, P, Br, N
(c) Si, P, Se, Br, N (d) Se, P, Si, Br, N
9. Pauling's equation for determining the electronegativity of an element is
(a) $X_A - X_B = 0.208 \sqrt{\Delta}$ (b) $X_A + X_B = 0.208 \sqrt{\Delta}$
(c) $X_A - X_B = 0.208 \Delta^2$ (d) $X_A - X_B = \sqrt{\Delta}$
10. The property of attracting electrons by the halogen atom in a molecule is called
(a) Ionisation potential (b) Electron affinity
(c) Electronegativity (d) Electronic attraction
11. The most polar bond is
(a) O-F (b) N-Cl
(c) N-F (d) N-N
12. Which is the correct order of electronegativities
(a) $F > N < O > C$ (b) $F > N > O > C$
(c) $F < N < O < C$ (d) $F > N > O < C$
13. In the following, the element with the highest electropositivity is
(a) Copper (b) Cesium
(c) Barium (d) Chromium
14. Which of these have no unit
(a) Electronegativity (b) Electron affinity
(c) Ionisation energy (d) Excitation potential

15. The correct order of decreasing electronegativity values among the elements I-beryllium, II-oxygen, III-nitrogen and IV-magnesium is
(a) $(II) > (III) > (I) > (IV)$ (b) $(III) > (IV) > (II) > (I)$
(c) $(I) > (II) > (III) > (IV)$ (d) $(I) > (II) > (IV) > (III)$
(e) $(II) > (III) > (IV) > (I)$

16. Increasing order of electronegativity is
(a) $Bi < P < S < Cl$ (b) $P < Bi < S < Cl$
(c) $S < Bi < P < Cl$ (d) $Cl < S < Bi < P$

6. Valency and Oxidation State

1. Which will show maximum non-metallic character
(a) B (b) Be
(c) Mg (d) Al
2. Which of the following set has the strongest tendency to form anions
(a) Ga, In and Te (b) Na, Mg and Al
(c) N, O and F (d) V, Cr and Mn
3. The halogen that is most easily reduced is
(a) F_2 (b) Cl_2
(c) Br_2 (d) I_2
4. The maximum valency of an element with atomic number 7 is
(a) 2 (b) 5
(c) 4 (d) 3
5. Which of the following metals exhibits more than one oxidation state
(a) Na (b) Mg
(c) Fe (d) Al
6. Which is the weakest base
(a) NaOH (b) KOH
(c) $Ca(OH)_2$ (d) $Zn(OH)_2$
7. Which of the following elements is found in native state
(a) Al (b) Au
(c) Cu (d) Na
8. Acidity of pentoxides in VA group
(a) Decreases (b) Increases
(c) Remains same (d) None
9. The correct order of increasing order of oxidising power is
(a) $F_2 < Cl_2 < Br_2 < I_2$ (b) $F_2 < Br_2 < Cl_2 < I_2$
(c) $Cl_2 < Br_2 < F_2 < I_2$ (d) $I_2 < Br_2 < Cl_2 < F_2$

10. In any short period the valency of an element with respect to oxygen
- Increases one by one from IA to VIIA
 - Decreases one by one from IA to VIIA
 - Increases one by one from IA to IVA and then decreases from VA to VIIA one by one
 - Decreases one by one from IA to IVA and then increases from VA to VIIA one by one
11. Pentavalency in phosphorus is more stable when compared to that of nitrogen even though they belong to same group is due to
- Reactivity of phosphorus
 - Inert nature of nitrogen
 - Dissimilar electronic configuration
 - Larger size of phosphorus atom
12. Fluorine is the best oxidising agent because it has
- Highest electron affinity
 - Highest E_{red}°
 - Highest E_{oxid}°
 - Lowest electron affinity
13. Which of the following oxides is most basic
- Na_2O
 - Al_2O_3
 - SiO_2
 - SO_2
14. In a periodic table the basic character of oxides
- Increases from left to right and decreases from top to bottom
 - Decreases from right to left and increases from top to bottom
 - Decreases from left to right and increases from top to bottom
 - Decreases from left to right and increases from bottom to top
15. Elements A and B with their respective electronic configurations $3d^{10}4s^1$ and $4d^{10}5s^1$ in their outermost shell, are
- Both non-metals
 - Both coinage metals
 - A is a non-metal and B is coinage metal
 - A is a coinage metal and B is non-metal
16. The stable bivalency of Pb and trivalency of Bi is
- Due to d contraction in Pb and Bi
 - Due to relativistic contraction of the 6s orbitals of Pb and Bi, leading to inert pair effect
 - Due to screening effect
 - Due to attainment of noble configuration

