

**PERIODIC TABLE**

**YEAR LONG REVISION EXERCISE**  
Not To Be Discussed in Class

**SECTION - 1 : SINGLE CHOICE CORRECT QUESTIONS**

- An element with atomic number 106 has been discovered recently. Which of the following electronic configuration will it possess :-  
(A)  $[\text{Rn}] 5f^{14} 6d^5 7s^1$  (B)  $[\text{Rn}] 5f^{14} 6d^5 7s^2$   
(C)  $[\text{Rn}] 5f^{14} 6d^6 7s^0$  (D)  $[\text{Rn}] 5f^{14} 6d^1 7s^2 7p^3$
- Correct order of ionic radii is :-  
(A)  $\text{Ti}^{4+} < \text{Mn}^{7+}$  (B)  $^{37}\text{Cl}^- < ^{35}\text{Cl}^-$  (C)  $\text{K}^+ > \text{Cl}^-$  (D)  $\text{P}^{3+} > \text{P}^{5+}$
- Which of the following ion is smallest in size-  
(A)  $\text{Cl}^-$  (B)  $\text{Na}^+$  (C)  $\text{Mg}^{+2}$  (D)  $\text{S}^{-2}$
- The electro negativity follows the order-  
(A)  $\text{F} > \text{O} > \text{Cl} > \text{Br}$  (B)  $\text{F} > \text{Cl} > \text{Br} > \text{O}$  (C)  $\text{O} > \text{F} > \text{Cl} > \text{Br}$  (D)  $\text{Cl} > \text{F} > \text{O} > \text{Br}$
- Which of the following has  $2^{\text{nd}}$  IP  $< 1^{\text{st}}$  IP  
(A) Mg (B) Ne (C) C (D) None
- The correct order of decreasing first ionization energy is :-  
(A)  $\text{Si} > \text{Al} > \text{Mg} > \text{Na}$  (B)  $\text{Si} > \text{Mg} > \text{Al} > \text{Na}$   
(C)  $\text{Al} > \text{Si} > \text{Mg} > \text{Na}$  (D)  $\text{Mg} > \text{Li} > \text{Al} > \text{Si}$
- The electron affinity  
(A) Of carbon is greater than oxygen (B) Of fluorine is less than iodine  
(C) Of  $\text{Cl}^-$  is less than Cl (D) Of S is less than oxygen
- Which will have the maximum value of electron affinity  $\text{O}^x$ ,  $\text{O}^y$  and  $\text{O}^z$  [x, y and z respectively are 0, -1 and -2] :-  
(A)  $\text{O}^x$  (B)  $\text{O}^y$  (C)  $\text{O}^z$  (D) All have equal
- Which of the following ion has largest size :-  
(A)  $\text{F}^-$  (B)  $\text{Al}^{+3}$  (C)  $\text{Cs}^+$  (D)  $\text{O}^{-2}$
- $\begin{array}{cccc} 1 & 2 & 3 & 4 \\ \text{H}_3\text{C} & -\text{CH} & =\text{C} & =\text{CH}_2 \end{array}$   
In the given compound which carbon atom will show maximum electronegativity -  
(A) Fourth (B) First  
(C) Third (D) EN of all the carbon atoms is same
- (a)  $\text{M}_{(\text{g})}^- \rightarrow \text{M}_{(\text{g})}$  (b)  $\text{M}_{(\text{g})} \rightarrow \text{M}_{(\text{g})}^+$  (c)  $\text{M}_{(\text{g})}^+ \rightarrow \text{M}_{(\text{g})}^{+2}$  (d)  $\text{M}_{(\text{g})}^{+2} \rightarrow \text{M}_{(\text{g})}^{+3}$   
Minimum and maximum I.P. would be of :-  
(A) a, d (B) b, c (C) c, d (D) d, a
- Which is correct order of size of O,  $\text{O}^{2-}$ ,  $\text{F}^-$  and F :-  
(A)  $\text{O}^{2-} > \text{O} > \text{F}^- > \text{F}$  (B)  $\text{O} > \text{O}^{2-} > \text{F} > \text{F}^-$   
(C)  $\text{O}^{2-} > \text{F}^- > \text{F} > \text{O}$  (D)  $\text{O}^{2-} > \text{F}^- > \text{O} > \text{F}$
- The right order of ionization potential of Li, Be, B & C is :  
(A)  $\text{C} > \text{Be} > \text{B} > \text{Li}$  (B)  $\text{C} > \text{B} > \text{Be} > \text{Li}$  (C)  $\text{C} > \text{B} > \text{Li} > \text{Be}$  (D)  $\text{B} > \text{C} > \text{Be} > \text{Li}$
- The correct order of second ionization potential of C, N, O and F is  
(A)  $\text{C} > \text{N} > \text{O} > \text{F}$  (B)  $\text{O} > \text{N} > \text{F} > \text{C}$  (C)  $\text{O} > \text{F} > \text{N} > \text{C}$  (D)  $\text{F} > \text{O} > \text{N} > \text{C}$

