CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

PERIODIC TABLE

Level-I (C.W)

1. Lother Meyer obtained the curve for the known elements by plotting their atomic volumes against

A. Atomic numbers

B. Atomic masses

C. Densities

D. Ionization energies

Answer: B

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2. In Lother Meyer plot, the peaks are occupied by

A. Alkali metal

B. Alkaline earth metals

C. Halogen

D. Noble gases

Answer: A

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3. The law of triad is applicable to a group of a)Cl, Br, I b)C,N,O c) Na, K, Rb d)H, O, N

A. Cl, Br, I

B. C,N,O

C. Na, K, Rb

D. H, O, N

Answer: A

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4. The atomic number of element Unq is:

A. 102

B. 103

C. 104

D. 105

Answer: C

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5. The basis for the classification of elements in the modern periodic table is

A. Electronic configuration

B. Atomic weight

C. Atomic volume

D. Equivalent weight

Answer: A

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6. Considering the chemical properties, atomic weight of Be was corrected based on

A. Electronic configuration

B. Valency

C. Atomic number

D. Both 2 and 3

Answer: B

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7. Mendeleff corrected the atomic weight of

A. Be

B. N

C. O

D. Cl

Answer: A

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8. Anamalous pair in Mendeleef's table is

A. Li, Na

B. Mg, Al

C. Co, Ni

D. Be, B

Answer: C

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9. Eka silicon is now called as

A. Gallium

B. Scandium

C. Germanium

D. Indium

Answer: C

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10. The atomic weights of "Be" and "In" were correctly by Mendeleef using for formula

A. $\sqrt{v} = a(Z - b)$

B. $mvr = \frac{nh}{2\pi}$

C. Atomic weight = Equivalent weight $\times$ valency

D. Equivalent weight = Atomic weight $\times$ valency

Answer: C

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11. The plot of $\sqrt{v}$ vs Z is

A. Straight line

B. Exponential curve

C. Hyperbolic

D. Curve with -ve slope

Answer: A

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12. The longest and shortest periods are

A. 1 & 6

B. 2 & 6

C. 6 & 1

D. 1 & 7

Answer: C

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13. The number of elements present in the fourth period is

A. 32

B. 18

C. 8

D. 2

Answer: B

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14. The general electronic configuration elements of carbon family

A. ns^2np^4

B. ns^2np^3

C. ns^2np^1

D. ns^2np^2

Answer: D

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15. The strong element of fifth period is

A. K

B. Rb

C. Kr

D. Xe

Answer: B

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16. Which of these does not reflect the periodicity of the elements.

A. Bonding behaviour

B. Electro negativity

C. Noble gas

D. An alkali metal

Answer: D

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17. The atomicity of noble gases is

A. 2

B. 1

C. 4

D. 6

Answer: B

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18. The element with atomic numbers 19 is

A. Halogen

B. Chalcogen

C. Noble gas

D. An alkali metal

Answer: D

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19. Which pair of atomic numbers represent s-block elements?

A. 7,15

B. 6,12

C. 9,17

D. 3,12

Answer: D

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20. The element with electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$ belongs to

A. 4th period, VA group

B. 5th period, IVA group

C. 4th period, VIIA group

D. 7th period, IVA group

Answer: C

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21. The element with ns^2np^4 as outer electron configuration is a

A. Alkalimetal

B. Chalcogen

C. Noble gas

D. Halogen

Answer: B

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22. If the differentiating electron enters (n-1) d-sublevel. The element is

A. A representiative elemet

B. A noble gas

C. An alkali metal

D. A transition element

Answer: D

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23. Atoms with three of their outer most orbits incompletety filled with electrons are present in

A. Lanthanides

B. Representative elements

C. s-block elements

D. Transitional elements

Answer: A

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24. The name of the element with atomic number 100 was adopted in honour of

A. Alfred Noble

B. Enric Fermi

C. Dimitri Mendeleef

D. Albert Einstein

Answer: B

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25. Inner transition elements exhibit different coloured compounds on account of unfilled ....Orbitals

A. s

B. f

C. d

D. p

Answer: B

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26. The total numbers of elements in the Group 11 is

A. 3

B. 5

C. 7

D. 9

Answer: A

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27. The atomic numbers of elements of second transition series lie in the range of

A. 38 to 47

B. 39 to 48

C. 40 to 49

D. 41 to 50

Answer: B

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28. Atomic number of next inert gas to be discovered will be

A. 87

B. 104

C. 118

D. 132

Answer: C

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29. The element with atomic number 12 belongs to.........Group and........period

A. IA, third

B. IIA, third

C. IIA, third

D. IIA, second

Answer: C

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30. Elements which generally exhibit multiple oxidation states and whose ions are usually coloured are

A. Metalloids

B. Transition elements 0

C. Non-metals

D. Gases

Answer: B

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31. Ce-58 is a member of

A. s-block

B. p-block

C. d-block

D. f-block

Answer: D

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32. The outer most orbit of an element "X" is partially filled with electrons in 's' and 'p' subshells. Then that element is

A. An inert gas

B. A representative element

C. A transition element

D. An inner transition element

Answer: B

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33. Which is the atomic number of another element present in the same group as the element with $Z = 13$ is present A)$Z = 14$ B) $Z = 32$ C)$Z = 49$ D)$Z = 20$

A. $Z = 14$

B. $Z = 32$

C. $Z = 49$

D. $Z = 20$

Answer: C

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34. Which statement is incorrect for the d-block elements A)Have atomic radii larger than s and p-block elements B)Have high melting points, boiling points an tensile strength C)Have variable oxidation states D)Exhibit catalytic activity

A. Have atomic radii larger than s and p-block elements

B. Have high melting points, boiling points an tensile strength

C. Have variable oxidation states

D. Exhibit catalytic activity

Answer: A

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35. When a neutral atom is converted to the anion its

A. Atomic number increases

B. Atomic number decreases

C. Size increases

D. Mass number increases

Answer: C

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36. The term periodicity in the properties of element are arranged in the increasing order of their atomic numbers similar elements

A. Reoccur after a fixed interval

B. Reoccur after certain regular interval

C. Form vertical groups

D. Form horizontal rows

Answer: B

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37. The correct order of variation in the sizes of atoms is Be , C , F , Ne

A. $Be > C > F > Ne$

B. $Be < C < F < Ne$

C. $Be > C > F > Ne$

D. $F > Ne > Be > C$

Answer: C

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38. Which one of the following has the largest radius A)Na^{+} B) Mg^{2+} C)O^{2-} D)Al^{3+}

A. Na^{+}

B. Mg^{2+}

C. O^{2-}

D. Al^{3+}

Answer: C

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39. Atomic radii of fluorine atom and neon atom in angstrom units are respectively given by A)0.762, 1.60 B)1.60, 1.60 C)0.72, 0.72 D)1.60,0.762

A. 0.762, 1.60

B. 1.60, 1.60

C. 0.72, 0.72

D. 1.60,0.762

Answer: A

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40. Which one is the correct order of the size of the iodine species ? A)$I > I^{+} > I^{-}$ B)$I > I^{-} > I^{+}$ C)$I^{+} > I^{-} > I$ D) $I^{-} > I > I^{+}$

A. $I > I^{+} > I^{-}$

B. $I > I^{-} > I^{+}$

C. $I^{+} > I^{-} > I$

D. $I^{-} > I > I^{+}$

Answer: D

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41. Atomic radius is measured by A)Rutherford's α-ray scattering experiment B) X-ray diffraction technique C)Mulliken oil drop method D)Thomson's water-melon model

A. Rutherford's α-ray scattering experiment

B. X-ray diffraction technique

C. Mulliken oil drop method

D. Thomson's water-melon model

Answer: B

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42. Vander waal's radius is used for

A. Molecular substances in gaseous state only

B. Molecular substance in liquid state only

C. Molecular substances in solid state only

D. Molecular substances in any state

Answer: C

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43. Separation of lanthanides from their mixture is not easy because of

A. Shielding effect

B. Pentetrating effect

C. Consequences of lanthanide contraction

D. Inert pair effect

Answer: C

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44. If atomic radius of F is XA^0 then atomic radius of Ne could be

A. $< XA^0$

B. $> XA^0$

C. $= XA^0$

D. Half of 'F'

Answer: B

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45. If an element 'X' is assumed to have the types of radii, then their order is

A. Crystal radius $>$ Vander waals radius $>$ Covalent radius

B. Vander waals radius $>$ Carystal radius $>$ Covalent radius

C. Covalent radius $>$ Crystal radius $>$ vander waals radius

D. Vander waals radius $>$ Covalent radius $>$ Crystal radius

Answer: B

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46. Covalent radius of $Li$is $123 \pm$ .The crystal radius of Li will be:

A. > 123 pm

B. < 123 pm

C. $+123$ pm`

D. $= \frac{123}{2}$pm

Answer: B

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47. O^{2-} and Si^{4+} are isoelectronic ions. If the ionic radius of O^{2-} is $1A^0$, the ionic radius of Si^{4+} will be

A. $1.4A^0$

B. $0.41A^0$

C. $2.8A^0$

D. $1.5A^0$

Answer: B

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48. Which set represents isoelectronic species ? A) $Na^{+}, Mg^{2+}, Al^{3+}, Cl^{-}$ B)$Na^{+}, Ca^{2+}, Sc^{3+}, F^{-}$ C) $K^{+}, Cl^{-}, Mg^{2+}, Sc^{3+}$ D)$K^{+}, Cl^{-}, Ca^{2+}, Sc^{3+}$

