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| **Karan Arora** **R.L. Chemistry Classes M: 99968-68554**  **Class : XI**  **“PERIODIC CLASSIFICATION OF ELEMENTS”** |

**Assignment – I**

1. a) Write the electronic configurations of the elements given below:

A (At. No. = 9), B (At. No. = 12), C (At. No. = 29), D (At. No. = 54) and E (At. No. = 58)

b) Also predict the period, group number and block to which they belong.

c) Classify them as representative elements, noble gases, transition and inner transition elements.

1. Predict the position of the element in the periodic table satisfying the electronic configuration,

(n – 1) d1 ns2 for n = 4.

1. Elements A, B, C, D and E have the following electronic configurations.

A: 1s2 2s2 2p1 B: 1s2 2s2 2p6 3s2 3p1 C: 1s2 2s2 2p6 3s2 3p3

D: 1s2 2s2 2p6 3s2 3p5 E: 1s2 2s2 2p6 3s2 3p6 4s2

Which among these will belong to the same group in the periodic table?

1. Which of the following species are isoelectronic?

a) O2- b) Na c) F d) Mg2+

e) Cl - f) Al3+ h) Ne

Arrange them in decreasing order of their size.

1. Which one of the following pairs would have a large size?

a) K or K+ b) Br or Br - c) O2- or F - d) Li+ or Na+

e) P or As f) Na+ or Mg2+

1. Arrange the following in order of increasing radii?

a) I, I+, I- b) C, N, Si, P c) O2-, N3-, S2-, F -

1. Select from each group, the species which has the smallest radius starting appropriate reason.

a) O, O -, O2- b) K+, Ca2+, Ar c) Si, P, Cl

**Answers**

1. b)

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Block | Group No. | Period No. |
| A | p | 17 | 2nd |
| B | s | 2 | 3rd |
| C | d | 11 | 4th |
| D | p | 18 | 5th |
| E | f |  |  |

c) A,B → Representative, C - Transition, D – Noble gas, E – Inner transition

2. d – block, Group No. 3 3. A & B 4. O2- > Ne > Mg2+ > Al3+

5. a) K b) Br - c) O2- d) Na+ e) As f) Na+

6. a) I+ < I < I - b) N < C < P < Si c) F - < O2- < N3- < S2- 7. a) O b) Ca2+ c) Cl

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**Assignment – II**

1. Calculate the energy required to convert all the atoms of magnesium to magnesium ions present in 24 mg of magnesium vapours? First and second ionization enthalpies of Mg are 737.76 and 1450.73 KJ mol-1 respectively.
2. Calculate the energy in joules required to convert all atoms of sodium to sodium ions present in 2.3 mg of sodium vapours? Ionization enthalpy of sodium is 495 KJ mol-1 (Atomic mass of Na = 23).
3. The ionization potential of hydrogen is 13.6 eV. Calculate the energy in KJ required to produce 0.1 mole of H+ ions. (Given, 1 eV = 96.49 KJ mol-1 ).
4. The first and second ionization potentials of helium atoms are 24.58 eV and 54.4 eV respectively. Calculate the energy in KJ required to produce 1 mole of He2+ ions?
5. The H1 and H2 of Mg (g) are 740 and 1450 KJ mol-1. Calculate the percentage of Mg+ (g) and Mg2+ (g) if 1g of Mg (g) absorbs 50 KJ of energy.
6. The electronic configuration for the following neutral atoms are given for use in questions.

a) 1s2 2s2 2p6 3s2  b) 1s2 2s2 2p6 3s1  c) 1s2 2s2 2p4  d) 1s2 2s2 2p5  e) 1s2 2s2 2p6

i) Which of the electronic configurations given above would you expect for the noble gas?

ii) Which of the electronic configurations given above would you expect to have the lowest ionization enthalpy.

iii) List the above configurations in order of increasing ionization enthalpy.

1. The first H­1) and the second (H2) ionization enthalpies (KJ mol-1) of a few elements designated by Roman numerals are shown below:

Elements H1 H2

I 2372 3251

II 520 7300

III 900 1760

IV 1680 3380

Which of the above elements is likely to be: (a) a reactive metal (b) a reactive non – metal

(c) a noble gas (d) a metal that forms a stable binary halide of the formula AX2 (X = halogen).

1. Arrange the following in the order of increasing ionization enthalpy:

a) 1s2 2s2 2p6 3s2 b) 1s2 2s2 2p63s1 c) 1s2 2s2 2p6 d) 1s2 2s2 2p2 e) 1s2 2s2 2p3

1. The electronic configurations of some neutral atoms are given below:

(i) 1s2 2s2 (ii) 1s2 2s2 2p1  (iii) 1s2 2s2 2p4 (iv) 1s2 2s2 2p3

Which of these electronic configuration would be expected to have the highest

a) H1  b) H2  c) H3  d) H4

1. Among the elements Li, K, Ca, S and Kr, which one has the lowest first ionization enthalpy? Which has the highest first ionization enthalpy?
2. Which of the following pairs of elements would you expect to have a lower first ionization enthalpy?

a) Cl or F b) Cl or S c) K or Ar d) Kr or Xe

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1. For each of the following pairs, predict which one has lower first ionization enthalpy?

a) N or O b) Na or Na+ c) Be+ or Mg2+ d) I or I -

1. Predict which atom in each of the following pairs has the greater first ionization enthalpy ?

(a) B and C (b) N and O (c) F and Ne

1. The first H­1) and the second (H2) ionization enthalpies (KJ mol-1) of three elements I, II, III are given below: I II III

H1 403 549 1142

H2 2640 1060 2080

Identify the element which is likely to be : (a) non metal (b) an alkali metal (c) an alkaline earth metal.