- 15.** The correct sequence of the electron affinity of C, N, O and F is :  
 (A)  $C > N < O < F$  (B)  $O > N > C > F$  (C)  $C < N > O < F$  (D)  $C > N > O > F$
- 16.** The decreasing order of the ionization potential of the following elements is :  
 (A)  $Ne > Cl > P > S > Al > Mg$  (B)  $Ne > Cl > P > S > Mg > Al$   
 (C)  $Ne > Cl > S > P > Mg > Al$  (D)  $Ne > Cl > S > P > Al > Mg$
- 17.** One element has atomic weight 39. Its electronic configuration is  $1s^2, 2s^2 2p^6, 3s^2 3p^6 4s^1$ . The true statement for that element is :  
 (A) More (IE) (B) Transition element  
 (C) Isotone with  $^{36}_{18}Ar$ . (D) Stable oxide  $M_2O$
- 18.** Is a data sufficiency problem in which it is to be decided on the basis of given statements whether the given question can be answered or not. (No matter whether the answer is yes or no)  
 If  $\Delta H_{\text{solution}} < 0$  then compound acts as ionic in aqueous solution. Is  $AlCl_3(s)$  ionic in aqueous solution.  
**Statement 1 :** L.E. of  $AlCl_3$  is 5137 kJ/mol  
**Statement 2 :**  $\Delta H_{\text{HE}}$  of  $Al^{+3}$  ion is  $-4665 \text{ kJ/mol}^{-1}$  &  $\Delta H_{\text{HE}}$  of  $Cl^-$  is  $-381 \text{ kJ/mol}^{-1}$   
 (A) Statments (A) alone is sufficient but statement (B) is not sufficient  
 (B) Statments (B) alone is sufficient but statement (A) is not sufficient  
 (C) Both statement together are sufficient but neither statement alone is sufficient  
 (D) Statement (A) & (B) together are not sufficient
- 19.** Match List I with List II and select the correct answer using the codes given below :
- | <b>List I</b>   |          | <b>List II</b> |          |
|---|----------|----------------|----------|
| A. $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^2$                       |          | 1. In          |          |
| B. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^1$               |          | 2. Pd          |          |
| C. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^6 4d^{10}$  |          | 3. Ca          |          |
| D. $1s^2, 2s^2 2p^6, 3d^{10}, 4s^2 4p^6 4d^{10}, 5s^2 5p^1$ |          | 4. Cu          |          |
| <b>Code : A</b>   | <b>B</b> | <b>C</b>       | <b>D</b> |
| (A) 1   | 2        | 3              | 4        |
| (B) 1   | 3        | 2              | 4        |
| (C) 3   | 4        | 2              | 1        |
| (D) 1   | 4        | 3              | 2        |
- 20.** Match List I (Atomic Number of Element) with List II (Block to which the Element Belongs) and select the correct answer using the codes given below :
- | <b>List I</b>              |          | <b>List II</b>                       |          |
|----------------------------|----------|--------------------------------------|----------|
| (Atomic Number of Element) |          | (Block to which the element belongs) |          |
| A. 24                      |          | 1. p                                 |          |
| B. 38                      |          | 2. f                                 |          |
| C. 49                      |          | 3. s                                 |          |
| D. 59                      |          | 4. d                                 |          |
| <b>Code : A</b>            | <b>B</b> | <b>C</b>                             | <b>D</b> |
| (A) 2                      | 1        | 3                                    | 4        |
| (B) 4                      | 3        | 1                                    | 2        |
| (C) 2                      | 3        | 1                                    | 4        |
| (D) 4                      | 1        | 3                                    | 2        |
- 21.** The first ionization potentials (eV) of Be and B respectively are :  
 (A) 8.29eV, 9.32 eV (B) 9.32 eV, 9.32 eV (C) 8.29 eV, 8.29 eV (D) 9.32 eV, 8.29 eV
- 22.** Alkaline earth metals always form dipositive ions due to  
 (A)  $IE_2 - IE_1 > 10 \text{ eV}$  (B)  $IE_2 - IE_1 = 17 \text{ eV}$   
 (C)  $IE_2 - IE_1 < 10 \text{ eV}$  (D) None of these
- 23.** The correct order of second I.P.  
 (A)  $Na < Mg > Al < Si$  (B)  $Na > Mg < Al > Si$   
 (C)  $Na > Mg > Al < Si$  (D)  $Na > Mg > Al > Si$