A. $Na^{+}, Mg^{2+}, Al^{3+}, Cl^{-}$

B. $Na^{+}, Ca^{2+}, Sc^{3+}, F^{-}$

C. $K^{+}, Cl^{-}, Mg^{2+}, Sc^{3+}$

D. $K^{+}, Cl^{-}, Ca^{2+}, Sc^{3+}$

Answer: D

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49. Which of the following pairs of ions have the same electronic configuration A)Cr^{+3}, Fe^{+3} B)Fe^{+3}, Mn^{+2} C)Fe^{+3}, Co^{+3} D) Sc^{+3}, Cr^{+3}

A. Cr^{+3}, Fe^{+3}

B. Fe^{+3}, Mn^{+2}

C. Fe^{+3}, Co^{+3}

D. Sc^{+3}, Cr^{+3}

Answer: B

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50. Which one of the following groups represent a collection of isolectronic species ? (At.no $Cs = 55, Br = 35$)

A. Ca^{2+}, Cs^{2+}, Br

B. Na^{+}, Ca^{2+}, Mg^{2+}

C. N^{3-}, F^{-}, Na^{+}

D. Be, Al^{3+}, Cl^{+}

Answer: C

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51. In a period, atom with smaller radius is

A. Chalcogen

B. Halogen

C. Aerogen

D. Pnicogen

Answer: B

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52. As number of protons is the nucleus increases, atomic radius gradually......in a period

A. Increases

B. Decreases

C. No change

D. Stable

Answer: B

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53. The Lanthanide contraction is responsible for the fact that

A. Zr and Hf have same radius

B. Zr and Zn have the same oxidation state

C. Zr and Y have same radius

D. Zr and Nb have similar oxidation state

Answer: A

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54. The increasing order of the atomic radius of Si, S, Na, Mg, Al is

A. $S < Si < Al < Mg < Na$

B. $Na < Al < Mg < S < Si$

C. $Na < Mg < Si < Al < S$

D. $Na < Mg < Al < Si < S$

Answer: A

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55. Which of the following process refers to ionisation potential ?

A. $X_{(s)} \rightarrow X^{+}_{(g)} + e^{-}$

B. $X_{(g)} + aq \rightarrow X^{+}_{(aq)} + e^{-}$

C. $X_{(g)} \rightarrow X^{+}_{(g)} + e^{-}$

D. $X_{(g)} + e^{-} \rightarrow X^{-}_{(g)}$

Answer: C

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56. The element with highest ionization potential is

A. Nitrogen

B. Oxygen

C. Helium

D. Neon

Answer: C

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57. In the long form of periodic table elements with low ionisation potential are present in

A. IA group

B. IV A group

C. VII A group

D. Zero group

Answer: A

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58. As atomic number of elements increases I.P. value of the elements of the same

A. Decreases

B. Increases

C. Remains constant

D. First increases and then decreases

Answer: B

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59. The ionization potential values of an element are in the following order $I_1 < I_2 < \; < \; < \; < I_3 < I_4 < I_5$. The element is

A. Alkali metal

B. Chalcogen

C. Halogen

D. Alkaline earth metals

Answer: D

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60. Which of the following elements has the lowest ionization potential ?

A. N

B. O

C. F

D. Ne

Answer: B

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61. The ionisation energy of nitrogen is more than that of oxygen because

A. of the extra stability of half-filled p orbitals in nitrogen

B. of the smaller size of nitrogen

C. The former contains less number of electrons

D. The former is less electronegative

Answer: A

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62. The correct order of the second ionisation potential of carbon, nitrogen, oxygen and fluorine is

A. $C > N > O > F$

B. $O > N > F > C$

C. $O > F > N > C$

D. $F > O > N > C$

Answer: C

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63. The I_1 values of Li, Be and C are $5.4eV/\text{atom}$, $9.32eV/\text{atom}$ and $11.26eV/\text{atom}$. The I_1 value of Boron is

A. $13.6eV/\text{atom}$

B. $8.29 eV$ / atom

C. $14.5 eV$ / atom

D. $21.5 eV$ / atom

Answer: B

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64. The ionisation potential of "X" ion is equal to

A. The electron affinity of "X" atom

B. The electronegativity of "X" atom

C. The ionisation energy of "X" atom

D. The electron affinity of "X^{2+}" ion

Answer: B

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65. The I_1 of potassium is $4.339 eV / \text{atom}$. The I_1 of sodium

A. 4.339

B. 2.21

C. 5.138

D. 1.002

Answer: C

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66. The first ionization potentials of four consecutive elements present in the second period of periodic table are 8.3, 11.3, 14.5, and 13.6 eV respectively which one of the following is the first ionization potential of nitrogen ?

A. 13.6

B. 11.3

C. 8.3

D. 14.5

Answer: D

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

A. $M^{-}(g) \rightarrow M(g)$

B. $M(g) \rightarrow M^{+}(g)$

C. $M^{+}(g) \rightarrow M^{2+}(g)$

D. $M^{2+}(g) \rightarrow M^{3+}(g)$

Answer: D

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68. The I_1, I_2, I_3, I_4 values of an element "M" are 120 kJ/mole, $600kJ/\text{mole}$, $1000kJ/\text{mole}$ and $8000kJ/\text{mole}$. Then the formula of its sulphate is

A. MSO_4

B. $M_2(SO_4)_3$

C. M_2SO_4

D. $M_3(SO_4)_2$

Answer: B

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69. The electronic configuration of element $A, B,$ and $C$are $[He]2s^1, [Ne]3s^1,$ and $[Ar]4s^1,$ respectively. Which one of the following order is correct for the $IE_1\left(\text{in}kJmol^{-1}\right)$ of A,$B,$ and C ?

A. $A > B > C$

B. $C > B > A$

C. $B > C > A$

D. $C > A > C$

Answer: A

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70. Which of the following species has the highest ionization potential

A. Li^+

B. Mg^+

C. Al^+

D. Ne

Answer: A

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71. The low electron affinity value of nitrogen is due to

A. Small size

B. High nuclear charge

C. Half-filled 2p sublevel

D. High metallic character

Answer: C

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72. Energy is released in the process of

A. $Na_{(g)} \rightarrow Na^{+}_{(g)} + e$

B. $O^{-}_{(g)} + e \rightarrow O^{-2}_{(g)}$

C. $O_{(g)} + e \rightarrow O^{-}_{(g)}$

D. $N^{-2}_{(g)} + e \rightarrow N^{-3}_{(g)}$

Answer: C

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73. Electron affinity values are obtained indirectly by

A. Electric discharge method

B. Born-Haber cycle method

C. Electron microoscpic method

D. Mulliken oil drop method

Answer: B

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74. Energy is absorbed when a second electron is added to oxygen. This is because

A. O^{-} has stable configuration

B. O^{-} has repulsion with electron to be added

C. O^{-} has lower nuclear charge than O

D. O^{2-} has unstable configuration

Answer: B

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75. The decreasing order of electron affinity of halogen's is

A. $F > Cl > Br > I$

B. $F < Cl < Br < I$

C. $F < Cl > Br < I$

D. $Cl > F > Br > I$

Answer: D

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76. The electron affinity values (in $kJmol^{-1}$) of three halogens, x, y, and $z$are, respectively, -349, -333, and -325. Then x, y, and x, 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

Answer: B

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77. For univalent elements, the average value of first ionization potential and first electron affinity is equal to its

A. Polarising power

B. Covalent radius

C. Electronegativity

D. Dipole moment

Answer: C

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78. The reference element in Paulings scale of Electronegativity is

A. H

B. O

C. N

D. Cl

Answer: A

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79. Electronegativity is the property related to

A. Isolated atom in gaseous state

B. Isolated atom is solid state

C. Inert gas

D. Bonded atoms in a molecule

Answer: D

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80. The values that are useful in writing chemical formulae and in calculation of oxidation states are

A. Ionisation potential

B. Electron affinity

C. Electronegativity

D. Metallic character

Answer: C

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81. Let electronegativity, ionisation energy and electron affinity by represented as EN, IP and EA respectively. Which one of the following equation is correct according to Mulliken ?

A. $EN = IP'EA$

B. $EN = IP/EA$

C. $EN = (IP + EA)/2$

D. $EN = IP - EA$

Answer: C

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82. In which group all the elements do not have same number of valence electrons?

A. Zero

B. First

C. Second

D. Seventh

Answer: A

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83. Metal exhibiting higher oxidation state is in which block ?

A. p

B. s

C. d

D. f

Answer: C

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84. Among the following outermost configurations of transitionn metals, which shows the highest oxidation state

A. $3d^3 4s^2$

B. $3d^5 4s^1$

C. $3d^5 4s^2$

D. $3d^6 4s^2$

Answer: C

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85. The less electropositive element is

A. Na

B. Be

C. Li

D. Mg

Answer: B

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86. Electropositivity is very high for

A. Al

B. Ge

C. Li

D. Ba

Answer: D

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87. The most electropositive element is

A. Cs

B. C

C. Cl

D. K

Answer: A

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88. Which one of the following represents the electronic configuration of the most electropositive element?