1. From each set, choose the atom which has the largest ionization enthalpy ?

a) F, O, N b) Mg, P, Ar c) B, Al, Ga

**Answers**

1. 2.188 KJ 2. 49.5 J 3. 131.226 KJ 4. 7620.780 KJ

5. Mg+ (g) = 68.35% and Mg2+ (g) = 31.65% 6. (i) e, (ii) b, (iii) b < a < c < d < e

7. a = II, b = IV, c = I, d = III 8. (b) < (a) < (d) < (e) < (c)

9. (a) (iv), (b) (iii), (c) (i), (d) (ii) 10. Lowest: K, Highest: Kr

11. (a) Cl (b) S (c) K (d) Xe 12. (a) O (b) Na (c) Be+ (d) I

13. (a) C (b) N (c) Ne 14. (a) III (b) I (c) II 15. (a) F (b) Ar (c) B

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**Assignment - III**

1. The electron gain enthalpy of chlorine is – 349 KJ mol-1. How much energy in KJ is released when 3.55 g of chlorine is converted completely into Cl – ion in the gaseous state?
2. The amount of energy released when 1 x 1010 atoms of chlorine in vapour state are converted to Cl – ion

according to the equation, Cl (g) + e- Cl –(g) is 57.86 x 10-10 J

Calculate the electron gain enthalpy of chlorine atom in terms of KJ mol-1 and eV per atom.

1. The electron affinity of bromine is 3.36 eV. How much energy in Kcal is released when 8 g of bromine is completely converted to Br – ions in the gaseous state?(1eV = 23.06 Kcal mol-1).
2. The amount of energy released when one million atoms of iodine are completely converted into I – ions in the vapour state according to the equation, I (g) + e- I –(g) is 4.9 x 10-13 j.

Calculate the electron affinity of iodine in: a) KJ/mol b) in eV per atom

1. Which of the following elements has the most negative electron gain enthalpy? (More – ve value first)

a) [Ne] 3s2 3p3 b) [Ne] 3s2 3p4 c) [Ne] 3s2 3p5

1. Which of the following pairs of elements would have more negative electron gain enthalpy? (More – ve value first)

a) N or O b) F or Cl c) S or O d) C or Si

1. Arrange the elements with the following electronic configurations in order of increasing electron gain enthalpy. (More negative value first)

a) 1s2 2s2 2p5 b) 1s2 2s2 2p4  c) 1s2 2s2 2p3  d) 1s2 2s2 2p6 3s2 3p4

1. Arrange the following elements in order of decreasing electron gain enthalpy: B, C, N, O.
2. The electron gain enthalpies of halogens decrease in the order F > Cl > Br > I. Comment upon the statement (More negative value first)
3. Predict the formulas of the stable binary compounds that would be formed by the following pairs of elements:

a) Silicon and oxygen b) Aluminium and bromine

c) Calcium and iodine d) Element 114 and fluorine

**Answers**

1. 34.9 KJ 2. - 348.49 KJ, - 3.61 eV/ atom 3. 7.748 Kcal 4. a) 295 KJ/mol b) 3.06 eV/atom

5. C 6. (a) O (b) Cl (c) S (d) C 7. (a) > (d) > (b) > (c) 8. O, C, B, N

9. The statement is wrong. The actual order is I < Br < F < Cl

10. (a) SiO2 (b) AlBr3 (c) CaI2 (d) MF4

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**N.C.E.R.T INTEXT QUESTIONS**

1. What would be the IUPAC name and symbol for the element with atomic number 120?
2. How would you justify the presence of 18 elements in the 5th period of the Periodic Table.
3. The elements Z = 117 and Z = 120 have not yet been discovered. In which family / group would you place these elements and also give the electronic configuration in each case.
4. Considering the atomic number and position in the periodic table, arrange the following elements in the increasing order of metallic character : Si, Be, Mg, Na, P.
5. Which of the following species has the largest and the smallest size : Mg , Mg2+ , Al , Al3+ .
6. The first ionization enthalpy ( H) values of the third periodic elements, Na, Mg and Si are respectively 496, 737 and 786 KJ mol-1 predict whether the H value for Al will be more close to 575 or 760 KJ mol-1? Justify your answer.
7. Which of the following will have the most negative electron gain enthalpy and which the least negative? P, S, Cl, F. Explain your answer.
8. Using the Periodic Table , predict the formulas of the compounds which might be formed by the following pairs of elements : a) Silicon and Bromine b) Aluminium and Sulphur
9. Are the oxidation state and covalency of Al in [AlCl(H2O)6]2+ same ?
10. Show by a chemical reaction with water that Na2O is a basic oxide and Cl2O7 is an acidic oxide.

**N.C.E.R.T EXERCISE**

1. What is the basic theme of organization in the periodic table?
2. Which important property did Mendeleev use to classify the elements in his periodic table and did he stick to that ?
3. What is the basic difference in approach between Mendeleev’s Periodic Law and the Modern Periodic Law ?
4. On the basis of quantum numbers, justify that the sixth period of the periodic table should have 32 elements.
5. In terms of period and group, where would you locate the element with Z = 114 ?
6. Write the atomic number of the element in the third period and seventeenth group of the periodic table.
7. Which element do you think would have been named by

a) Lawrence Berkeley Laboratory b) Seaborg’s group ?

1. Why do elements in the same group have similar physical and chemical properties ?
2. What does atomic radius and ionic radius mean to you ?
3. How do atomic radii vary in a period and in a group ? How do you explain the variation ?
4. What do you understand by isoelectronic species ? Name the species that will be isoelectronic with each of the following atoms or ions : a) F - b) Ar c) Mg2+ d) Rb+
5. Consider the following species: N3- , O2- , F - , Na+ , Mg2+ and Al3+ .

a) What is common in them ? b) Arrange them in order of increasing ionic radii ?

1. Explain why cations are smaller and anions are larger in radii then their parent atoms ?
2. What is the significance of the term “isolated gaseous atom” and “ground state” while defining the ionization enthalpy and electron gain enthalpy ?

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1. Energy of an electron in the ground state of the hydrogen atom is – 2.18 x 10-18 J. Calculate the ionization enthalpy of atomic hydrogen in terms of KJ mol-1 .
2. Among the 2nd period elements, the actual ionization energies are in the order :

Li < B < Be < C < O < N < F < Ne. Explain why :

a) Be has higher H than B b) O has lower H than N and F ?

1. How would you explain the fact that the first ionization enthalpy of sodium is lower than that of magnesium but its second ionization enthalpy is higher than that of magnesium ?
2. What are the various factors due to which the ionization enthalpy of the main group elements tends to decrease down the group ?
3. The first ionization enthalpy values (in KJ mol-1) of group 13 elements are :

B Al Ga In Tl

801 577 579 558 589 , How will you explain this deviation from the general trend ?