17. The most stable oxidation state exhibited by thallium is
- 0
 - +1
 - +2
 - +3
18. An element 'X' which occurs in the first short period has an outer electronic structure s^2p^1 . What is the formula and acid-base character of its oxides
- XO_3 , basic
 - X_2O_3 , basic
 - X_2O_3 , acidic
 - XO_2 , acidic
19. Which of the following sequence correctly represents the decreasing acid nature of oxides
- $\text{Li}_2\text{O} > \text{BeO} > \text{B}_2\text{O}_3 > \text{CO}_2 > \text{N}_2\text{O}_3$
 - $\text{N}_2\text{O}_3 > \text{CO}_2 > \text{B}_2\text{O}_3 > \text{BeO} > \text{Li}_2\text{O}$
 - $\text{CO}_2 > \text{N}_2\text{O}_3 > \text{B}_2\text{O}_3 > \text{BeO} > \text{Li}_2\text{O}$
 - $\text{B}_2\text{O}_3 > \text{CO}_2 > \text{N}_2\text{O}_3 > \text{Li}_2\text{O} > \text{BeO}$

7. IIT-JEE/ AIEEE

1. Atomic radii of fluorine and neon in angstrom units are respectively given by [1987]
- 0.762, 1.60
 - 1.60, 1.60
 - 0.72, 0.72
 - None of these values
2. Which one of the following is the smallest in size [1989]
- N^{3-}
 - O^{2-}
 - F^-
 - Na^+
3. The size of the following species increases in the order [1990]
- $\text{Mg}^{2+} < \text{Na}^+ < \text{F}^- < \text{Al}$
 - $\text{F}^- < \text{Al} < \text{Na}^+ > \text{Mg}^{2+}$
 - $\text{Al} < \text{Mg}^{2+} < \text{F}^- < \text{Na}^+$
 - $\text{Na}^+ < \text{Al} < \text{F}^- < \text{Mg}^{2+}$
4. The correct order of radii is [2000]
- $\text{N} < \text{Be} < \text{B}$
 - $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$
 - $\text{Na} < \text{Li} < \text{K}$
 - $\text{Fe}^{3+} < \text{Fe}^{2+} < \text{Fe}^{4+}$
5. The ionic radii (in Å) of N^{3-} , O^{2-} and F^- are respectively [2015]
- 1.36, 1.40 and 1.71
 - 1.36, 1.71 and 1.40
 - 1.71, 1.40 and 1.36
 - 1.71, 1.36 and 1.40