- 24.** Two elements A & B are such that B.E. of A-A, B-B & A-B are respectively 81 Kcal/mole, 64Kcal/mole, 76 kcal/mole & electronegativity of B is 2.4 then the electronic configuration of A is, (if  $X_B > X_A$ )  
(A)  $1s^2 2s^2 2p^1$  (B)  $[\text{Ne}] 3s^2 3p^1$  (C)  $[\text{He}] 2s^2 2p^4$  (D)  $[\text{Ne}] 3s^2 3p^5$
- 25.** Moving from right to left in a periodic table, the atomic size is:  
(A) increased (B) decreased (C) remains constant (D) none of these
- 26.** The increasing order of electronegativity in the following elements:  
(A) C, N, Si, P (B) N, Si, C, P (C) Si, P, C, N (D) P, Si, N, C
- 27.** One element has atomic weight 39. Its electronic configuration is  $1s^2, 2s^2 2p^6, 3s^2 3p^6 4s^1$ . The true statement for that element is:  
(A) High value of IE (B) Transition element  
(C) Isotone with  $^{38}_{18}\text{Ar}$  (D) None
- 28.** The decreasing size of  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Cl}^-$  &  $\text{S}^{2-}$  follows the order:  
(A)  $\text{K}^+ > \text{Ca}^{+2} > \text{S}^{2-} > \text{Cl}^-$  (B)  $\text{K}^+ > \text{Ca}^{+2} > \text{Cl}^- > \text{S}^{2-}$   
(C)  $\text{Ca}^{+2} > \text{K}^+ > \text{Cl}^- > \text{S}^{2-}$  (D)  $\text{S}^{2-} > \text{Cl}^- > \text{K}^+ > \text{Ca}^{+2}$
- 29.** Which of the following has the maximum number of unpaired electrons  
(A)  $\text{Mg}^{2+}$  (B)  $\text{Ti}^{3+}$  (C)  $\text{V}^{3+}$  (D)  $\text{Fe}^{2+}$
- 30.** The incorrect statement among the following is:  
(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
- 31.** The electrons, identified by  $n$  &  $l$  ;  
(i)  $n = 4, l = 1$  (ii)  $n = 4, l = 0$   
(iii)  $n = 3, l = 2$   
(iv)  $n = 3, l = 1$  can be placed in order of increasing energy, from the lowest to highest as :  
(A) (iv) < (ii) < (iii) < (i) (B) (iii) < (ii) < (iv) < (i)  
(C) (i) < (iii) < (ii) < (iv) (D) (iii) < (i) < (iv) < (ii)
- 32.** According to the Modern Periodic law of elements, the variation in properties of elements is related to their:-  
(A) Nuclear masses (B) Atomic numbers  
(C) Nuclear neutron-proton number ratio (D) Atomic masses
- 33.** The reduction in atomic size with increase in atomic number is a characteristic of elements of :-  
(A) d-block (B) f-block (C) Radioactive series (D) High atomic masses
- 34.** Which of the following groupings represent a collection of isoelectronic species ?  
(At. no. Cs = 55, Br = 35)  
(A)  $\text{N}^{3-}$ ,  $\text{F}^-$ ,  $\text{Na}^+$  (B) Be,  $\text{Al}^{3+}$ ,  $\text{Cl}^-$  (C)  $\text{Ca}^{2+}$ ,  $\text{Cs}^+$ , Br (D)  $\text{Na}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$
- 35.** The atomic numbers of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are respectively 23, 24, 25 and 26. Which one of these may be expected to have the highest second ionization enthalpy ?  
(A) Cr (B) Mn (C) Fe (D) V
- 36.** Which one of the following sets of ions represents the collection of isoelectronic species ?  
(A)  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{Mg}^{2+}$ ,  $\text{Sc}^{3+}$  (B)  $\text{Na}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Sc}^{3+}$ ,  $\text{F}^-$  (C)  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Sc}^{3+}$ ,  $\text{Cl}^-$  (D)  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Al}^{3+}$ ,  $\text{Cl}^-$
- 37.** Which of the following ions has the highest value of ionic radius ?  
(A)  $\text{O}^{2-}$  (B)  $\text{B}^{3+}$  (C)  $\text{Li}^+$  (D)  $\text{F}^-$