1. Which of the following pairs of elements would have a more negative electron gain enthalpy ?

a) O or F b) F or Cl

1. Would you expect the second electron gain enthalpy of O as positive, more negative or less negative than the first ? Justify your answer.
2. What is the basic difference between the terms electron gain enthalpy and electronegativity ?
3. How would you react to the statement that the electronegativity of N on Pauling scale is 3∙0 in all the nitrogen compounds ?
4. Describe the theory associated with the radius of an atom as it (a) gains an electron (b) loses an electron
5. Would you expect the first ionization enthalpies of two isotopes of the same element to be same or different ? Justify your answer .
6. What are major differences between metals and non – metals ?
7. Use the periodic table to answer the following questions :

a) Identify an element with five electrons in the outer sub shell.

b) Identify the element that would tend to lose two electrons.

c) Identify the element that would tend to gain two electrons.

d) Identify the group having metal, non – metal, liquid as well as gas at room temperature>

1. The increasing order of reactivity among group 1 elements is Li < Na < K < Rb < Cs, whereas that of group 17 is F > Cl > Br > I. Explain ?
2. Write the general electronic configuration of s-, p-, d- and f- block elements :
3. Assign the position of the elements having outer electronic configuration : a) ns2 np4 for n = 3

b) (n-1) d2 ns2 for n = 4 c) (n-2) f 7 (n-1)d1 ns2 for n = 6 in the periodic table .

1. Predict the formula of the stable binary compounds that would be formed by the combination of the following pairs of elements .

a) Lithium and oxygen b) Magnesium and nitrogen c) Aluminium and iodine

d) Silicon and oxygen e) Phosphorus and fluorine f) Element 71 and fluorine

1. In the modern periodic table, the period indicate the value of :

a) atomic number b) mass number c) principal quantum number d) azimuthal quantum number

1. Considering the elements, F, Cl, O and N, the correct order of their chemical reactivity in terms of oxidizing property is :

a) F > Cl >O > N b) F > O > Cl > N c) Cl > F > O > N d) O > F > N > Cl

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1. The first H­1) and the H­2) ionization enthalpies (in KJ mol-1) and the H­) electron gain enthalpy (in KJ mol1) of a few elements are given below :

Element H­1 H­2 H­

I 520 7300 - 60

II 419 3051 - 48

III 1681 3374 - 328

IV 1008 1846 - 295

V 2372 5251 + 48

VI 738 1451 - 40

Which of the above element is likely to be :

a) the least reactive metal b) the most reactive metal

c) the most reactive non – metal d) the least reactive non – metal

e) the metal which can form a stable binary halide of the formula MX2 (X = halogen) ?

f) the metal which can form predominantly stable covalent halide of the formula MX (X = halogen) ?

1. Which of the following statements related to the modern periodic table is incorrect ?

a) The p-block has 6 columns, because a maximum of 6 electrons can occupy all the orbitals in a p-subshell.

b) The d-block has 8 columns, because a maximum of 8 electrons can occupy all the orbitals in a d- subshell.

c) Each block contain a number of columns equals to the number of electrons that can occupy that subshell.

d) The block indicates value of azimuthal quantum number (l) for the last subshell that received electrons in building up the electronic configuration.

1. Anything that influences the valence electrons will affect the chemistry of the element. Which one of the following factors does not affect the valence shell ?

|  |  |
| --- | --- |
| a) Valence principle quantum number (n) | b) Nuclear charge (Z) |
| c) Nuclear mass | d) Number of core electrons |

1. The size of isoelectronic species – F - , Ne and Na+ is affected by :

|  |  |
| --- | --- |
| a) Nuclear charge (Z) | b) Valence principle quantum number (n) |
| c) electron-electron interaction in the outer orbital | d) none of the factors because their size is the same |

1. Which of the following statements is incorrect in relation to ionization enthalpy ?

a) Ionization enthalpy increases for each successive electron

b)The greatest increase in ionization enthalpy is experienced on removal of electrons from core noble gas configuration.

c) End of valence electrons is marked by a big jump in ionization enthalpy.

d) Removal of electron from orbitals bearing lower ‘n’ value is easier than from orbital having higher ‘n’ value.

1. Considering the elements B, Al, Mg and K, the correct order of their metallic character is :

a) B >Al > Mg > K b) Al > Mg > B > K c) Mg > Al > K > B d) K > Mg > Al > B

1. Considering the elements B, C, N, F and Si, the correct order of their non – metallic character is :

a) B > C > Si > N > F b) Si > C > B > N > F c) F > N > C > B > Si d) F > N > C > Si > B

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**COMPETITION FOCUS – 1**

1. Consider the isoelectronic species, Na+, Mg2+ , F – and O2- . The correct order of increasing length of their radii is \_\_\_\_\_\_ .

|  |  |
| --- | --- |
| a) F - < O2- < Mg2+ < Na+ | b) Mg2+ < Na+ < F - < O2- |
| c) O2- < F - < Na+ < Mg2+ | d) O2- < F - < Mg2+ < Na+ |

1. Which of the following is not an actinoids ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Curium (Z = 96) | b) Californium (Z = 98) | c) Uranium (Z = 92) | d) Terbium (Z = 65) |

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 :

|  |  |  |  |
| --- | --- | --- | --- |
| a) s > p > d > f | b) f > d > p > s | c) p < d < s > f | d) f > p > s > d |

1. The first ionization enthalpies of Na, Mg, Al and Si are in the order :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Na < Mg > Al < Si | b) Na > Mg > Al > Si | c) Na < Mg < Al < Si | d) Na > Mg > Al < Si |

1. The electronic configuration of gadolinium (Atomic number = 64) is

|  |  |  |  |
| --- | --- | --- | --- |
| a) [Xe] 4f 3 5d5 6s2 | b) [Xe] 4f 7 5d2 6s1 | c) [Xe] 4f 7 5d1 6s2 | d) [Xe] 4f 8 5d6 6s2 |

1. 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 3d-orbitals are filled with electrons after 3p-orbitals and before 4s-orbitals.

d) The first ionization enthalpies of elements generally increase with increase in atomic number as we go along a period.

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

|  |  |  |  |
| --- | --- | --- | --- |
| a) F > Cl > Br > I | b) F > Cl < Br > I | c) F < Cl > Br > I | d) F < Cl < Br < I |

1. The period number in the long form of the periodic table is equal to

a) Magnetic quantum number of any of element of the period.

b) atomic number of any element of the period.

c) maximum Principle quantum number of any element of the period.

d) maximum Azimuthal quantum number of any element of the period.