6. Ionic radii of [1999]
 (a) $Ti^{4+} < Mn^{7+}$ (b) $^{35}Cl^- < ^{37}Cl^-$
 (c) $K^+ > Cl^-$ (d) $P^{3+} > P^{5+}$
7. The statement that is not correct for the periodic classification of elements is [1992]
 (a) The properties of elements are the periodic functions of their atomic number
 (b) Non-metallic elements are lesser in number than metallic elements
 (c) The first ionisation energies along a period do not vary in a regular manner with increase in atomic number
 (d) For transition elements the d -sub-shells are filled with electrons monotonically with increase in atomic number
8. The first ionisation potential of Na , Mg , Al and Si are in the order [1988]
 (a) $Na < Mg > Al < Si$ (b) $Na > Mg > Al > Si$
 (c) $Na < Mg < Al > Si$ (d) $Na > Mg > Al < Si$
9. Which one of the following elements has the highest ionisation energy [2006]
 (a) $[Ne]3s^2 3p^1$ (b) $[Ne]3s^2 3p^2$
 (c) $[Ne]3s^2 3p^3$ (d) $[Ar]3d^{10} 4s^2 4p^2$
10. The set representing the correct order of first ionisation potential is [2001]
 (a) $K > Na > Li$ (b) $Be > Mg > Ca$
 (c) $B > C > N$ (d) $Ge > Si > C$
11. Which has maximum first ionisation potential [1982;]
 (a) C (b) N
 (c) B (d) O
12. The first ionisation potential of Na is 5.1 eV. The value of electron gain enthalpy of Na^+ will be [2013]
 (a) -2.55 eV (b) -5.1 eV
 (c) -10.2 eV (d) +2.55 eV
13. Which of the following atoms has the highest first ionization energy [2016]
 (a) Na (b) K
 (c) Sc (d) Rb
14. The correct order of second ionization potential of carbon, nitrogen, oxygen and fluorine is [1981]
 (a) $C > N > O > F$ (b) $O > N > F > C$
 (c) $O > F > N > C$ (d) $F > O > N > C$
15. The incorrect statement among the following is [1997]
 (a) The first ionisation potential of Al is less than the first ionisation potential of Mg
 (b) The second ionisation potential of Mg is greater than the second ionisation potential of Na
 (c) The first ionisation potential of Na is less than the first ionisation potential of Mg
 (d) The third ionisation potential of Mg is greater than the third ionisation potential of Al
16. Which of the following represents the correct order of increasing first ionization enthalpy for Ca , Ba , S , Se and Ar [2013]
 (a) $Ca < S < Ba < Se < Ar$ (b) $S < Se < Ca < Ba < Ar$
 (c) $Ba < Ca < Se < S < Ar$ (d) $Ca < Ba < S < Se < Ar$
17. The first ionisation potentials in electron volts of nitrogen and oxygen atoms are respectively given by [1987]
 (a) 14.6, 13.6 (b) 13.6, 14.6
 (c) 13.6, 13.6 (d) 14.6, 14.6
18. The electronegativity of the following elements increases in the order [1987]
 (a) C, N, Si, P (b) N, Si, C, P
 (c) Si, P, C, N (d) P, Si, N, C
19. Which one of the following oxides is neutral [1996]
 (a) CO (b) SnO_2
 (c) ZnO (d) SiO_2
20. Which one of the following sets of ions represents the collection of isoelectronic species [2004]
 (a) $K^+, Cl^-, Mg^{2+}, Sc^{3+}$ (b) $Na^+, Ca^{2+}, Sc^{3+}, F^-$
 (c) $K^+, Ca^{2+}, Sc^{3+}, Cl^-$ (d) $Na^+, Mg^{2+}, Al^{3+}, Cl^-$
21. Following statements regarding the periodic trends of chemical reactivity of the alkali metals and the halogens are given. Which of these statements gives the correct picture [2006]