A. $[He]2s^1$

B. $[He]2s^2$

C. $[Xe]6s^1$

D. $[Xe]6s^2$

Answer: C

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89. Most metallic element has the following electron arrangement in its atom is

A. 2,8,4

B. 2,8,8

C. 2,8,8,1

D. 2,8,8,7

Answer: C

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90. Among (a) Na_2O (b) MgO, (c) Al_2O_3, (d) P_2O_5 (e) Cl_2O_7 the most basic, most acidic and amphoteric oxide can be

A. a,b,c

B. b,e,c

C. a,e,c

D. e,c,a

Answer: C

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91. Which of the following cannot form an amphoteric oxide ?

A. Al

B. Sn

C. Sb

D. P

Answer: D

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92. The elements x,y and z are present in one period of the periodic table. Chemically their oxides are acidic, amphoteric and basic respectively. When these elements are arranged in ascending order of atomic number they are

A. x,y,z

B. z,y,x

C. y,z,x

D. y,x,z

Answer: B

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93. Boron and Silicon resemble chemically. This is due to the equal value of their

A. EA

B. Atomic volume

C. Polarizing power of ions

D. Nuclear charge

Answer: C

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94. The electronegativity of Be is same as that of

A. Al

B. Mg

C. Na

D. Li

Answer: A

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95. Beryllium shows diagonal relationship with aluminum . Which of the following similarity is incorrect?

A. Be_2C like Al_4C_3 yields methane on hydrolysis

B. Be, like Al is rendered passive by HNO_3

C. $Be(OH)_2$ like $Al(OH)_3$ is basic

D. Be forms beryllates and Al forms aluminate

Answer: C

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96. Diagonal relationsgip is quite pronounced in the elements of

A. 2^{nd} & 3^{rd} periods

B. 1^{st} & 2^{nd} periods

C. II & III groups

D. 3^{rd} & 4^{th} periods

Answer: A

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97. Diagonal relationship is shown by

A. $B - S$

B. $Li - Mg$

C. $Mg - Ca$

D. $S - Se$

Answer: B

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98. The pair of elements that have similar chemical properties are

A. Lithium and Magnesium

B. Beryllium and Boron

C. Aluminium and Magnesium

D. carbon and Nitrogen

Answer: A

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Level-II (C.W)

1. The following are some statements about Mendeleeff's periodic table

(i) It is based on increasing order of atomic numbers.

(ii) Mendeleef corrected the atomic weight of some elements like Be, In etc

(iii) $(Ar, H_2), (Co, CI_2), (Te, F_2)$ are three inverted pairs

(iv) It is based on increasing order of atomic weights

A. only (i) correct

B. (ii) & (iv) correct

C. only (iii) correct

D. only (iv) is correct

Answer: B

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2. Which of the following pairs of atoms have same number of electrons in the outermost orbit

A. $N - O$

B. $Na - Cl$

C. $Ca - Cl$

D. $Cl - Br$

Answer: D

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3. The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^3$. The atomic number of the element which is just below the above element in the periodic table is

A. 49

B. 31

C. 34

D. 33

Answer: D

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4. The element present in the IIIA group and 3 period in the periodic table is

A. Carbon

B. Phosphorous

C. Cobalt

D. Aluminium

Answer: D

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5. The long form of periodic table is nothing but just a graphical representation of _____principle.

A. Aufbau

B. Phosphorous

C. Cobalt

D. Aluminium

Answer: A

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6. In the sixth period, the orbitals being filled are

A. $5s, 5p, 5d$

B. $6s, 6p, 6d, 6f$

C. $6s, 5f, 6d, 6p$

D. $6s, 4f, 5d, 6p$

Answer: D

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7. The number of valence electrons that can be present in the second element of any period is

A. 1

B. 2

C. 5

D. 7

Answer: B

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8. At room temperature liquid metal and liquid non-metals are

A. Hg & I_2

B. Cs & Cl_2

C. Hg & Br_2

D. Cd & S

Answer: C

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9. Which of the following contains same number of elements

A. 1st period & O group

B. 6th period & III B group

C. 5th period & III B group

D. 3rd period & VIIA group

Answer: B

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10. The statement that is false regarding the long form the periodic table is

A. It reflects the sequence of filling the electron in the order of sub-energy levels s,p,d and f

B. It helps to predict the stale valency states of the elements

C. It reflects trends in physical and chemical properties of the elements

D. It helps to predict the relative ionicity of the bond between any two elements.

Answer: B

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11. Covalent bond length of chlorine molecule is $1.98A^0$. Covalent radius of chlorine is

A. $1.98\overset{0}{A}$

B. $1.7\overset{0}{A}$

C. $2.05\overset{0}{A}$

D. $0.99\overset{0}{A}$

Answer: D

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12. In which of the following pairs, the first atom or ion is not large than the second?

A. Fe^{2+}, Fe^{3+}

B. O, S

C. N, O

D. Cl^{-}, Cl

Answer: B

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13. The covalent radius of hydrogen is $0.37A^0$. The bond length in H_2 molecule is

A. $0.185A^0$

B. $0.74A^0$

C. $1.48A^0$

D. $0.37A^0$

Answer: B

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14. In the isoelectronic species the ionic radii of N^{3-}, O^{2-}, F^{-} are respectively given by

A. $1.36, 1.40, 1.71$

B. $1.36, 1.71, 1.40$

C. $1.71, 1.40, 1.36$

D. $1.71, 1.36, 1.40$

Answer: C

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15. Chloride ion and chlorine atom have

A. Same size

B. same stability

C. Same nuclear charge

D. Same electron configuration

Answer: C

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16. The covalent and Van der wall's radii of chlorine respectively are

A. $1.80A^0$ & $0.99A^0$

B. $0.99A^0$ & $1.80A^0$

C. $1.80A^0$ & $1.80A^0$

D. $0.99A^0$ & $0.99A^0$

Answer: B

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17. The atomic radii of two elements "X" and "Y" are $0.72A^0$ and $1.6A^0$. Then the elements "X" & "Y" are

A. F & Ne

B. Ne & F

C. Li & Be

D. Fe & Fe^{2+} ion

Answer: A

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18. Among O, C, F, Cl and Br the increasing order of atomic radii is

A. $F < O < C < Cl < Br$

B. $F < C < O < Cl < Br$

C. $F < Cl < Br < O < C$

D. $C < O < F < Cl < Br$

Answer: A

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19. The ionic size decreases in the order

A. $K^{+} > S^{2-} > Sc^{3+} > V^{5+} > Mn^{7+}$

B. $S^{2-} > K^{+} > Sc^{3+} > V^{5+} > Mn^{7+}$

C. $Mn^{7+} > V^{5+} > Sc^{3+} > K^{+} > S^{2-}$

D. $Mn^{7+} > V^{5+} > Sc^{3+} > S^{2-} > K^{+}$

Answer: B

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20. The group of elements with highest second ionisation energy is

A. IIA group

B. Zero group

C. VIIA group

D. IA group

Answer: D

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21. Which of the following transitions do represents first ionisation potential ?

A. $M^{-}_{(g)} \rightarrow M_{(g)}$

B. $M_{(g)} \rightarrow M^{+}_{(g)}$

C. $M^{+}_{(g)} \rightarrow M^{2+}_{(g)}$

D. $M^{+2}_{(g)} \rightarrow M^{3+}_{(g)}$

Answer: B

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22. In a period element with large radius is a

A. Alkali element

B. Alkaline earth element

C. Noble has second

D. Chalcogen

Answer: A

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23. The first, second, third and fourth, ionization potential values of an element are 8.4, 25.15, 37.92 and $256.3eV$ respectively. The element is

A. Magnesium

B. Silicon

C. Sodium

D. Aluminium

Answer: D

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24. Ionization energy is high for

A. Sulphide ion

B. Phosphide ion

C. Calcium ion

D. Magnesium ion

Answer: D

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25. The removal of an electron is very difficult from

A. Argon atom

B. Chloride ion

C. Calcium ion

D. Sodium ion

Answer: D

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26. Which one of the following elements has the highest ionisation energy?