1. The elements in which electrons are progressively filled in 4f- orbital are called

|  |  |  |  |
| --- | --- | --- | --- |
| a) actinoids | b) transition elements | c) Lanthanoids | d) Halogens |

1. Which of the following is the correct order of size of the given species :

|  |  |  |  |
| --- | --- | --- | --- |
| a) I > I - > I+ | b) I+ > I - > I | c) I > I+ > I - | d) I - > I > I+ |

1. Electronic configurations of four elements A, B, C and D are given below :

A: 1s2 2s2 2p6 B: 1s2 2s2 2p4 C: 1s2 2s2 2p6 3s1 D: 1s2 2s2 2p5

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 |

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1. The formation of the oxide ion, O2- (g), from oxygen atom requires first an exothermic and then an endothermic step as shown below :

O (g) + e - → O – (g) ; Hᶱ = - 141 KJ mol-1

O – (g) + e - → O 2– (g) ; Hᶱ = + 780 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

**Answers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. b | 2. d | 3. a | 4. a | 5. c | 6. c | 7. c |
| 8. c | 9. c | 10. d | 11. a | 12. c |  |  |

**COMPETITION FOCUS – 2**

**(More than one option)**

1. Which of the following elements can show covalency greater than 4 ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Be | b) P | c) S | d) B |

1. Those elements impart colour to the flame on heating in it, the atoms of which require low energy for the ionization (i.e. Absorb energy in the visible region of spectrum). The elements of which of the following groups will impact colour to the flame ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 2 | b) 13 | c) 1 | d) 17 |

1. Which of the following sequences contain atomic numbers of only representative elements ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3, 35, 53, 87 | b) 2, 10, 22, 36 | c) 7, 17, 25, 37, 48 | d) 9, 35, 51, 88 |

1. Which of the following elements will gain one electron more readily in comparison to other elements of their group ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) S (g) | b) Na (g) | c) O (g) | d) Cl (g) |

1. Which of the following statements are correct ?

a) Helium has the highest first ionization enthalpy in the periodic table.

b) Chlorine has less negative electron gain enthalpy than Fluorine.

c) Mercury and Bromine are liquids at room temperature.

d) In any period, atomic radius of alkali metal is the highest.

1. Which of the following sets contain only isoelectronic ions ?

|  |  |
| --- | --- |
| a) Zn2+ , Ca2+ , Ga3+ , Al3+ | b) k+ , Ca2+ , Sc3+ , Cl - |
| c) P3- , S2- , Cl - , K+ | d) Ti 4+ , Ar , Cr3+ , V5+ |

1. In which of the following options order of arrangement does not agree with the variation of property indicated against it ?

|  |  |
| --- | --- |
| a) Al3+ < Mg2+ < Na+ < F - (increasing ionic size) | b) B < C < N < O (increasing first ionization enthalpy) |
| c) I < Br < Cl < F (increasing electron gain enthalpy) | d) Li < Na < K < Rb (increasing metallic radius) |

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1. Which of the following have no unit ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Electronegativity | b) Electron gain enthalpy | c) Ionization enthalpy | d) Metallic character |

1. Ionic radii vary in

a) inverse proportion to the effective nuclear charge

b) inverse proportion to the square of effective nuclear charge

c) direct proportional to the screening effect.

d) direct proportional to the square of screening effect.

1. An element belongs to 3rd period and group = 13 of the periodic table. Which of the following properties will be shown by the element ?

|  |  |
| --- | --- |
| a) Good conductor of electricity | b) Liquid, metallic |
| c) Solid, metallic | d) Solid, non-metallic |

1. The elements which are not radioactive and have been named after the names of planet are :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Hg | b) Np | c) Pu | d) Ra |

1. Which of the following processes do not involve absorption of energy :

|  |  |  |  |
| --- | --- | --- | --- |
| a) S (g) + e – → S – (g) | b) O – (g) + e – → O2– (g) | c) Cl (g) + e – → Cl – (g) | d) O (g) + e – → O – (g) |

1. Which of the following sequence contains atomic numbers of only representative elements

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3, 33, 53, 87 | b) 6, 14, 17, 38, 55 | c) 7, 17, 25, 37, 48 | d) 9, 35, 54, 88 |

1. Mark the correct statements out of the following :

a) Helium has the highest first ionization enthalpy in the periodic table.

b) Fluorine has less negative electron gain enthalpy than chlorine.

c) In any period, atomic radius of the noble gas is the highest.

d) Hg and Br are liquids at room temperature

1. In which of the following pairs, both the species have nearly the same size?

|  |  |  |  |
| --- | --- | --- | --- |
| a) K+, F - | b) Rb+, O2- | c) Li+, Mg2+ | d) Mg2+, Al3+ |

1. Which of the following are not d-block elements?

|  |  |  |  |
| --- | --- | --- | --- |
| a) [Xe] 5d1 6s2 | b) [Rn] 6d1 7s2 | c) [Xe] 4f 1 5d1 6s2 | d) [Rn] 5d2 7s2 |

1. Consider the following ionization steps :

M (g) → M+ (g) + e - ; H = 100 eV

M (g) → M2+ (g) +2 e - ; H = 250 eV

Select the correct statements :

|  |  |
| --- | --- |
| a) H­1 of M (g) is 100 eV | b) H­1 of M+ (g) is 150 eV |
| c) H­2 of M (g) is 250 eV | d) H­2 of M (g) is 150 eV |

**Answers**

1. b, c 2. a, c 3. a, d 4. a, d 5. a, c 6. b, c

7. b, c 8. a, d 9. a, c 10. a, c 11. a, b, c 12. a, c, d

13. a, b, d 14. a, b, c, d 15. a, b, c 16. c, d 17. a, b, d

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 10

**Karan Arora M: 99968-68554**

**COMPETITION FOCUS – 3**

1. According to periodic law of elements, the variation in properties of elements is related to their

|  |  |
| --- | --- |
| a) nuclear neutron-proton number ratios | b) atomic masses |
| c) nuclear masses | d) atomic numbers |

1. Eka-aluminium and Eka-silicon are known as

|  |  |
| --- | --- |
| a) Gallium and germanium | b) Aluminium and silicon |
| c) Iron and sulphur | d) Proton and silicon |

1. Lanthanoids are

a) 14 elements in the sixth period (atomic no. = 90 to 103) that are filling 4f-sublevel.

b) 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 5f-sublevel.

c) 14 elements in the sixth period (atomic no. = 58 to 71) that are filling 4f-sublevel.

d) 14 elements in the seventh period (atomic no. = 58 to 71) that are filling 4f-sublevel.