 (a) The reactivity decreases in the alkali metals but increases in the halogens with increase in atomic number down the group
 (b) In both alkali metals and the halogens the chemical reactivity decreases with increase in atomic number down the group
 (c) Chemical reactivity increase with increase in atomic number down the group in both the alkali metals and halogens
 (d) In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group

22. According to the periodic law of elements, the variation in properties of elements is related to their [2003]
 (a) Atomic masses
 (b) Nuclear masses
 (c) Atomic numbers
 (d) Nuclear neutron-proton number
23. Which is the correct order of ionic sizes (At. no. : Ce = 58, Sn = 50, Yb = 70 and Lu = 71) [2002]
 (a) $Ce > Sn > Yb > Lu$ (b) $Sn > Ce > Lu > Yb$
 (c) $Lu > Yb > Sn > Ce$ (d) $Sn > Yb > Ce > Lu$
24. Which one of the following ions has the highest value of ionic radius [2004]
 (a) O^{2-} (b) B^{3+}
 (c) Li^+ (d) F^-
25. The set representing the correct order of ionic radius is [2009]
 (a) $Li^+ > Be^{2+} > Na^+ > Mg^{2+}$
 (b) $Na^+ > Li^+ > Mg^{2+} > Be^{2+}$
 (c) $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$
 (d) $Mg^{2+} > Be^{2+} > Li^+ > Na^+$
26. Increasing order of ionic size for the ions, F^- , O^{2-} , Na^+ , Al^{3+} is [2010]
 (a) $O^{2-} < F^- < Na^+ < Al^{3+}$ (b) $Al^{3+} < Na^+ < F^- < O^{2-}$
 (c) $O^{2-} < Na^+ < F^- < Al^{3+}$ (d) $Al^{3+} < F^- < Na^+ < O^{2-}$
27. The increasing order of the first ionisation enthalpies of the elements B, P, S and F (lowest first) is [2006]
 (a) $F < S < P < B$ (b) $P < S < B < F$
 (c) $B < P < S < F$ (d) $B < S < P < F$
28. The formation of the oxide ion $O_{(g)}^{2-}$ requires first an exothermic and then an endothermic step as shown below
 $O_{(g)} + e^- = O_{(g)}^-; \Delta H^\circ = -142 \text{ kJmol}^{-1}$
 $O_{(g)}^- + e^- = O_{(g)}^{2-}; \Delta H^\circ = 844 \text{ kJmol}^{-1}$
 This is because [2004]
 (a) O^- ion will tend to resist the addition of another electron
 (b) Oxygen has high electron affinity
 (c) Oxygen is more electronegative
 (d) O^- ion has comparatively larger size than oxygen atom
29. Which among the following factors is the most important in making fluorine the strongest oxidizing halogen [2004]
 (a) Hydration enthalpy (b) Ionisation enthalpy
 (c) Electron affinity (d) Bond dissociation energy
30. Among Al_2O_3 , SiO_2 , P_2O_3 and SO_2 the correct order of acid strength is [2004]
 (a) $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$
 (b) $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$
 (c) $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$
 (d) $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$
31. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides [2011]
 (a) $Al_2O_3 < MgO < Na_2O < K_2O$
 (b) $MgO < K_2O < Al_2O_3 < Na_2O$
 (c) $Na_2O < K_2O < MgO < Al_2O_3$
 (d) $K_2O < Na_2O < Al_2O_3 < MgO$
32. Beryllium and aluminium exhibit many properties which are similar. But, the two elements differ in [2004]
 (a) Forming covalent halides
 (b) Forming polymeric hydrides
 (c) Exhibiting maximum covalency in compounds
 (d) Exhibiting amphoteric nature in their oxides