- 38.** Among  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{P}_2\text{O}_3$  and  $\text{SO}_2$ , the correct order of acid strength is :-  
 (A)  $\text{Al}_2\text{O}_3 < \text{SiO}_2 < \text{SO}_2 < \text{P}_2\text{O}_3$  (B)  $\text{SiO}_2 < \text{SO}_2 < \text{Al}_2\text{O}_3 < \text{P}_2\text{O}_3$   
 (C)  $\text{SO}_2 < \text{P}_2\text{O}_3 < \text{SiO}_2 < \text{Al}_2\text{O}_3$  (D)  $\text{Al}_2\text{O}_3 < \text{SiO}_2 < \text{P}_2\text{O}_3 < \text{SO}_2$
- 39.** The formation of the oxide ion  $\text{O}^{2-}(\text{g})$  requires first an exothermic and then an endothermic step as shown below :-  
 $\text{O}(\text{g}) + e^- = \text{O}^-(\text{g}), \Delta H^\circ = -142 \text{ kJ mol}^{-1}$   
 $\text{O}^-(\text{g}) + e^- = \text{O}^{2-}(\text{g}), \Delta H^\circ = 844 \text{ kJ mol}^{-1}$   
 This is because :-  
 (A)  $\text{O}^-$  ion will tend to resist the addition of another electron  
 (B) Oxygen has high electron affinity  
 (C) Oxygen is more electronegative  
 (D)  $\text{O}^-$  ion has comparatively larger size than oxygen atom
- 40.** In which of the following arrangements the order is NOT according to the property indicated against it ?  
 (A)  $\text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^+ < \text{F}^-$  – increasing ionic size  
 (B)  $\text{B} < \text{C} < \text{N} < \text{O}$  – increasing first ionization enthalpy  
 (C)  $\text{I} < \text{Br} < \text{F} < \text{Cl}$  – increasing electron gain enthalpy (with negative sign)  
 (D)  $\text{Li} < \text{Na} < \text{K} < \text{Rb}$  – increasing metallic radius
- 41.** Which of the following oxides is amphoteric in character ?  
 (A)  $\text{SnO}_2$  (B)  $\text{SiO}_2$  (C)  $\text{CO}_2$  (D)  $\text{CaO}$
- 42.** Pick out the isoelectronic structure from the following :  
 I.  $^+\text{CH}_3$  II.  $\text{H}_3\text{O}^+$  III.  $\text{NH}_3$  IV.  $\text{CH}_3^-$   
 (A) I and II (B) III and IV (C) I and III (D) II, III and IV
- 43.** The lanthanide contraction is responsible for the fact that  
 (A) Zr and Y have about the same radius (B) Zr and Nb have similar oxidation state  
 (C) Zr and Hf have about the same radius (D) Zr and Zn have the same oxidation state
- 44.** Which of the following factors may be regarded as the main cause of lanthanide contraction ?  
 (A) poor shielding of one of 4f electron by another in the subshell  
 (B) effective shielding of one of 4f electrons by another in the subshell  
 (C) poorer shielding of 5d electrons by 4f electrons  
 (D) greater shielding of 5d electrons by 4f electrons
- 45.** The increasing order of the first ionization enthalpies of the elements B, P, S and F (lowest first) is :-  
 (A)  $\text{F} < \text{S} < \text{P} < \text{B}$  (B)  $\text{P} < \text{S} < \text{B} < \text{F}$  (C)  $\text{B} < \text{P} < \text{S} < \text{F}$  (D)  $\text{B} < \text{S} < \text{P} < \text{F}$
- 46.** Which one of the following sets of ions represents a collection of isoelectronic species ?  
 (A)  $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-, \text{S}^{2-}$  (B)  $\text{Li}^+, \text{Na}^+, \text{Mg}^{+2}, \text{Ca}^{+2}$  (C)  $\text{K}^+, \text{Cl}^-, \text{Ca}^{+2}, \text{Sc}^{+3}$  (D)  $\text{Ba}^{+2}, \text{Sr}^{+2}, \text{K}^{+2}, \text{Ca}^{+2}$
- 47.** 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 ?  
 (A) In both the alkali metals and the halogens the chemical reactivity decreases with increase in atomic number down the group  
 (B) Chemical reactivity increases with increase in atomic number down the group in both the alkali metals and halogens  
 (C) In alkali metals the reactivity increases but in the halogen it decreases with increase in atomic number down the group  
 (D) The reactivity decreases in the alkali metals but increases in the halogens with increase in atomic number down the group
- 48.** Zinc does not show the variable valency as elements of d-block, because :  
 (A) This is soft metal (B) d-orbital is full  
 (C) Its melting point is low (D) Volatile Metal