1. An element X belong to fourth period and fifteenth group of the periodic table. Which one of the following is true regarding the outer electronic configuration of X ? It has:

a) partially filled d-orbitals and completely filled s-orbitals.

b) completely filled s-orbitals and completely filled p-orbitals.

c) completely filled s-orbitals and half-filled p-orbitals.

d) half-filled d-orbitals and completely filled s-orbitals.

1. The general outer electronic configuration of transition metal is:

|  |  |  |  |
| --- | --- | --- | --- |
| a) ns2 nd1-10 | b) ns2 np1 (n-1)d1-10 | c) ns2 np6 (n-1)d1-10 | d) ns0-2 (n-1)d1-10 |

1. Element with valence shell electronic configuration as (n-1)d5 ns1 is placed

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1, s-block | b) 16, s-block | c) 7, s-block | d) 6, s-block |

1. The element with atomic number 113 has recently been discovered. Its electronic configuration is similar to that of

|  |  |  |  |
| --- | --- | --- | --- |
| a) Si | b) Ga | c) Bi | d) At |

1. An element with atomic number 106 has been discovered recently. Which of the following electronic configurations will it possess ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) [Rn] 5f 14 6d4 7s2 | b) [Rn] 5f 14 6d4 7s1 | c) [Rn] 5f 14 6d4 7s0 | d) [Rn] 5f 14 6d4 7s2 7p3 |

1. Atoms of the elements belonging to the same group of periodic table will have

|  |  |
| --- | --- |
| a) same number of protons | b) same number of electrons in the valence shell |
| c) same number of neutrons | d) same number of electrons |

1. Which of the following remains unchanged on descending a group in the periodic table

|  |  |  |  |
| --- | --- | --- | --- |
| a) Valence electrons | b) Atomic size | c) Density | d) Metallic character |

1. Point out the wrong statement, in a given period of the periodic table, the s-block elements has, in general, a lower value of

|  |  |  |  |
| --- | --- | --- | --- |
| a) Electronegativity | b) atomic radius | c) Ionization energy | d) Electron affinity |

1. Of the following pairs, the one containing examples of metalloid elements in the periodic table is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Na & K | b) F & Cl | c) Cu & Hg | d) Si & Ge |

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 11

1. The highly metallic element will have the configuration of

|  |  |  |  |
| --- | --- | --- | --- |
| a) 2, 8, 7 | b) 2, 8 , 8, 5 | c) 2, 8, 8, 1 | d) 2, 8, 2 |

1. Which of the following represents most electro positive element ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) [He] 2s1 | b) [He] 2s2 | c) [Xe] 6s1 | d) [Xe] 6s2 |

1. The five successive ionization energies of an element are 800, 2427, 3658, 25024 and 32824 KJ mol-1 respectively. The number of valence electrons is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3 | b) 5 | c) 4 | d) 2 |

1. Which among the following species has the same number of electrons in its outermost as well as penultimate shell ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Mg2+ | b) O 2– | c) F – | d) Ca2+ |

1. Which of the following transitions involves maximum amount of energy ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) M – (g) → M (g) | b) M (g) → M – (g) | c) M+ (g) → M2+ (g) | d) M2+ (g) → M3+ (g) |

1. Screening effect is not observed in

|  |  |  |  |
| --- | --- | --- | --- |
| a) He+ | b) Li2+ | c) Be3+ | d) in all the three |

1. In which case effective nuclear charge is minimum ?

|  |  |
| --- | --- |
| a) Be | b) Be2+ |
| c) Be3+ | d) all have the same effective nuclear charge |

1. Covalent radius of nitrogen is 70 pm. Hence covalent radius of boron is about

|  |  |  |  |
| --- | --- | --- | --- |
| a) 60 pm | b) 110 pm | c) 50 pm | d) 40 pm |

1. Which electronic configuration of an element has abnormally high difference between second and third ionization energy ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1s2 2s2 2p6 3s1 | b) 1s2 2s2 2p6 3s2 3p1 | c) 1s2 2s2 2p6 3s2 3p2 | d) 1s2 2s2 2p6 3s2 |

1. The correct order of decreasing first ionization energy is

|  |  |  |  |
| --- | --- | --- | --- |
| a) C > B > Be > Li | b) C > Be > B > Li | c) B > C > Be > Li | d) Be > Li > B > C |

1. The first ionization potential (eV) of Be and B respectively are

|  |  |  |  |
| --- | --- | --- | --- |
| a) 8∙29, 9∙32 | b) 9∙32, 8∙29 | c) 9∙32, 9∙32 | d) 8∙29, 8∙29 |

1. Which of the following configuration represents atoms of the element having the highest second ionization potential ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1s2 2s2 2p4 | b) 1s2 2s2 2p6 | c) 1s2 2s2 2p6 3s1 | d) 1s2 2s2 2p6 3s2 |

1. Electronic configuration of most electronegative element is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1s2 2s2 2p6 3s1 | b) 1s2 2s2 2p6 3s2 3p5 | c) 1s2 2s2 2p5 | d) 1s2 2s2 2p6 3s2 3p6 |

1. The first ionization energy for Li is 5.4 eV and electron affinity of Cl is 3.61 eV. The H (in KJ mol-1) for the reaction : Li (g) + Cl (g) → Li+ (g) + Cl – (g) ,

if the resulting ions do not combine with each other is (1 eV = 1.6 x 10-19 J )

|  |  |  |  |
| --- | --- | --- | --- |
| a) 70 | b) 100 | c) 170 | d) 270 |

1. Valence electron in the element A are 3 and that in element B are 6. Most probable compound formed from A to B is

|  |  |  |  |
| --- | --- | --- | --- |
| a) A2B | b) AB2 | c) A6B3 | d) A2B3 |

1. A, B and C are element in the third short period. Oxide of A is ionic, that of B is amphoteric and that of C is a giant molecule. A, B and C will have atomic numbers in the order

|  |  |  |  |
| --- | --- | --- | --- |
| a) A < B < C | b) C < B < A | c) A < C < B | d) B < A < C |