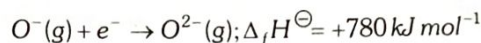
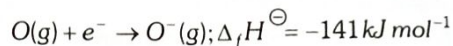
8. NEET/ AIPMT/ CBSE-PMT

1. If an atom has electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$, it will be placed in [2002]
 (a) Second group (b) Third group
 (c) Fifth group (d) Sixth group
2. The electronic configuration of an element is $1s^2, 2s^2 2p^6, 3s^2 3p^3$. What is the atomic number of the element which is just below the above element in the periodic table [1995]
 (a) 33 (b) 34
 (c) 31 (d) 49
3. Modern periodic table is based on the atomic number of the elements. The experiment which proved the significance of the atomic number was [1989]
 (a) Mullikan's oil drop experiment
 (b) Moseley's work on X-ray spectra
 (c) Bragg's work on X-ray diffraction
 (d) Discovery of X-rays by Rontgen

4. The element $Z = 114$ has been discovered recently. It will belong to which of the following family/ group and electronic configuration [2017]
- (a) Halogen family, $[Rn]5f^{14}6d^{10}7s^27p^5$
- (b) Carbon family, $[Rn]5f^{14}6d^{10}7s^27p^2$
- (c) Oxygen family, $[Rn]5f^{14}6d^{10}7s^27p^4$
- (d) Nitrogen family, $[Rn]5f^{14}6d^{10}7s^27p^6$
5. Among the elements Ca , Mg , P and Cl , the order of increasing atomic radii is [2010]
- (a) $Mg < Ca < Cl < P$ (b) $Cl < P < Mg < Ca$
- (c) $P < Cl < Ca < Mg$ (d) $Ca < Mg < P < Cl$
6. Which of the following does not represent the correct order of the property indicated [1997]
- (a) $Sc^{3+} > Cr^{3+} > Fe^{3+} > Mn^{3+}$: ionic radii
- (b) $Sc < Ti < Cr < Mn$: Density
- (c) $Mn^{2+} > Ni^{2+} < Co^{2+} < Fe^{2+}$: ionic radii
- (d) $FeO < CaO > MnO > CuO$: Basic nature
7. Identify the correct order of the size of the following [2007; 2010]
- (a) $Ca^{2+} < K^+ < Ar < S^{2-} < Cl^-$
- (b) $Ca^{2+} < K^+ < Ar < Cl^- < S^{2-}$
- (c) $Ar < Ca^{2+} < K^+ < Cl^- < S^{2-}$
- (d) $Ca^{2+} < Ar < K^+ < Cl^- < S^{2-}$
8. Ionic radii are [2003, 04]
- (a) Directly proportional to effective nuclear charge
- (b) Directly proportional to square of effective nuclear charge
- (c) Inversely proportional to effective nuclear charge
- (d) Inversely proportional to square of effective nuclear charge
9. Identify the **wrong** statement in the following [2012]
- (a) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius
- (b) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius
- (c) Atomic radius of the elements increases as one move down the first group of the periodic table
- (d) Atomic radius of the elements decreases as one move across from left to right in the 2nd period of the periodic table
10. Which of the following orders of ionic radii is correctly represented [2014]
- (a) $F^- > O^{2-} > Na^+$ (b) $Al^{3+} > Mg^{2+} > N^{3-}$
- (c) $H^- > H > H^+$ (d) $Na^+ > F^- > O^{2-}$
11. Which of the following statement concerning lanthanides elements is false [1994]
- (a) Lanthanides are separated from one another by ion exchange method
- (b) Ionic radii of trivalent lanthanides steadily increases with increase in the atomic number
- (c) All lanthanides are highly dense metals
- (d) More characteristic oxidation state of lanthanide elements is +3
12. The species Ar , K^+ and Ca^{2+} contain the same number of electrons. In which order do their radii increase [2015]
- (a) $Ca^{2+} < Ar < K^+$ (b) $Ca^{2+} < K^+ < Ar$
- (c) $K^+ < Ar < Ca^{2+}$ (d) $Ar < K^+ < Ca^{2+}$
13. Which of the following has the smallest size [1996]
- (a) Na^+ (b) Mg^{+2}
- (c) Cl^- (d) F^-
14. Which one is the correct order of the size of the iodine species [1997]
- (a) $I > I^+ > I^-$ (b) $I > I^- > I^+$
- (c) $I^+ > I^- > I$ (d) $I^- > I > I^+$
15. Among the following which one has highest cation to anion size ratio [2010]
- (a) CsI (b) CsF
- (c) LiF (d) NaF
16. The first ionisation potentials (eV) of Be and B respectively are [1998]
- (a) 8.29eV, 9.32eV (b) 9.32eV, 9.32eV
- (c) 8.29eV, 8.29eV (d) 9.32eV, 8.29eV
17. In which of the following options the order of arrangement does not agree with the variation of property indicated against it [2005; 2016]
- (a) $Al^{3+} < Mg^{2+} < Na^+ < F^-$ (increasing ionic size)
- (b) $B < C < N < O$ (increasing first ionisation enthalpy)
- (c) $I < Br < Cl < F$ (increasing electron gain enthalpy)
- (d) $Li < Na < K < Rb$ (increasing metallic radius)

18. A sudden large jump between the values of second and third ionisation energies of an element would be associated with the electronic configuration [1992]
- (a) $1s^2, 2s^2 2p^6, 3s^1$ (b) $1s^2, 2s^2 2p^6, 3s^2 3p^1$
- (c) $1s^2, 2s^2 2p^6, 3s^2 3p^2$ (d) $1s^2, 2s^2 2p^6, 3s^2$
19. Which element having following electronic configurations has minimum ionisation potential [1991]
- (a) $1s^1$ (b) $1s^2, 2s^2 2p^6$
- (c) $1s^2, 2s^2 2p^6, 3s^1$ (d) $1s^2, 2s^2 2p^2$
20. Which of the order for ionisation energy is correct [2001]
- (a) $Be > B > C > N > O$ (b) $B < Be < C < O < N$
- (c) $B < Be < C < N < O$ (d) $B < Be < N < C < O$
21. Which of the following order is wrong [2002]
- (a) $NH_3 < PH_3 < AsH_3$ -acidic nature
- (b) $Li^+ < Na^+ < K^+ < Cs^+$ -ionic radius
- (c) $Al_2O_3 < MgO < Na_2O < K_2O$ -basic
- (d) $Li < Be < B < C$ -1st ionisation potential
22. The elements which occupy the peaks of ionisation energy curve, are [2000]
- (a) Na, K, Rb, Cs (b) Na, Mg, Cl, I
- (c) Cl, Br, I, F (d) He, Ne, Ar, Kr
23. Which one of the elements has the maximum electron affinity [1996, 99]
- (a) F (b) Cl
- (c) Br (d) I
24. Which one of the following ionic species has the greatest proton affinity to form stable compound [2007]
- (a) HS^- (b) NH_2^-
- (c) F^- (d) I^-
25. Which one of the following arrangements represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, Al, F and O [2013]
- (a) $Al < Ca < O < C < F$ (b) $Al < O < C < Ca < F$
- (c) $C < F < O < Al < Ca$ (d) $Ca < Al < C < O < F$