A. $[Ne]3s^2 3p^1$

B. $[Ne]3s^2 3p^2$

C. $[Ne]3s^2 3p^3$

D. $[Ar]3s^{10} 4s^{2_4p^3}$

Answer: C

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27. The ionization potential for hydrogen atom is $13.6eV$, the ionization potential for He^+ is

A. $13.6eV$

B. $54.4eV$

C. $6.8eV$

D. $3.4eV$

Answer: B

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28. The IP_1 of O,S,RF & Cl are in the order of

A. $F > O > Cl > S$

B. $S > Cl > O > F$

C. $Cl > S > O > F$

D. $F > Cl > O > S$

Answer: A

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29. The $I.P_1$'s of N, P, O & S are in the order of

A. $S > P < O > N$

B. $N > O > P > S$

C. $N > O < P > S$

D. $N < O < P < S$

Answer: B

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30. The correct order of ionization energies is

A. $Zn < Cd < Hg$

B. $Hg < Cd < Zn$

C. $Ar > Ne > He$

D. $Cs < Rb < Na$

Answer: D

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31. Configuration that shows the highest energy released when an electron is added to the atom is

A. $1s^2 2s^2 2p^3$

B. $1s^2 2s^2 2p^4$

C. $1s^2 2s^2 2p^5$

D. $1s^2 2s^2 2p^6$

Answer: C

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32. The electron affinity values of element A, C and D are respectively $-135, -60, -200$ and $-348 kJ mol^{-1}$. The outer electronic configuration of element B is

A. $3s^2 3p^5$

B. $3s^2 3p^4$

C. $3s^2 3p^3$

D. $3s^2 3p^2$

Answer: C

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33. Energy is released during the formation of

A. Hydride ion

B. Oxide ion

C. Ferrous ion

D. Ferric ion

Answer: A

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34. Which of the following is not the reason for the higher EA_1 of halogens

(I) high nuclear charge (II) larger atomic size

(III) easy to get octet configuration, ns^2np^6

(IV) half filled p-orbitals The correct answer is

A. I and IV

B. I, II and III

C. II and IV

D. II and III

Answer: C

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35. Which of the following are the correct statements

(I) EA of noble gases is endothermic

(II) EA of Fluorine is less than chlorine

(III) EA of oxygen is less than sulphur

(IV) EA of N is more than phosphorous The correct answer is

A. I,II,III and IV

B. I, II and III

C. II and IV

D. I and IV

Answer: B

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36. The electron affinity of bromine atom is equal to the..........of bromide ion

A. ionisation potential

B. Electron affinity

C. effective nuclear charge

D. electron negative

Answer: A

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37. EA_1 values of the following elements has positive value

(I) Be (II) Br (III) Mg (IV) Cl

The correct answer is

A. I, and III

B. II and IV

C. I, II and III

D. I, II and IV

Answer: A

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38. The process requiring the absorption of energy is

A. $F \rightarrow F^{-}$

B. $Cl \rightarrow Cl^{-}$

C. $O^{-} \rightarrow O^{2-}$

D. $H \rightarrow H^{-}$

Answer: C

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39. Arrange S, O and Se in acending order of electron affinity?

A. $Se < S < O$

B. $O < Se < S$

C. $S \leq O \leq Se$

D. $S < Se < O$

Answer: B

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

$O_{(g)} + e^{-} = O^{-}_{(g)} \Delta H^{\circ} = -142 kJmol^{-1}$

$O^{-}_{(g)} + e^{-} = O^{2-}_{(g)} \Delta H^{\circ} = 844 kJmol^{-1}$ This is because of :

A. O^{-} ion has comparatively larger size than oxygen atom

B. Oxygen has high electron affinity

C. O^{-} ion will tend to resist the addition of another electron

D. Oxygen is more electronegative

Answer: C

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41. With respect of chlorine, hydrogen will be

A. Electropositive

B. Electronegative

C. Neutral

D. High reactive

Answer: A

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42. The experimental bond energy of HY differs from its calculated valueby $1.96k.\ cals / \text{mole}$. The electronegativity of 'y' is equal to

A. 1.81

B. 1.78

C. 1.72

D. 1.9

Answer: A

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43. Electrongativity is not applicable for the element with configuration

A. $1s^2$

B. $1s^1$

C. $1s^2 2s^2 2p^1$

D. $1s^2 2s^2 2p^5$

Answer: A

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44. When the polarity of bond A-B is "D" expressed in Si units, the relationship between their Electronegativity difference is

A. $X_A - X_B = 0.1017\Delta$

B. $X_A - X_B = \sqrt{0.208}\Delta$

C. $X_A - X_B = \sqrt{0.1017}\Delta$

D. $X_A - X_B = 0.1017\sqrt{\Delta}$

Answer: C

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45. Pauling scale of electronegativity of elements helps to determine

A. Covalent nature of an element

B. Position of an element in EMF series

C. Dipole moment of molecules

D. Polarity of bond

Answer: C

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46. The electronagetivity difference between two chlorine atoms of Cl_2 molecule is zero. So the bond formed is

A. 100% pure ionic

B. 100% pure covalent

C. 50% ionic & 50% covalent

D. 70% covalent, 30% ionic

Answer: B

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47. Regarding the electronegativity

(i) The element with maximum electornegativity: Fluorine (ii) In Pauling scale, the reference element is: Silicon

(iii) Elements with stable configuration have high electronegativity

(iv) the electron with maximum electronpositivity: Hydrogen

A. Only (i) correct

B. Only (ii) correct

C. only (iii) correct

D. Only (iv) is correct

Answer: A

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48. An element with electronic arrangement as 2,8,18,1 will exhibit the following stable oxidation states

A. $+2$ and $+4$

B. $+1$ and $+2$

C. $+2$ to $+7$

D. $+1$ only

Answer: B

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49. The outer most shell of a representative element contains 'a' electrons and penultimate shell contains 'b' electron. The valency of the element will be

A. $a + b$

B. $b - a$

C. b

D. a or $8 - a$

Answer: D

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50. The most common oxidation states of cerium are

A. $+2, \ +3$

B. $+2, \ +4$

C. $+3, \ +4$

D. $+3, \ +5$

Answer: C

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51. Which of the following statements are wrong

(I) Bi^{3+} is more stable than Bi^{5+}

(II) Mn shows $+8$ oxidation state

(III) The oxidation state of an element is always less than or equal to its group number

(IV) s-block elements show variable oxidation states

The answer is

A. II and IV

B. II and III

C. I, II and III

D. II, III and IV

Answer: A

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52. The correct order of electropositive nature of Li,Na and K is

A. $Li > Na > K$

B. $Li > K > Na$

C. $Na > K > Li$

D. $K > Na > Li$

Answer: D

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53. Which one of the following order represents the correct sequence of the increasing basic nature of the given oxides?

A. $K_2O < Na_2O < Al_2O_3 < MgO$

B. $MgO < K_2O < Al_2O_3 < Na_2O$

C. $Na_2O < K_2O < MgO < Al_2O$

D. $Al_3O_3 < MgO < Na_2O < K_2O$

Answer: D

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54. Beryillum resembles Aluminium in properties. This is mainly due to

A. Equal electronegativity values of elements

B. Equal atomic volumes of the elements

C. Equal electron affinity

D. Equal nuclear charges in the their atoms

Answer: A

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55. The chemical similarly between boron and silicon is mainly due to equal value of their

A. electronegativity

B. nuclear charge

C. charge to $\left(\text{ionic radius}^2\right)$ ratio

D. atomic volume

Answer: C

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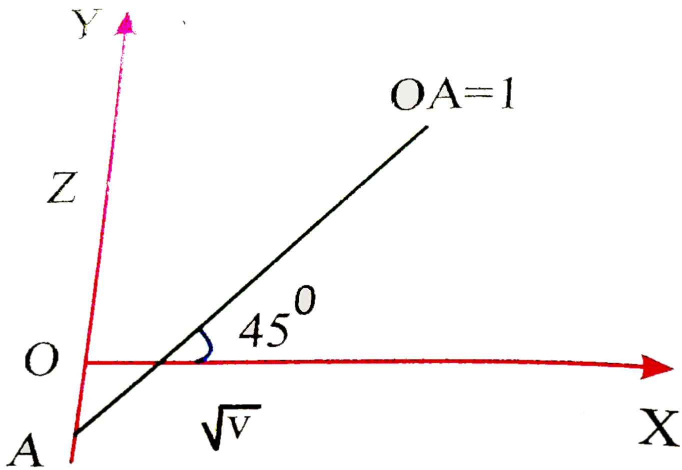
Level-III

1. The frequency of the characterstic X ray of K_{α} line of metal targent 'M' is $2500cm^{-1}$ and the graoh between $\sqrt{v}$ Vs 'z' is as follows, then atomic number of M is



A. 49

B. 50

C. 51

D. 25

Answer: A

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2. Which of the following does not represents the correct order of the property indicated ?

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

Answer: A

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3. EN of the element (A) is E_1 and EA is E_2 hence IP will be :

A. $2e_1 - E_2$

B. $E_1 - E_2$

C. $E_1 - 2E_2$

D. $(E_1 + E_2)/2$

Answer: A

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4. The correct order of atomic radii is:

A. $Yb^{3+} < Pm^{3+} < Ce^{3+} < la^{3+}$

B. $ce^{3+} < Yb^{3+} < Pm^{3+} < La^{3+}$

C. $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$

D. $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

Answer: A

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5. In which of the following arrangements , the order is not correct according to the property indicated against it:

A. Increasing size $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$

B. Increasing $IE_1 : B < C < N < O$

C. Increasing $EA_1 : I < Br < F < Cl$s

D. Increasing metallic radius: $Li < Na < K < Rb$

Answer: B

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6. Successive ionisation potentials of an element M are $8.3, 25.1, 37.9, 259.3$ and 340.1 ev. The formula of its bromide is

A. MBr_5

B. MBr_4

C. MBr_3

D. MBr_2

Answer: C

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7. The IP_1, IP_2, IP_3 and IP_4 of an element A are $6.0, 10.0, 16.0$ and $45.0 ev$ respectively. The molecular weight of the oxide of the element A is (x is atomic weight)

A. $x + 48$

B. $2x + 48$

C. $3x + 48$

D. $x + 32$

Answer: B

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8. H-H, X-X and $H - X$ bond energies are $104 Kcal / \text{mole} 60 Kcal / \text{mole}$ and $101 kcal / \text{mole}$. Assuming the electronegativity of hydrogen to be 2.1 the electronegativity of unknown element X is $\left(\sqrt{19} = 4.36\right)$

A. 3.5

B. 3

C. 4

D. 2.5

Answer: B

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9. The ionisation energy and electron affinity of an element are 13.0ev and 3.8 ev respectively. Its electronegativity is

A. 2.8

B. 3.0

C. 3.5

D. 4.0

Answer: B

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10. The bond energies of H-H, X-X and H-X are $104K.\ cal, 38K.\ cal$ and $138K.\ Cal$ respectively the electron egativity of 'X' is $[\sqrt{67} = 8.18]$

A. 3.0

B. 3.5

C. 3.8

D. 1.7

Answer: C

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11. The atomic numbers of elements A,B,C and D are Z - 1, Z, Z + 1 and Z + 2 respectively. If B is a noble gas, choose the correct

statement among the following statements :

I. A has higher electron affinity.

II. C exists in +2 oxidation state.

III. D is an alkaline earth metal.

A. a & b

B. b & c

C. a & c

D. a,b & c

Answer: C

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12. $M_{(g)} \rightarrow M^{+}_{(g)} + e^{-}, \Delta H = 100 eV$

$M_{(g)} \rightarrow M^{2+}_{(g)} + 2e^{-}, \Delta H = 250 eV$ which is incorrect statement?