1. The correct order of radii is

|  |  |  |  |
| --- | --- | --- | --- |
| a) N < Be < B | b) F – < O2- < N3- | c) Na < Li < K | d) Fe3+ < Fe2+ < Fe4+ |

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 12

1. The set representing the correct order of first ionization potential is

|  |  |  |  |
| --- | --- | --- | --- |
| a) K > Na > Li | b) Be > Mg > Ca | c) B > C > N | d) Ge > Si > C |

1. In crystals of which of the following ionic compounds, would you except the maximum distance between centres of cations and anions.

|  |  |  |  |
| --- | --- | --- | --- |
| a) CsF | b) Csl | c) Lil | d) LiF |

1. Which of the following grouping represents a collection of isoelectronic species? (At. no; Cs = 55, Br = 35)

|  |  |  |  |
| --- | --- | --- | --- |
| a) Ca2+ , Cs+ , Br | b) Na+ , Ca2+ , Mg2+ | c) N3-, F –, Na+ | d) Be , Al3+ , Cl – |

1. The ions O2- , F - , Na+ , Mg2+ and Al3+ are isoelectronic. Their ionic radii show

a) a significant increase from O2- to Al3+

b) a significant decrease from O2- to Al3+

c) an increase from O2- to F – and then decrease from Na+ to Al3+

d) a decrease from O2- to F – and then increase from Na+ to Al3+

1. The ionic radii of isoelectronic species N3- , O2- and F - in Å are in the order :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1∙36 , 1∙40 , 1∙71 | b) 1∙36 , 1∙71 , 1∙40 | c) 1∙71 , 1∙40 , 1∙36 | d) 1∙71 , 1∙36 , 1∙40 |

1. The correct order of Ist ionization potential among the following elements Be , B , C , N , O is

|  |  |  |  |
| --- | --- | --- | --- |
| a) B < Be < C < O < N | b) B < Be < C < N < O | c) Be < B < C < N < O | d) Be < B < C < O < N |

1. Which of the following has highest value of ionic radius ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Li+ | b) B3+ | c) O2- | d) F – |

1. The formation of the oxide ion, O2- (g), requires first an exothermic and then an endothermic step as shown below : O (g) + e - → O – (g) ; Hᶱ = - 142 KJ mol-1 ; O – (g) + e - → O 2– (g) ; Hᶱ = + 844 KJ mol-1

This is because

a) oxygen is more electronegative.

b) Oxygen has high electron affinity

c) O – will tend to resist the addition of another electron

d) O – ion has comparatively larger size than oxygen atoms.

1. In which of the following arrangements, the order is NOT according to the property indicated against it ?

a) Al3+ < Mg2+ < Na+ < F - [ Increasing ionic size ]

b) B < C < N < O [ Increasing first ionization enthalpy ]

c) I < Br < F < Cl [ Increasing electron gain enthalpy with negative sign ]

d) Li < Na < K < Rb [ Increasing metallic radius ]

1. In the following , the element with the highest ionization enthalpy is

|  |  |  |  |
| --- | --- | --- | --- |
| a) [Ne] 3s2 3p1 | b) [Ne] 3s2 3p3 | c) [Ne] 3s2 3p2 | d) [Ne] 3s2 3p4 |

1. One mole of magnesium in the vapour state absorbed 1200 KJ mol-1 of energy. If the first and second ionization energies of Mg are 750 and 1450 KJ mol-1 respectively, the final composition of the mixture is

|  |  |
| --- | --- |
| a) 31 % Mg+ + 69 % Mg2+ | b) 69 % Mg+ + 31 % Mg2+ |
| c) 86 % Mg+ + 14 % Mg2+ | d) 14 % Mg+ + 86 % Mg2+ |

1. Which of the following sets of ions represents a collection of isoelectronic species?

|  |  |  |  |
| --- | --- | --- | --- |
| a) N3-, O2-, F –, S2- | b) Li+, Na+, Mg2+, Ca2+ | c) K+, Cl -, Ca2+, Sc3+ | d) Ba2+, Sr2+, K+, Ca2+ |

1. The increasing order of the first ionization enthalpy of the elements B, P, S and F (Lowest first) is

|  |  |  |  |
| --- | --- | --- | --- |
| a) B < P < S < F | b) B < S < P < F | c) F < S < P < B | d) P < S < B < F |

1. Which of the following species has the highest electron affinity ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) F – | b) O | c) O – | d) Na+ |

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 13

1. The size of following species increases in the order

|  |  |
| --- | --- |
| a) Mg2+< Na+< F – < Al | b) F – < Al < Na+< Mg2+ |
| c) Al < Mg2+< F – < Na+ | d) Na+< Al < F – < Mg2+ |

1. 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) Chemical reactivity increases with increase in atomic number down the group in both the alkali metals and halogens.

b) In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group.

c) The reactivity decrease in the alkali metals but increases in the halogens with increase in atomic number.

d) In both the alkali metals and the halogens, the chemical reactivity decreases with increase in atomic number down the group .

1. Which electronic configuration of an element has abnormally high difference between second and third ionization energy?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1s2 2s2 2p6 3s1 | b) 1s2 2s2 2p6 3s2 3p1 | c) 1s2 2s2 2p6 | d) 1s2 2s2 2p6 3s2 |

1. Identify the least stable ion amongst the following :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Li – | b) Be – | c) B – | d) C – |

1. With which of the following electronic configuration an atom has the lowest ionization enthalpy ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1s2 2s2 2p6 | b) 1s2 2s2 2p5 | c) 1s2 2s2 2p3 | d) 1s2 2s2 2p6 3s1 |

1. The group of elements in which the differentiating electrons enters the ante-penultimate shell of atoms are called

|  |  |  |  |
| --- | --- | --- | --- |
| a) f-block elements | b) p-block elements | c) s-block elements | d) d-block elements |

1. The atom of smallest atomic radius among the following is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Na | b) K | c) Br | d) Li |

1. The element with atomic number 117 would be placed in

|  |  |  |  |
| --- | --- | --- | --- |
| a) Nobel gas family | b) Alkali family | c) Alkaline earth family | d) Halogen family |