26. The formation of the oxide ion $O^{2-}(g)$, from oxygen atom requires first an exothermic and then an endothermic step as shown below



Thus, process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon. It is due to the fact that [2015]

- (a) Electron repulsion outweighs the stability gained by achieving noble gas configuration
- (b) O^- ion has comparatively smaller size than oxygen atom
- (c) Oxygen is more electronegative
- (d) Addition of electron in oxygen results in larger size of the ion
27. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species [2005; 2010]
- (a) $Cl < F < S < O$ (b) $O < S < F < Cl$
- (c) $S < O < Cl < F$ (d) $F < Cl < O < S$
28. Which of the following is the most electronegative [1991]
- (a) F (b) He
- (c) Ne (d) Na
29. Which of the following elements shows maximum number of different oxidation states in its compounds [1998]
- (a) Eu (b) La
- (c) Gd (d) Am
30. Which one of the elements with the following outer orbital configurations may exhibit the largest number of oxidation states [2009]
- (a) $3d^3 4s^2$ (b) $3d^5 4s^1$
- (c) $3d^5 4s^2$ (d) $3d^2 4s^2$
31. Which of the following gas does not have an octet or eight electrons in the outer shell [2001]
- (a) Ne (b) Ar
- (c) Rn (d) He

9. AIIMS

1. Which of the following is the atomic number of a metal

[2000]

- (a) 32 (b) 34
- (c) 36 (d) 38

2. Chloride of an element A gives neutral solution in water. In the periodic table, the element A belongs to [1992]
 (a) First group (b) Third group
 (c) Fifth group (d) First transition series
3. Which of the following elements are analogous to the lanthanides [1998]
 (a) Actinides (b) Borides
 (c) Carbides (d) Hydrides
4. The radii of F, F^-, O and O^{2-} are in the order of [1999]
 (a) $O^{2-} > F^- > O > F$ (b) $O^{2-} > F^- > F > O$
 (c) $F^- > O^{2-} > F > O$ (d) $O^{2-} > O > F^- > F$
5. Which of the following ion is the smallest ion [2001]
 (a) O_2^+ (b) O_2^-
 (c) O_2 (d) O_2^{2-}
6. Which of the following element has maximum, first ionisation potential [2001]
 (a) V (b) Ti
 (c) Cr (d) Mn
7. Which of the following gaseous atoms has highest value of IE [2000]
 (a) P (b) Si
 (c) Mg (d) Al
8. Hydrogen has high ionisation energy than alkali metals, due to its [1999]
 (a) Large size (b) Small size
 (c) Ionic bond (d) Covalent bond
9. Among the following options, the sequence of increasing first ionisation potential will be [2000]
 (a) $B < C < N$ (b) $B > C > N$
 (c) $C < B < N$ (d) $N > C > B$
10. Which has the highest second ionisation potential [1991]
 (a) Nitrogen (b) Carbon
 (c) Oxygen (d) Fluorine
11. Which of the following transitions involves maximum amount of energy [1992]
 (a) $M^-(g) \rightarrow M(g)$ (b) $M(g) \rightarrow M^+(g)$
 (c) $M^+(g) \rightarrow M^{2+}(g)$ (d) $M^{2+}(g) \rightarrow M^{3+}(g)$

12. For electron affinity of halogens which of the following is correct [2004]
 (a) $Br > F$ (b) $F > Cl$
 (c) $Br < Cl$ (d) $F > I$
13. Which of the following is the most electropositive element [1998]
 (a) Aluminium (b) Magnesium
 (c) Phosphorus (d) Sulphur
14. Thallium shows different oxidation states because [1982]
 (a) It is a transition element
 (b) Of inert pair effect
 (c) Of its amphoteric character
 (d) Of its higher reactivity

10. Assertion & Reason

Read the assertion and reason carefully to mark the correct option out of the options given below :

- (a) If both assertion and reason are true and the reason is the correct explanation of the assertion.
 (b) If both assertion and reason are true but reason is not the correct explanation of the assertion.
 (c) If assertion is true but reason is false.
 (d) If the assertion and reason both are false.
 (e) If assertion is false but reason is true.