A. I_1 of $M_{(g)}$ is $100 eV$

B. I_1 of $M^{+}_{(g)}$ is $150 eV$

C. I_2 of $M_{(g)}$ is $250 eV$

D. I_2 of $M_{(g)}$ is $150 eV$

Answer: C

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13. The increasing order of the first ionization enthalpies of the elements B,P,S and F (lowest first) is:

A. $F < S < P < B$

B. $P < S < B < F$

C. $B < P < S < F$

D. $B < S < P < F$

Answer: D

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14. Using the data given below,predict the nature of heat changes for the reaction .

$Mg_g + 2F_g \rightarrow Mg_g^{2+} + 2F_g^-$

IE_1 and IE_2 of $Mg_g$are 737.7 and $451 kJ\text{mol}^{-1}$. EA_1 for F_g is $-328 kJ\text{mol}^{-1}$.

A. $1232.4 KJ\text{mole}^{-1}$

B. $+1532.7 KJ\text{mole}^{-1}$

C. $-1232.4 KJ\text{mole}^{-1}$

D. $-1532.7 KJ\text{mole}^{-1}$

Answer: B

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15. $(IE)_1$ and $(IE)_2$ of $Mg_{(g)}$ are $740, 1540 kJ mol^{-1}$. Calculate percentage of $Mg^{+}_{(g)}$ and $Mg^{2+}_{(g)}$ if 1g of $Mg_{(g)}$ absorbs $50.0 kJ$ of energy.

A. $\% Mg^{+} = 50$ and $\% Mg^{+2} = 50$

B. $\% Mg^{+} = 70.13$ and $\% Mg^{+2} = 29.87$

C. $\% Mg^{+} = 75$ and $\% Mg^{+2} = 25$

D. $\% Mg^{+} = 60$ and $\% Mg^{+2} = 40$

Answer: B

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16. How many Cs atoms can be convered to Cs^{+} ions by 1 joule energy if IE_1 for Cs is 376 $KJ \text{mole}^{-1}$

A. $1.6'10^{18}$

B. $1.6'10^{10}$

C. $5.8'10^{14}$

D. $5.8'10^{25}$

Answer: A

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17. The elecron affinity of chlorine is $3.\ 7eV$. How much energy in kcal is released when $2g$ chlorine is completely converted to cl^{-} ion in a gaseous state ?

$\left(1eV = 23.\ 06kcal\text{mol}^{-10}\right)$.

A. $4.8Kcal$

B. $2.4Kcal$

C. $10.2 Kcal$

D. $14.2 Kcal$

Answer: A

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18. The energy needed for $Li_g \rightarrow Li_g^{3+} + 3e$ is $1.96 \times 10^4 kJmol^{-1}$. If the first ionisation energy of Li is $520 kJmol^{-1}$. Calcuate the second ionisation energy of Li.

(Given : IE_1 for $H = 2.2.18 \times 10^{-18} kJ\text{atom}^{-1}$).

A. $5270 KJ\text{mole}^{-1}$

B. $3210 KJ\text{mole}^{-1}$

C. $7270 KJ\text{mole}^{-1}$

D. $9290 KJ\text{mole}^{-1}$

Answer: C

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19. 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 alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group B)The reactivity decreases in the alkali metals but increases in the halogens with increases in atomic number down the group. C)In both the alkali metals and the halogen the chemical reactivity decreases with increases in atomic number down the group D)Chemical reactivity increases with increases in atomic number down the group in both the alkali metals and halogens.

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

B. The reactivity decreases in the alkali metals but increases in the halogens with increases in atomic number down the group.

C. In both the alkali metals and the halogen the chemical reactivity decreases with increases in atomic number down the group

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

Answer: A

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20. Which of the following represent the correct order of increasing first ionisation enthalpy for Ca, Ba, S, Se and Ar

A. $Ca < S < Ba < Se < Ar$

B. $S < Se < Ca < Ba < Ar$

C. $Ba < Ca < Se < S < Ar$

D. $Ca < Ba < S < Se < Ar$

Answer: C

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21. The correct sequence which shown decreasing order of the ionic radii of the elements is

A. $Al^{3+} > Mg^{2+} > Na^{+} > F^{-} > O^{2-}$

B. $Na^{+} > Mg^{2+} > AI^{3+} > O^{2-} > F^{-}$

C. $Na^{+} > F^{-} > Mg^{2+} > O^{2-} > AI^{3+}$

D. $O^{2-} > F^{-} > Na^{+} > Mg^{2+} > AI^{3+}$

Answer: D

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22. The set representing the correct order of ionic radius is

A. $Li^{+} > Be^{2+} > Na^{+} > Mg^{2+}$

B. $Na^{+} > Mg^{2+} > Li^{+} > Be^{2+}$

C. $Li^{2+} > Na^{+} > Mg^{2+} > Be^{2+}$

D. $Mg^{2+} > Be^{2+} > Li^{+} > Na^{+}$

Answer: B

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23. The charge/size ratio of a cation determines its polarising power. Which one of the following sequeces represents the increasing order of the polarising power of the cationic species, $K^{+}, Ca^{2+}, Mg^{2+}, Be^{2+}$?

A. $Mg^{2+} < Be^{2+} < K^{+} < Ca^{2+}$

B. $Be^{2+} < K^{+} < Ca^{2+} < Mg^{2+}$

C. $k^{+} < Ca^{2+} < Mg^{2+} < Be^{2+}$

D. $Ca^{2+} < Mg^{2+} < Be^{2+} < K^{+}$

Answer: C

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Level-IV

1. Assertion (A): According to Mendeleeff, periodic properties of elements is a function of their atomic masses.

Assertion (R): Atomic number is equal to number of protons

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

B)Both (A) and (R) are true and (R) is not the correct explanation of (A) C)(A) is true but (R) is false D)(A) is false but (R) is true

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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2. Assertion (A): The transition metal ions are generally paramagnetic in nature

Assertion (R): Metal ions with incompletely filled d-orbitals are paramagetic in nature

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

3. Assertion (A): Be and Al have similar properties

Assertion (R): Cations of Be and Al have same polarizing power

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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4. Assertion (A): Li forms covalent compounds

Assertion (R): Li^+ ion is small and has high polarizing power

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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5. Assertion (A): The nagtive ion is always larger than its atom

Assertion (R): As the number of electron increase, the nuclear charge per electron is reduced.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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6. Assertion (A): The second ionisation energy of 'O' is greater than that of 'N'

Assertion (R): The half flled p-orbitals cause greater stability.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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7. Assertion: Shielding effect increases as we go down the group.

Reason: More is the number of electrons in the penultimate shell, more is shielding.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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8. Assertion (A): Electron affinity of Flourine is less than that of chlorine

Assertion (R): Chlorine can accommodate an electron by utilising partly filled 3p orbitals

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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9. Assertion (A): The second electron affinity of oxygen is endothermic.

Assertion (R): Oxygen is the second highest electronegative element

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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10. Assertion (A): The size decreases in the order $O^{2-} > Mg^{2+} > Al^{3+}$

Assertion (R): In isoelectronic ions, the size decreases with increase in nuclear charge.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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11. Assertion (A): Each d-block series contains ten elements

Assertion (R): The max capacity of d-orbitals is of ten electron as in each series d-orbitals are gradually filled up.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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12. Assertion (A): The first ionisation energy of B is less than that of Be

Assertion (R): The penetration ability of s-electron is higher than that of p-electrons the correct answer is

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

13. Assertion (A): The ionic size of Mg^{2+} is larger than Al^{3+}

Assertion (R): In isoelecronic species, greater the nuclear charge, less is the size

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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14. Assertion (A): The second electron affinity of oxygen is exothermic.

Assertion (R): Oxygen is the second highest electronegative element

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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15. Assertion (A): Al_2O_3 dissolves in both $NaOH$ and HCl

Assertion (R): Metallic oxides generally dissolve in both strong acids and strong alkalies.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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16. Assertion (A): Cu^{+2} paramagnatic ltbr. Assertion (R): All the orbitals present in Cu^{+2} ion are doubly occupied

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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17. Assertion (A): Zn is not a transition element.