## SECTION - 2 : MULTIPLE CHOICE CORRECT QUESTIONS

49. Which one of the following statement (s) is (are) correct?  
 (A) The electronic configuration of Cr is  $[\text{Ar}] 3d^5 4s^1$ . (Atomic No. of Cr = 24)  
 (B) The magnetic quantum number may have a negative value  
 (C) In silver atom, 23 electrons have a spin of one type and 24 of the opposite type. (Atomic No. of Ag = 47)  
 (D) The oxidation state of nitrogen in  $\text{HN}_3$  is  $-3$ .
50. If Aufbau's principle and Hund's rule were not followed.  
 (A) K would have been d-block element & paramagnetic.  
 (B) Cu would have been s-block element.  
 (C) Cr would have been diamagnetic  
 (D)  $\text{Fe}^{+3}$  ion would have 5 unpaired electrons.
51. Which of the following pair have nearly the same atomic radii  
 (A) Al and Ga (B) Fe and Ni (C) Zr and Hf (D) Pt & Pd
52. Which of the following is false -  
 (A)  $\text{Cr}^{2+}$  (g) ion has greater magnetic moment compared to  $\text{Co}^{3+}$  (g)  
 (B) The magnitude of ionization potential of iron anion (monoanion) would be equal to electron gain enthalpy of iron.  
 (C) Lanthanide contraction is cause of lower I.P. of Pb than Sn  
 (D) If successive ionization energy are 332, 738, 849, 4080, 4958 (in kJ/mol). Then this element can be of 15th group
53. Which of the following general electronic configuration for transition elements is not correct :-  
 (A)  $(n+1)s^{1-2} nd^{1-10}$  (B)  $ns^{1-2} (n-1)d^{1-10}$  (Where  $n = 2, 3, 4, \dots$ )  
 (C)  $ns^{0,1,2} (n-1)s^2 p^6 d^{1-10}$  (D)  $(n-1)d^{1-10} ns^{0-2}$
54. Which of the following statement is/are not correct:-  
 (A) I.P. increases down the group  
 (B) IP of s-block elements is less than corresponding d-block elements  
 (C) If  $\Delta IP > 16 \text{ eV}$  higher oxidation state is more stable  
 (D) IP of halogen elements is maximum in their respective period
55. Out of the following statements which is/are correct :-  
 (A) H is an element of minimum atomic radius (B) He is an element of highest I.P.  
 (C) Cl is an element of highest EA (D) Li is an element of lowest I.P.
56. In which of the following sets of elements 1<sup>st</sup> element is more metallic than second.  
 (A) Ba, Ca (B) Sb, Sn (C) Ge, S (D) Na, F

## SECTION - 3 : COMPREHENSION BASED QUESTIONS

### Paragraph for Q.57 to Q.59

Ionic radius is defined as the distance between the nucleus and the outermost shell of an ion. The size of the cation of the same element decreases with the increase in positive charge. If  $Z/e$  ratio increases, the size decreases. According to Pauling, ionic radius depends on effective nuclear charge.

$$r_{\text{ion}} \propto \frac{1}{Z_{\text{eff}}} \quad \text{or} \quad r_{\text{ion}} = \frac{C}{Z_{\text{eff}}} A$$

For 10 electronic system  $C = 6.14$ .