1. Correct order of ionization energy of C, N, O and F is.

|  |  |  |  |
| --- | --- | --- | --- |
| a) F < N < C < O | b) C < N < O < F | c) C < O < N < F | d) F < O < N < C |

1. Which of the following processes involves absorption of energy?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Cl + e – → Cl – | b) O – + e – → O 2– | c) O + e – → O – | d) S + e – → S – |

1. Which pair of atomic numbers represents s-block elements ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 7, 15 | b) 6, 12 | c) 9, 17 | d) 4, 12 |

1. Elements with atomic number 56 belongs to which block ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) s | b) p | c) d | d) f |

1. The correct order of decreasing ionic radii among the following isoelectronic species is

|  |  |  |  |
| --- | --- | --- | --- |
| a) K+ > Ca2+ > Cl – > S2- | b) Ca2+ > K+ > S2- > Cl – | c) Cl – > S2- > Ca2+ > K+ | d) S2- > Cl – > K+ > Ca2+ |

1. Which of the following represents the correct order of increasing electron gain enthalpy with negative sigh for the elements O, S, F and Cl ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) S < O < Cl < F | b) Cl < F < O < S | c) O < S < F < Cl | d) F < S < O < Cl |

1. The correct sequence which shows decreasing order of the ionic radii of the element is

|  |  |
| --- | --- |
| a) O2- > F – > Na+ > Mg2+ > Al3+ | b) Al3+ > Mg2+ > Na+ > F – > O2- |
| c) Na+ > Mg2+ > Al3+ > O2- > F – | d) Na+ > F – > Mg2+ > O2- > Al3+ |

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 14

1. Among the elements Ca, Mg, P and Cl the order of increasing atomic radii is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Mg < Ca < Cl < P | b) Cl < P < Mg < Ca | c) P < Cl < Ca < Mg | d) Ca < Mg < P < Cl |

1. Among the following which one has the highest cation to anion size ratio ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Csl | b) CsF | c) LiF | d) NaF |

1. In the periodic table, the basic character of oxides

a) increases from left to right and decreases from top to bottom

b) decreases from right to left and increases from top to bottom

c) decreases from left to right and increases from top to bottom

d) decreases from left to right and increases from bottom to top

1. Which of the following orders about ionization energy is correct ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) N > O > F | b) N < O < F | c) N > O < F | d) N < O > F |

1. The diagonal partner of element B is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Li | b) Al | c) Si | d) Mg |

1. The order of decreasing negative electron gain enthalpy of O, S, Se is

|  |  |  |  |
| --- | --- | --- | --- |
| a) O > S > Se | b) S > O > Se | c) Se > O > S | d) S > Se > O |

1. Electronegativity of the following elements increases in the order

|  |  |  |  |
| --- | --- | --- | --- |
| a) C, N, Si, P | b) N, Si, C, P | c) Si, P, C, N | d) P, Si, N, C |

1. Among the following the third ionization energy is highest for

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

1. Which element is expected to have lowest first ionization enthalpy ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Sr | b) As | c) Xe | d) S |

1. Generally, the first ionization energy increases along a period. But there are some exceptions. One which is not exception is

|  |  |  |  |
| --- | --- | --- | --- |
| a) N & O | b) Na & Mg | c) Mg & Al | d) Be & B |

1. The electronic configuration of two elements X and Y are given below :

X = 1s2 2s2 2p6 3s2 3p6 4s2 ; Y = 1s2 2s2 2p6 3s2 3p5

The formula of the ionic compound that can be formed between these elements is

|  |  |  |  |
| --- | --- | --- | --- |
| a) XY | b) XY2 | c) X2Y | d) XY3 |

**Answers**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. d | 2. a | 3. c | 4. c | 5. d | 6. d | 7. b | 8. a |
| 9. b | 10. a | 11. b | 12. d | 13. c | 14. c | 15. a | 16. d |
| 17. d | 18. d | 19. a | 20. b | 21. d | 22. b | 23. b | 24. c |
| 25. c | 26. c | 27. d | 28. a | 29. b | 30. b | 31. b | 32. c |
| 33. b | 34. c | 35. a | 36. c | 37. c | 38. b | 39. b | 40. b |
| 41. c | 42. b | 43. b | 44. a | 45. b | 46. d | 47. b | 48. d |
| 49. a | 50. c | 51. d | 52. c | 53. b | 54. d | 55. a | 56. d |
| 57. c | 58. a | 59. b | 60. b | 61. c | 62. c | 63. c | 64. d |
| 65. c | 66. c | 67. a | 68. b | 69. b |  |  |  |

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 15

**Karan Arora M: 99968-68554**

**Comprehension Type Questions**

**Comprehension:** Periodic properties show a regular gradation on moving from left to right in a period or from top to bottom in a group. Down a group, the atomic/ionic radii, metallic character and reducing character increase while ionization enthalpy and electronegativity decrease. Along a period from left to right, atomic/ionic radii, metallic character decrease while ionization enthalpy, electronegativity, non-metallic character and oxidizing power increase. However, electron gain enthalpy become less negative down the group but more negative along a period. In contrast, inert gases have positive electron gain enthalpies which do not show any regular trend.

1. If the ionic radii of K+ and F – are about 1.34 Å each, then the expected values of atomic radii of K and F should be respectively :

a) 2.31 & 0.64 Å b) 2.31 & 1.34 Å c) 0.64 & 2.31 Å d) 1.34 & 1.34 Å

1. Which of the following isoelectronic ions has the lowest first ionization enthalpy ?

a) K+ b) Ca2+ c) Cl – d) S2-

1. The outermost electronic configuration of the most electronegative element is

a) ns2 np3 b) ns2 np4 c) ns2 np5 d) ns2 np6

1. Amongst the following elements (whose electronic configurations are given below), the one having the highest ionization enthalpy is :

a) [Ne] 3s2 3p1 b) [Ne] 3s2 3p3 c) [Ne] 3s2 3p2 d) [Ar] 3d10 4s2 4p3

1. Tick the correct order of second ionization enthalpy in the following :

a) F > O > N > C b) O > F > N > C c) O > N > F > C d) C > N > O > F

1. The incorrect statement among the following is :

a) The first ionization potential of Al is less than the first ionization potential of Mg.

b) The second ionization potential of Mg is greater than the second ionization potential of Na.

c) The first ionization potential of Na is less than the first ionization potential of Mg.

d) The third ionization potential of Mg is greater than the third ionization potential of Al.