Assertion (R): Elements with incompletely filled d-orbitals are called transition elements

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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18. Assertion (A): The transition metal ions are generally paramagnetic in nature

Assertion (R): Metal ions with incompletely filled d-orbitals are paramagnetic in nature.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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19. Assertion (A): Electron affinity of chlorine is greater than Fluorine

Assertion (R): Flourine is more electronegative element

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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20. Assertion (A): Ionisation potential of 'N' is greater than 'O'

Assertion (R): Nitrogen has 5 unpaired electrons

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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21. Assertion (A): The atomic radius of inert gases is higher than halogens

Assertion (R): Van der waall's radius is less than covalent radius

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

22. Assertion (A): In ionisation potential Vs atomic number curve peaks are occupied by inert gases

Assertion (R): ns^2np^6 configuration is stable

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

23. Assertion (A): Chemistry of Actinoids is more complicated than Lanthanoids

Assertion (R): Actionid elements are radio active

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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24. Assertion (A): The size decreases as $Pb > Pb^{+2} > Pb^{+4}$

Assertion (R): Z/e increases i.e force of attraction towards nucleous increases.

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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25. Assertion (A): Ionisation potential across a period is $Li < B < Be < C$

Assertion (R): Ionisation potential decreases with decrease in atomic size

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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26. Assertion (A): F^{-1} ion is larger in size compared of F

Assertion (R): Electron repulsion increases because of addition of electron which results in decrease effective nuclear charge

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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27. Assertion (A): Ionisation potential of K is numerically the same as electron affinity of K^{+}

Assertion (R): Ionisation potential and electron affinity both depend on screening effect

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

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

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28. Statement-1: Generally, ionisation enthalpy increases from left to right in a period.

Statement-2: When successive electrons are added to the orbitals in the same principal quantum level, the shielding effect of inner core of electrons does not increase very much to compensate for the increased attraction of the electron to the nucleus.

A. A is correct statement and R is wronf statement

B. A and R both are correct statements and R is correct explanation of A

C. A and R both are wrong statements

D. A is wrong statement and R is correct statement

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29. Assertion: Boron has a smaller first ionisation enthalpy than beryllium.

Reason: The penetration of a $2s$ electron to the nucleus is more than the $2p$ electron, hence $2p$ electorn is more shielded by the inner core of electrons than the 2s electrons.

A. A and R both are correct statements but R is not correct explanantion for A

B. A is correct statement but R is wrong statement

C. A and R both are correct statements and R si correct explanation for A.

D. A and r both are wrong statements.

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30. Assertion: Electron gain enthalpy always becomes less negative as we go down a group in Modern periodic table.

Reason: The size of the atom increase on going down the group in Modern periodic table and the added electron would be farther from the nucleus.

A. A and R both are correct statements but R is not correct explanantion for A

B. A and R both are correct statements and R is correct explanation of A

C. A and r both are wrong statements

D. A is wrong statement and R is correct statement

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31.

Column-I (Atomic no. of elements)	Column-II (IUPAC name)
(A) 105	(P) Uun
(B) 107	(Q) Uns
(C) 109	(R) Unp
(D) 110	(S) Une

A. $\begin{matrix} A & B & C & D \\ R & P & S & Q \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ P & R & S & Q \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ R & Q & S & P \end{matrix}$

D. $\begin{array}{cccc} A & B & C & D \\ Q & R & S & P \end{array}$

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32. Match the following

Type-I Series	Type-II Elements
A) 3d	1) Sc [21] to Zn (30)
B) 4d	2) La (57), Hf (72) to Hg (80)
C) 5d	3) Ce (58) to Lr (103)
D) 6d	4) Y (39) to Cd (48)
	5) Ac (89), Rf (104) to Mt (109)

The correct match is

A. $\begin{array}{cccc} A & B & C & D \\ 5 & 4 & 2 & 3 \end{array}$

B. $\begin{array}{cccc} A & B & C & D \\ 1 & 4 & 2 & 5 \end{array}$

C. $\begin{array}{cccc} A & B & C & D \\ 1 & 4 & 3 & 5 \end{array}$

D. $\begin{array}{cccc} A & B & C & D \\ 2 & 5 & 1 & 4 \end{array}$

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33. Match the following columns

Type-I Property	Type-II Element with the highest value
A) IP	1) Cl
B) EN	2) Cs
C) EA	3) He
D) atomic size	4) F
	5) H

A.

A	B	C	D
1	2	3	4

B.

A	B	C	D
3	4	1	2

C.

A	B	C	D
4	3	5	2

D.

A	B	C	D
5	1	2	3

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34. Match the following

List-1	List-2 (High value is observed for)
A) Ionisation potential	1) Chlorine
B) Electro positivity	2) Caesium
C) Electron affinity	3) Helium
D) Oxidation state	4) Fluorine
	5) Osmium

Match correc match is

A. $\begin{array}{cccc} A & B & C & D \\ 4 & 3 & 2 & 1 \end{array}$

B. $\begin{array}{cccc} A & B & C & D \\ 3 & 2 & 1 & 5 \end{array}$

C. $\begin{array}{cccc} A & B & C & D \\ 1 & 2 & 3 & 4 \end{array}$

D. $\begin{array}{cccc} A & B & C & D \\ 2 & 1 & 4 & 5 \end{array}$

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35. Match the following in view of diagonal relation

List-1	List-2
A) Li	1) Al
B) Si	2) C
C) Be	3) B
	4) Mg

The correct match is

A. $\begin{array}{ccc} A & B & C \\ 1 & 3 & 4 \end{array}$

B. $\begin{array}{ccc} A & B & C \\ 3 & 1 & 4 \end{array}$

C. $\begin{array}{ccc} A & B & C \\ 4 & 1 & 3 \end{array}$

D. $\begin{array}{ccc} A & B & C \\ 4 & 3 & 1 \end{array}$

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36. Match the atomic numbers given in column I with the block in which the element is placed in column II and mark the appropriate choice.

Column-I (Atomic Number)		Column-II (Block)	
A)	62	i)	d-block
B)	47	ii)	p-block
C)	56	iii)	f-block
D)	53	iv)	s-block

A. $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (ii)$

B. $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)$

C. $(A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (iii)$

D. $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)$

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37. Match the atomic numbers of the elements given in column I with the periods given in column II and mark the appropriate choice.

Column-I (Atomic Number)		Column-II (Period)	
A)	31	i)	5
B)	50	ii)	3
C)	56	iii)	4
D)	14	iv)	6

A. $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)$

B. $(A) \rightarrow (ii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (ii)$

C. $(A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (ii)$

D.

$(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (iv), (C) \rightarrow (iv), (D) \rightarrow (ii)$

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38. Match the list-I and List-II and select the correct answer using the code given below

List-I		List-II	
A)	Highest density	1)	Lithium
B)	Liquid metal	2)	Irridium
C)	Lightest metal	3)	Mercury
D)	Liquid at room temperature	4)	Bromine

A. $\begin{array}{cccc} P & Q & R & S \\ 2 & 3 & 1 & 4 \end{array}$

B. $\begin{array}{cccc} P & Q & R & S \\ 2 & 3.4 & 1 & 4 \end{array}$

C. $\begin{array}{cccc} P & Q & R & S \\ 1 & 3 & 2 & 3.4 \end{array}$

D. $\begin{array}{cccc} P & Q & R & S \\ 2 & 3 & 1 & 3.4 \end{array}$

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39. Ionization energies of five elements of same period in kcal/mol are given below:

Atom	IP1	IP2	IP3
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which element is a noble gas ?

A. P

B. T

C. R

D. S

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40. Ionization energies of five elements of same period in kcal/mol are given below:

Atom	IP1	IP2	IP3
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which element form stable unipositive ion?

A. P

B. Q

C. R

D. S

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41. Ionization energies of five elements of same period in kcal/mol are given below:

Atom	IP1	IP2	IP3
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

The element having most stable oxidation state $+2$ is?

A. Q

B. R

C. S

D. T

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42. Ionization energies of five elements of same period in kcal/mol

are given below:

Atom	IP1	IP2	IP3
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which is a non-metal (excluding noble gas)?

A. P

B. Q

C. R

D. S

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43. Which of the following is not an actinoid?

A. Curium $=(Z=96)$

B. Californium $(Z=98)$

C. uranium $(Z=92)$

D. terbium $(Z=65)$

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

A. $[Xe]4f^3 5d^5 6s^2$

B. $[Xe]4f^7 5d^2 6s^1$

C. $[Xe]4f^7 5d^1 6s^2$

D. $[Xe]4f^8 5d^6 6s^2$

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45. The statement that is not correct for periodic classification of element isA)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 electron after 3p-orbitals and before 4s-orbitals D)The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period

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 electron after 3p-orbitals and before 4s-orbitals

D. The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period

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

A. magnetic quantum number of any element of the priod

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

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47. The elements in which electrons are progressively filled in 4f-orbitals are calleD:

A. actinoids

B. Transition elements

C. lanthanoids

D. halogens

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

$O(g) + e^{-} \rightarrow O^{-}(g), \Delta H^{-} = -141kjmol^{-1}$

$O^{-}(g) + e^{-} \rightarrow O^{2-}(g), \Delta H^{-} = +780 kjmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even through 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 larget size of the ion C) electron repulsion outweights the stability gained by achieving noble gas configuration D) O^{-} ion has comparatively smaller size than oxygen atom

A. oxygen is more electronegative

B. addition of electron in oxygen results in larget size of the ion

C. electron repulsion outweights the stability gained by achieving noble gas configuration

D. O^{-} ion has comparatively smaller size than oxygen atom

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49. Electronic configuration of four elements p,q,r and s are given below

(p) $1s^2 2s^2 2p^6$ (q) $1s^2 2s^2 2p^4$

(r) $1s^2 2s^2 3s^1$ (s) $1s^2 2s^2 2p^5$

Correct order of increasing tendency of gain electron is

A. $p < r < q < s$

B. $p < q < r < s$

C. $s < q < r < p$

D. $s < p < q < r$

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50. All transition elements are d-block elements, but all d-block elements are not transition elements. Which the following is true.