57. Which of the following is correct ?  
 (A)  $\text{Sn}^{2+}$  is smaller in the size than  $\text{Sn}^{4+}$  (B)  $\text{Fe}^{3+}$  is bigger in size than  $\text{Sn}^{4+}$   
 (C)  $\text{F}^-$  is smaller than F (D)  $\text{Al}^{3+}$  is smaller than  $\text{Al}^{2+}$



58. Which one is largest in size ?  
 (A) Ne (B) F<sup>-</sup> (C) Na<sup>+</sup> (D) Al<sup>3+</sup>
59. The ionic radius of sodium is  
 (A) 0.82 Å (B) 0.905 (C) 0.35 (D) 0.865

#### SECTION - 4 : MATRIX - MATCH QUESTIONS

60. Match the following column and select the correct answer -

##### Column-I

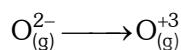
- (A) d-block element  
 (B) Halogen  
 (C) Alkali metal  
 (D) Noble gas

##### Column-II

- (P) 1s<sup>2</sup>, 2s<sup>2</sup>2s<sup>6</sup>, 3s<sup>2</sup>3p<sup>6</sup>, 4s<sup>1</sup>  
 (Q) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>2</sup>3p<sup>6</sup>  
 (R) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>2</sup>3p<sup>6</sup>3d<sup>6</sup>, 4s<sup>2</sup>  
 (S) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>5</sup>

#### SECTION - 5 : NUMERICAL ANSWER BASED QUESTIONS

61. The number of paired electrons in oxygen atom is:
62. Total number of inner transition elements are .....
63. Total number of enthalpy(s) (out of given) of O<sub>(g)</sub> which is/are associated with the conversion of



Given enthalpy(s) or heat : IE<sub>1</sub>, IE<sub>2</sub>, IE<sub>3</sub>, IE<sub>4</sub>, IE<sub>5</sub>

$\Delta_{\text{eg}}\text{H}_1, \Delta_{\text{eg}}\text{H}_2, \Delta_{\text{eg}}\text{H}_3$

Where I.E. = ionization enthalpy

$\Delta_{\text{eg}}\text{H}$  = electron gain enthalpy.

#### SECTION - 6 : SUBJECTIVE QUESTIONS

64. Li<sup>+</sup>, Mg<sup>2+</sup>, K<sup>+</sup>, Al<sup>3+</sup> (Arrange in increasing order of radii)
65. Among the elements B, Al, C and Si,  
 (a) which has the highest first ionization enthalpy?  
 (b) which has the most negative electron gain enthalpy?  
 (c) which has the largest atomic radius?  
 (d) which has the most metallic character?
66. Which of the elements Na, Mg, Si and P would have the greatest difference between the first and second ionization enthalpies. Briefly explain your answer.
67. The ionisation potentials of atoms A and B are 400 and 300 kcal mol<sup>-1</sup> respectively. The electron affinities of these atoms are 80.0 and 85.0 kcal mol<sup>-1</sup> respectively. Prove that which of the atoms has higher electronegativity.
68. The ionic radii of S<sup>2-</sup> and Te<sup>2-</sup> are 1.84 and 2.2 Å respectively. What would you predict for the ionic radius of Se<sup>2-</sup>.
69. Na and Mg<sup>+</sup> have same number of electrons. But removal of electron from Mg<sup>+</sup> requires more energy. Explain.

## SECTION - 7 : ASSERTION-REASON QUESTIONS

These questions contains, Statement I (assertion) and Statement II (reason).