1. Assertion : Positive ions will be wider than parent atoms. [1999]

Reason : Nuclear charge pulls them closer.

2. Assertion : Dinegative anion of oxygen (O^{2-}) is quite common but dinegative anion of sulphur (S^{2-}) is less common.

Reason : Covalency of oxygen is two. [2002]

3. Assertion : The atomic radii of calcium is smaller than sodium.

Reason : Calcium has a lower nuclear charge than sodium. [1999]

4. Assertion : First ionisation energy for nitrogen is lower than oxygen.

Reason : Across a period effective nuclear charge decreases. [2005]

5. Assertion : Noble gases have maximum electron affinity. [1995]

Reason : High electron affinity shows that the electron is loosely bonded to the atom.

6. Assertion : E° for Mn^{3+} / Mn^{2+} is more positive than Cr^{3+} / Cr^{2+} .

Reason : The third ionisation energy of Mn is larger than that of Cr . **[2006]**

7. Assertion : More is the electron affinity greater is the reducing character.

Reason : Reducing character depends on number of electrons gained.

8. Assertion : I.E. of ${}_7N$ is more than that of ${}_8O$ as well as ${}_6C$.

Reason : The reactivity of ${}_7N$ and ${}_6C$ towards oxygen is different.

9. Assertion : Electron affinity refers to an isolated atom's attraction for an additional electron while electronegativity is the ability of an element to attract electrons towards itself in a shared pair of electrons.

Reason : Electron affinity is a relative number and electronegativity is experimentally measurable.

10. Assertion : In transition elements ns orbital is filled up first and $(n-1)d$ afterwards, during ionization ns electrons are lost prior to $(n-1)d$ electrons.

Reason : The effective nuclear charge felt by $(n-1)d$ electrons is higher as compared to that of ns electrons.

3. Classification of Elements and Periodicity in Properties – Answers Keys

1. Extended or Long Form of Periodic Table

1	d	2	a	3	a	4	b	5	d
6	c	7	d	8	d	9	b	10	d
11	a	12	b	13	c	14	b	15	b
16	a	17	b	18	e	19	d	20	c
21	d	22	c	23	c	24	c	25	b
26	b	27	d	28	c	29	a	30	b

2. Atomic and Ionic Radii

1	a	2	d	3	c	4	c	5	a
6	a	7	c	8	d	9	b	10	b
11	a	12	c	13	b	14	d	15	d
16	d	17	d	18	a				

3. Ionisation Energy

1	a	2	c	3	a	4	a	5	c
6	a	7	c	8	a	9	b	10	a
11	c	12	d	13	a	14	c	15	b
16	a	17	b	18	a	19	e	20	c
21	b	22	c	23	c	24	d	25	b
26	c	27	a	28	c	29	c	30	a
31	b								

4. Electron Affinity

1	c	2	a	3	a	4	c	5	c
6	b	7	c	8	a	9	b	10	c
11	d								

5. Electronegativity

1	b	2	b	3	c	4	b	5	b
6	b	7	d	8	c	9	a	10	c
11	c	12	a	13	b	14	a	15	a
16	a								

6. Valency and Oxidation State

1	a	2	c	3	a	4	b	5	c
6	d	7	b	8	a	9	d	10	a
11	d	12	b	13	a	14	c	15	b
16	b	17	b	18	c	19	b		

7. IIT-JEE/ AIEEE

1	a	2	d	3	a	4	b	5	c
6	d	7	c	8	a	9	c	10	b
11	b	12	b	13	c	14	c	15	b
16	c	17	a	18	c	19	a	20	c
21	d	22	c	23	b	24	a	25	b
26	b	27	d	28	a	29	d	30	d
31	a	32	c						

8. NEET/ AIPMT/ CBSE-PMT

1	c	2	a	3	b	4	b	5	b
6	a	7	b	8	c	9	a	10	c
11	b	12	b	13	b	14	d	15	b
16	d	17	bc	18	d	19	c	20	b
21	d	22	d	23	b	24	b	25	d
26	a	27	b	28	a	29	d	30	c
31	d								

9. AIIMS

1	d	2	a	3	a	4	a	5	a
6	d	7	a	8	b	9	a	10	c
11	d	12	cd	13	b	14	b		

10. Assertion and Reason

1	e	2	b	3	d	4	d	5	d
6	a	7	d	8	b	9	c	10	a