A. Transition elements have completely filled d-orbitals

B. All d-block elements have partialy filled d-orbitals

C. Transition elements have partialy filled d-orbitals either in atomic or ionic state

D. In d-block elements differentiating electron eneter in to d-orbitals of outer most shell.

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51. Identify the group nad valency of the elements having atomic number 119. Also predict the outermost electronic configuration and write the general formula of its oxide.

A. $17 \quad 1 \quad ns^2np^5 \quad X_2O_7$

B. $16 \quad 2 \quad ns^2np^4 \quad XO_2$ or XO_3

C. $2 \quad 2 \quad ns^2 \quad XO$

D. $1 \quad 1 \quad ns^1 \quad X_2O$

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52. Among the elements B, Al, C and Si

a. Which has highest IE_1 ?

b. Which is most metallic ?

A. C,Al

B. C,Si

C. B,Al

D. B,Si

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53. Match the correct atomic radius with the element, in the increasing order

Element	Atomic radius(pm)
Be	74
C	88
O	111
B	77
N	66

A. $N < Be < B < C < O$

B. $Be > B < C < N > O$

C. $O < N < C < B < Be$

D. $O > N < B < C < Be$

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54. Match the correct ionisation enthalpies and electron gain enthalpies of the following elements.

	Elements		ΔH_1	ΔH_2	$\Delta_{eg} H$
(i)	Most reactive non-metal	A.	419	3051	-48
(ii)	Most reactive metal	B.	1681	3374	-328
(iii)	Least reactive element	C.	738	1451	-40
(iv)	Metal forming binary halide	D.	2372	5251	$+48$

A. A,B,C,D

B. B,A,D,C

C. C,D,A,B

D. D,C,B,A

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55. Electronic configuration of some elements is given in Column I and their electron gain enthalpies are given in column-II. Match the electronic configuration with electron gain enthalpy.

Column-I (Electronic configuraion)	Column-II (Electron gain enthalpy/kj mol⁻)
C. $1s^2 2s^2 2p^6$	1) -53
B. $1s^2 2s^2 2p^6 3s^1$	2) -328
C. $1s^2 2s^2 2p^5$	3) -141
D. $1s^2 2s^2 2p^4$	4) +48

A. A-1, B-2, C-3, D-4

B. A-4, B-1, C-2, D-3

C. A-2, B-4, C-1, D-3

D. A-4, B-3, C-2,D-1

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

A. Be

B. P

C. S

D. B

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

A. 2

B. 13

C. 1

D. 17

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

A. 3,33,53,87

B. 2,10,22,36

C. 7,17,25,37,48

D. 9,32,51,88

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59. Which of the following elements will gain one electron more readily comparison to other elements of their groups? a)$S(g)$ B) $Na(g)$ C)$O(g)$ D)$CI(g)$

A. $S(g)$

B. $Na(g)$

C. $O(g)$

D. $CI(g)$

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60. Which of the following statements are correct ?

A. Helium has the highest first ionisation enthalpy in the periodic table

B. Chlorine has less negative electron gain enthalpy than fluorine

C. Merucry and bromine are liquids at room temperature

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

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61. Which of the following is not the correct arrangement according to the property indicated against it ?

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)

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62. Ionic radii vary in

A. inverse proportion to the effective nuclear charge

B. inverse proportion to the square of effective nuclear charge

C. direct proportion to the screeing effect

D. direct proportion to the square of screening effect

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63. 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

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64. In the modern periodic table, elements are arranged in order of increasing atomic numbers, which is related to the electornic configuration. Depending upon the type of orbitals receiving the last electron, the elements in the periodic table have been divided into four blocks, viz, p,d and f. The modern periodic table consists of 7 periods and 18 groups. Each period begins with the filling of a new energy shell. in accordance with the Aufbau principal, the seven periods (1 to 7) have 2,8,8,18,18,32 and 32 elements respectively. The seventh period is still incomplete. To avoid the periodic table being too long, the two series of f-block elements, called lanthanoids and actinoids, are placed at the bottom of the main body of the periodic table

The element with atomic number 57 belongs to

A. s-block

B. p-block

C. d-block

D. f-block

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65. In the modern periodic table, elements are arranged in order of increasing atomic numbers, which is related to the electornic configuration. Depending upon the type of orbitals receiving the last electron, the elements in the periodic table have been divided into four blocks, viz, p,d and f. The modern periodic table consists of 7 periods and 18 groups. Each period begins with the filling of a new energy shell. in accordance with the Aufbau principal, the seven periods (1 to 7) have 2,8,8,18,18,32 and 32 elements respectively. The seventh period is still incomplete. To avoid the periodic table being too long, the two series of f-block elements, called lanthanoids and actinoids, are placed at the bottom of the main body of the periodic table

The last element of the p-block in 6th period is represented by the outermost electronic configuration

A. $7s^2 7p^6$

B. $5f^{14} 6d^{10} 7s^2 7p^0$

C. $4f^{14} 5d^{10} 6s^2 6p^6$

D. $4f^{14} 5d^{10} 6s^2 6p^4$

66. In the modern periodic table, elements are arranged in order of increasing atomic numbers, which is related to the electornic configuration. Depending upon the type of orbitals receiving the last electron, the elements in the periodic table have been divided into four blocks, viz, p,d and f. The modern periodic table consists of 7 periods and 18 groups. Each period begins with the filling of a new energy shell. in accordance with the Aufbau principal, the seven periods (1 to 7) have 2,8,8,18,18,32 and 32 elements respectively. The seventh period is still incomplete. To avoid the periodic table being too long, the two series of f-block elements, called lanthanoids and actinoids, are placed at the bottom of the main body of the periodic table

Which of the element whose atomic numbers are given below, cannot be accommodated in the present set up of the long form of the periodic table ?

A. 107

B. 118

C. 126

D. 102

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67. In the modern periodic table, elements are arranged in order of increasing atomic numbers, which is related to the electornic configuration. Depending upon the type of orbitals receiving the last electron, the elements in the periodic table have been divided into four blocks, viz, p,d and f. The modern periodic table consists of 7 periods and 18 groups. Each period begins with the filling of a new energy shell. in accordance with the Aufbau principal, the seven periods (1 to 7) have 2,8,8,18,18,32 and 32 elements respectively. The seventh period is still incomplete. To avoid the periodic table being too long, the two series of f-block elements, called lanthanoids and actinoids, are placed at the bottom of the main body of the periodic table

The electronic configuration of the element which is just above the element with atomic number 43 in the same group is

A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2 4p^6$

C. $1s^2 2s^2 2p^6 3s^2 3d^6 4s^2$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2$

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68. In the modern periodic table, elements are arranged in order of increasing atomic numbers, which is related to the electornic configuration. Depending upon the type of orbitals receiving the last electron, the elements in the periodic table have been divided into four blocks, viz, p,d and f. The modern periodic table consists of 7 periods and 18 groups. Each period begins with the filling of a new energy shell. in accordance with the Aufbau principal, the seven periods (1 to 7) have 2,8,8,18,18,32 and 32 elements respectively. The seventh period is still incomplete. To avoid the periodic table being too long, the two series of f-block elements, called lanthanoids and actinoids, are placed at the bottom of the main body of the periodic table

The elements with atomic numbers 35,53 and 85 are all

A. noble gases

B. halogens

C. heavy metals

D. light metals

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Level-I (H.W)

1. Mendeleev corrected the atomic weight of :

A. Be

B. In

C. Os

D. All of these

Answer: D

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2. Zero group was introduced by

A. Lother Meyer

B. Mendeleef

C. Ramsay

D. Lockyer

Answer: C

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3. According to Mendeleef's periodic law, the properties of elements are periodic function of

A. Atomic number

B. Atomic weight

C. Number of electrons

D. Density

Answer: B

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4. Total number of group in Mendeleef's table

A. 18

B. 9

C. 7

D. 10

Answer: B

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5. In Mendeleef table, the triad of VIII group is

A. Ru, Rh, Pd

B. Cu, Ag, Au

C. N, O, F

D. Tl, Pb, Bi

Answer: A

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6. Number of short periods in Mendeleef table

A. 2

B. 3

C. 4

D. 1

Answer: B

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7. The properties of the following elements were predicted by Mendeleeff before their isolation are

A. Co and Ni

B. I and Te

C. Sc, Ga and Ge

D. Cl, Ar and K

Answer: C

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8. The number of elements known when Mendeleef presented periodic table is

A. 50

B. 90

C. 63

D. 102

Answer: C

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9. The element 'Sc' is known long back as

A. Eka-aluminimum

B. Eka-boron

C. Eka-silicon

D. Eka-mercury

Answer: B

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10. Which of the following is not an anomalous pair?