- (A) Statement-I is true, Statement-II is true ; Statement-II is correct explanation for Statement-I.  
 (B) Statement-I is true, Statement-II is true ; Statement-II is NOT a correct explanation for statement-I  
 (C) Statement-I is true, Statement-II is false  
 (D) Statement-I is false, Statement-II is false

- 70. Statement -1** : Two successive ionisation energies of Argon are 56.8 eV and 36.8 eV respectively.  
**because**  
**Statement -2** :  $Z_{\text{eff}}$  of Ar ( $3s^23p^6$ ) is greater than  $\text{Ar}^+$  ( $3s^23p^5$ ).
- 71. Statement -1** : Electron affinity of fluorine is greater than chlorine.  
**because**  
**Statement -2** : Ionisation potential of fluorine is less than chlorine.
- 72. Statement -1** : Size of anion is larger than their parent atom.  
**because**  
**Statement -2** :  $Z_{\text{eff}}$  of anion is greater than that of their parent atom.
- 73. Statement -1** : Atomic radius of inert gases is largest in the period  
**because**  
**Statement -2** : Effective nuclear charge of inert gases is minimum
- 74. Statement -1** : 2<sup>nd</sup> IP of alkali metals is maximum in the period.  
**because**  
**Statement -2** : Alkali metals has smallest atomic size in the period.
- 75. Statement -1** : First ionization energy of nitrogen is lower than oxygen.  
**because**  
**Statement -2** : Across the period effective nuclear charge decreases.
- 76. Statement -1** : The third period contains only 8 elements and not 18 like 4th period.  
**because**  
**Statement -2** : In III period filling starts from  $3s^1$  and complete at  $3p^6$  whereas in IV period it starts from  $4s^1$  and complete after  $3d^{10}$  and  $4s^2$ .

## ANSWERS

• **SINGLE CHOICE CORRECT QUESTIONS**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (A)  | 2. (D)  | 3. (C)  | 4. (A)  | 5. (D)  |
| 6. (B)  | 7. (C)  | 8. (A)  | 9. (C)  | 10. (C) |
| 11. (A) | 12. (D) | 13. (A) | 14. (C) | 15. (A) |
| 16. (B) | 17. (D) | 18. (C) | 19. (C) | 20. (B) |
| 21. (D) | 22. (C) | 23. (B) | 24. (A) | 25. (A) |
| 26. (C) | 27. (C) | 28. (D) | 28. (D) | 30. (B) |
| 31. (A) | 32. (B) | 33. (B) | 34. (A) | 35. (A) |
| 36. (C) | 37. (A) | 38. (D) | 39. (A) | 40. (B) |
| 41. (A) | 42. (D) | 43. (C) | 44. (C) | 45. (D) |
| 46. (C) | 47. (C) | 48. (B) |         |         |

• **MULTIPLE CHOICE CORRECT QUESTIONS**

- |           |           |            |           |          |
|-----------|-----------|------------|-----------|----------|
| 49. (ABC) | 50. (ABC) | 51. (ABCD) | 52. (ACD) | 53. (AB) |
| 54. (ACD) | 55. (ABC) | 56. (ACD)  |           |          |

• **COMPREHENSION BASED QUESTIONS**

- |         |         |         |
|---------|---------|---------|
| 57. (D) | 58. (B) | 59. (B) |
|---------|---------|---------|

• **MATRIX MATCH QUESTIONS**

60. (A) - (R), (B) - (S), (C) - (P), (D) - (Q)

• **NUMERICAL ANSWER BASED QUESTIONS**

- |         |          |         |
|---------|----------|---------|
| 61. (6) | 62. (28) | 63. (5) |
|---------|----------|---------|

• **SUBJECTIVE QUESTIONS**

64.  $\text{Al}^{3+} < \text{Mg}^{2+} < \text{Li}^+ < \text{K}^+$   
 65. (a) C, (b) Si, (c) Al, (d) Al  
 66. Na, because during  $\text{IP}_2$  electron is removed from stable octet configuration ( $\text{ns}^2 \text{np}^6$ ).  
 67.  $\text{EN}_1 > \text{EN}_2$   
 68. Ionic radius of  $\text{Se}^{2-}$  is expected to be in between the ionic radii of  $\text{S}^{2-}$  and  $\text{Te}^{2-}$ . Thus

$$\text{Ionic radius of } \text{Se}^{2-} = \frac{1.84 + 2.21}{2} = 2.025 \text{ \AA}$$

69.  $\text{Mg}^+$  has more  $Z_{\text{eff}}$ .

• **ASSERTION-REASON QUESTIONS**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 70. (D) | 71. (D) | 72. (C) | 73. (C) | 74. (C) |
| 75. (D) | 76. (A) |         |         |         |