**Answers**

1. a 2. d 3. c 4. b 5. b 6. b

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 16

**Karan Arora M: 99968-68554**

**Matching Type Questions**

1. Column I Column II

(A) F (p) Maximum ionization enthalpy

(B) Cl (q) Maximum atomic radius

(C) He (r) Maximum electronegativity

(D) Cs (s) Maximum negative electron gain enthalpy

|  |  |
| --- | --- |
| a) A-q ; B-s ; C- r ; D-p | b) A-r ; B-s ; C- p ; D-q |
| c) A-r ; B-p ; C- q ; D-s | d) A-q ; B-p ; C- s ; D-r |

1. Column I Column II

(A) Noble gas (p) [Xe] 5d1 6s2

(B) Representative element (q) [Rn] 6d2 7s2

(C) Transition element (r) 1s2

(D) Inner transition element (s) [Kr] 5s2

|  |  |
| --- | --- |
| a) A-r ; B-s ; C- p ; D-q | b) A-r ; B-s ; C- q ; D-p |
| c) A-s ; B-r ; C- p ; D-q | d) A-s ; B-p ; C- r ; D-q |

1. Column I Column II

(A) He, Ne, Ar (p) Representative elements

(B) Fr, Ra, At (q) Lanthanoids

(C) Ce, Gd, Yb (r) Noble gases

(D) Rb, Ga, Cl (s) Radioactive elements

|  |  |
| --- | --- |
| a) A-s ; B-p ; C- q ; D-r | b) A-q ; B-s ; C- r ; D-p |
| c) A-r ; B-s ; C- p ; D-q | d) A-r ; B-s ; C-q ; D-p |

**Answers**

1. b 2. a 3. d

PERIODIC CLASSIFICATION OF ELEMENTS Page No. 17

**Karan Arora M: 99968-68554**

**Matrix-match Type Questions**

Match the entries of column I with appropriate entries of column II. Each entry in column I may have one or more than one correct option from column II.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ⃝ | p | q | r | s |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| D |  |  |  |  |

1. Column I Column II

(A) Cl, Br, I (p) Ionization enthalpy increases

(B) B, C, O (q) Negative electron gain enthalpy decreases

(C) O2-, O –, O (r) Atomic size decreases

(D) Cl, F, P (s) Belong to the same group

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ⃝ | p | q | r | s |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| D |  |  |  |  |

1. Column I Column II

(A) Magnesium (p) p-block

(B) Aluminium (q) Metal

(C) Arsenic (r) s-block

(D) Iodine (s) Metalloids

**Answers**

1. A-q, s ; B-p, r ; C-r ; D- q 2. A-q, r ; B-p, q ; C-p, s ; D- p

**Integer Type Questions**

**DIRECTIONS :** The answer to each of the following questions in a single A B C D E F

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ① | ① | ① | ① | ① | ① |
| ② | ② | ② | ② | ② | ② |
| ③ | ③ | ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ | ⑨ | ⑨ |

digit integer, ranging from 0 to 9. If the correct answers to the question numbers A, B, C and D (say) are 4, 0, 9 and 2 respectively, then the correct darkening of bubbles should be as shown on the side :

1. How many periods are present in the long form of the periodic table?
2. The number of groups which constitute p-block elements is/are.
3. How many of the following elements are s-block elements?

Rb , Al , B , K , S, Cd , Zn , Th , Sr.

1. How many series of elements constitute of f-block elements?
2. On the Pauling scale, the electronegativity of fluorine is.
3. Total number of elements present in the 2nd short period is.

**Answers**

A. 7 B. 6 C. 3 D. 2 E. 4 F. 8

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**Assertion-Reason Type Questions**

**DIRECTIONS :** In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the correct answer as:

1. If both assertion and reason are true, but reason is the true explanation of the assertion.
2. If both assertion and reason are true, but reason is not the true explanation of the assertion.
3. If assertion is true, but reason is false.
4. If both assertion and reason are false.
5. **Assertion:** The ionic size of O2- is bigger than that of F – ion.

**Reason:** O2- and F – are isoelectronic ions.

1. **Assertion:** The elements having 1s2 2s2 2p6 3s2 and 1s2 2s2 configurations belong to the same group.

**Reason:** Both have same number of electrons in the valence shell.

1. **Assertion:** The ionic radii follows the order : I – < I < I+.

**Reason:** Smaller the value of z /e, larger the size of the species.

1. **Assertion:** Sixth period is the longest period in the periodic table.

**Reason:** Sixth period involves the filling of all the orbitals of the sixth energy level.

1. **Assertion:** Of all the elements, helium has the highest value of first ionization enthalpy.

**Reason:** Helium has the most positive electron gain enthalpy of all the elements.

1. **Assertion:** The ionization of s-electron requires more energy than ionization of p-electron of same shell.

**Reason:** s-electrons are closer to the nucleus than p-electrons and hence are more strongly attracted by the nucleus.

1. **Assertion:** The elements with electronic configuration [Xe]54 4f 1 5d1 6s2 is a d-block element.

**Reason:** The last electron enters the d-orbital.

1. **Assertion:** The first ionization enthalpy of aluminium is lower than that of magnesium.

**Reason:** Ionic radius of aluminium is smaller than that of magnesium.

1. **Assertion:** Helium and Beryllium have similar outer electronic configurations of the type ns2.

**Reason:** Both are chemically inert.

1. **Assertion:** F atom less negative electron gain enthalpy than Cl atom.

**Reason:** Additional electrons are repelled more effectively by 3 p-electrons in Cl and than by 2 p-electrons in F atom.

1. **Assertion:** The first ionization energy of Be is greater than that of B.

**Reason:** 2 p-orbital is lower in energy than 2 s-orbital.

1. **Assertion:** First ionization energy for nitrogen is lower than that of oxygen.

**Reason:** Across a period effective nuclear charge decreases.

1. **Assertion:** F is more electronegative than Cl.

**Reason:** F has higher electron affinity than Cl.

**Answers**

1. b 2. a 3. d 4. c 5. c 6. a 7. d

8. b 9. c 10. c 11. c 12. d 13. c

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