A. s, Cl

B. Te, I

C. Co, Ni

D. Ar, k

Answer: A

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11. The number of periods in the long from of periodic table is

A. 6

B. 7

C. 8

D. 18

Answer: B

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12. The total number of gaseous elements are

A. 8

B. 9

C. 10

D. 11

Answer: D

Watch Video Solution

13. Which of the following remains unchanged in descending in a group in the periodic table?

A. Valence electrons

B. Atomic size

C. Density

D. Metallic character

Answer: A

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14. In a period, elements are arranged in strict sequence of

A. Decreasing charges in the nucleus

B. Increasing charges in the nucleus

C. Constant charges in the nucleus

D. Equal charges in the nucleus

Answer: B

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15. Which of the following is not a representative element

A. Sodium

B. Boron

C. Calcium

D. Chromium

Answer: D

Watch Video Solution

16. The inert gas present in the second long period is

A. Kr

B. Xe

C. Ar

D. Rn

Answer: B

Watch Video Solution

17. Mono atomic element among the following is

A. Phosphorus

B. Oxygen

C. Krypton

D. Sulphur

Answer: C

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18. Which one of the following pairs of atomic numbers, represents elements belonging to the same group?

A. 11, 20

B. 13, 30

C. 13, 31

D. 14, 33

Answer: C

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19. The atomic number of elements lie in the range of

A. 88 to 101

B. 89 to 102

C. 90 to 103

D. 91 to 104

Answer: C

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20. The atomic number of elements of first transition series lie in the range of

A. 19 to 18

B. 20 to 29

C. 21 to 29

D. 22 to 31

Answer: C

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21. In the long form of periodic all non-metals are placed in

A. s- block

B. p-block

C. d-block

D. f-block

Answer: B

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22. All elements of the same group will have

A. Same electron configuration

B. Silimar outer electron configuration

C. Same ionization potential value

D. Different chemical properties

Answer: B

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23. The atomic number of an element is always equal to

A. Number of neutrons in nucleus

B. Half of the atomic weight

C. Electrical charge of the nucleus

D. Weight of the nucleus

Answer: C

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24. Which of the following is not the electronic configuration of a representative element

A. ns^2

B. ns^2np^5

C. ns^2np^1

D. ns^2np^6

Answer: D

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25. Which of the following electronic configuration corresponds to an inert gas? A)$1s^1 2s^2 2p^5$ B)$1s^2 2s^2 2p^6$ C)$1s^2 2s^1$ D)$1s^2 2s^2 2p^6 3s^1$

A. $1s^1 2s^2 2p^5$

B. $1s^2 2s^2 2p^6$

C. $1s^2 2s^1$

D. $1s^2 2s^2 2p^6 3s^1$

Answer: B

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26. Which of the following electronic configuration in the outermost shell is characterstic of alkali metals? A) $(n-1)s^2p^6, ns^2p^1$ B)$(n-1)s^2p^6, d^{10}, ns^1$ C)$(n-1)s^2p^6, ns^1$ D) $(n-1)s^2p^6, ns^1$

A. $(n-1)s^2p^6, ns^2p^1$

B. $(n-1)s^2p^6, d^{10}, ns^1$

C. $(n-1)s^2p^6, ns^1$

D. $ns^2p^6d^1$

Answer: C

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27. Lanthanum belongs to .... Block

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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28. Which pair of elements of atomic numbers given below will have similar chemical properties

A. 13, 22

B. 3, 11

C. 4, 24

D. 2, 4

Answer: B

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29. The period that includes all blocks of elements is

A. 1

B. 2

C. 6

D. 7

Answer: C

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30. Elements with atomic numbers 9, 17, 35, 53 are collectively known as

A. chalcogens

B. halogens

C. lanthanides

D. rare gases

Answer: B

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31. First transitional series is present in

A. Third period

B. Fifth period

C. Fourth period

D. Sixth period

Answer: C

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32. In iron atom $(z = 26)$, the differentiating electron enters ..... Sublevel

A. 4d

B. 3d

C. 4p

D. 5p

Answer: B

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33. The elements with atomic numbers 39 to 48 belong to

A. Forth period

B. Fifth period

C. Sixth period

D. Third period

Answer: B

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34. The atomic numbers of Lanthanides are from

A. 58 to 71

B. 90 to 103

C. 21 to 30

D. 39 to 48

Answer: A

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35. The first lanthanide is

A. La

B. Ce

C. Th

D. Lu

Answer: B

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36. The 4f level is successively filled up in

A. Alkali metals

B. Rare gases

C. Lanthanides

D. Actinides

Answer: C

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37. Lanthanides are group of elements in which the differentiating electron enters into

A. s-sub level

B. d-sub level

C. p-sub level

D. f-sub level

Answer: D

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38. Most of the ratio active elements are in

A. Lanthanides

B. Actinides

C. Representative elements

D. Second transitional series

Answer: B

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39. The elements with atomic numbers 2, 10, 18 36, 54, and 86 are collectively known as

A. Alkaline earth metals

B. Inert gases

C. Halogens

D. Rare earths

Answer: B

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40. Which of the following represents the electronic configuration of d-block elements

A. $(n-1)s^2nd^{1-10}$

B. $(n-1)d^{1-10}ns^{1-2}$

C. $(n-1)s^2p^6, ns^1$

D. $ns^2p^2d^1$

Answer: B

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41. The general configuration $(n-1)d^3ns^2$ indicates that particular element belongs to the following group

A. VB

B. IVB

C. VIB

D. IIIB

Answer: A

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42. If the valency shell electronic structure for an element is ns^2np^5, this element will belong to the group of

A. Alkali metals

B. Inert metals

C. Noble gases

D. Halogens

Answer: D

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43. Variable valency is exhibited by

A. Normal elements

B. Metallic elements

C. Transitional elements

D. Non-metallic elements

Answer: C

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44. Which one of the following belongs to representative group of elements in the periodic table?

A. Lanthanum

B. Argon

C. Chromium

D. Aluminium

Answer: D

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45. The element californium belongs to a familt of

A. Actinide series

B. Alkali metal family

C. Alkaline earth family

D. Lanthanide series

Answer: A

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46. Transition metals are often paramagnetic due to

A. Their high m.p. and b.p

B. The presence of vacant d-orbitals

C. The presence of one or more unpaired d-electrons

D. Their being less electropositive than the elements of groups

IA and IIA

Answer: C

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47. A member of Lanthanide

A. Caesium

B. Lanthanum

C. Niobium

D. Luticium

Answer: D

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48. Which is wrong about transition metals?

A. They are diamagnetic

B. they are paramagnetic

C. They form complexes

D. They show variable oxidation states

Answer: A

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49. The electron configuration of the starting and ending elements of fourth period are

A. $4s^1$ and $3d^{10}4s^2 4p^6$

B. $4s^1$ and $4s^2 3d^{10}$

C. $4s^2 3d^1$ and $4s^2 4p^6$

D. $4s^2 3d^1$ and $4s^2 3d^{10}$

Answer: A

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50. In which of the following period a maximum number of 32 elements are present

A. 4th

B. 6th

C. 3rd

D. 7th

Answer: B

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51. The element having 18 electrons in its outer most shell is:

A. $._{28} Ni$

B. $._{46} Pd$

C. $._{29} Cu$

D. None of these

Answer: B

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52. The maximum number of valency electrons possible for atom in the second period of the periodic table is :

A. 18

B. 10

C. 8

D. 2

Answer: C

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53. The atomic number of an element 'X' is 34. Then it is present in _______ period and _____ in group.

A. 4th period and IVA group

B. 4th period and VIA group

C. 4th period and VII A group

D. 5 th period and VIA group

Answer: B

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54. The position of element with $Z = 24$ in the periodic table is

A. V A group and 4 period

B. VI B group and 4 period

C. IV A group and 3 period

D. III B group and 3 period

Answer: B

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55. Transition metals exhibit variable oxidation states. It is because of

A. The smaller atomic radius

B. The higher nuclearcharge

C. High screening effect

D. the energy difference between $(n-1)d$ & ns-subshell is very less

Answer: D

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56. The following is the reason for the periodicity in the properties of elements

A. Similarity in atomic mass

B. Similarity in atomic numbers

C. Similarity in outer electronic configuration

D. Similarity in atomic radius

Answer: C

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57. The largest atom among the following is

A. Sodium

B. Silicon

C. Potassium

D. Calcium

Answer: C

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58. Atom loses electrons and becomes

A. Only cation

B. Only anion

C. Either cation or anion

D. Neither cation nor anion

Answer: A

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59. Al^{3+} has low ionic radius than Mg^{2+} because

A. Al^{3+} has high nuclear charge than Mg^{2+}

B. Mg atom has less no. of neutrons than Al atom

C. Mg and Al differ in electronegativity values

D. Al atom has low I_1 value than Mg atom

Answer: A

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60. Largest particle among the following is

A. Cl^{-}

B. K^{+}

C. Ca^{++}

D. S^{2-}

Answer: D

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61. The increasing order of the ionic radii of the given isoelectronic species is :-

A. $Cl^{-}, Ca^{2+}, K^{+}, S^{2-}$

B. $S^{2-}, Cl^{-}, Ca^{2+}, K^{+}$

C. $K^{+}, S^{2-}, Ca^{2+}, Cl^{-}$

D. $Ca^{2+}, K^{+}, Cl^{-}, S^{2-}$

Answer: D

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62. Which of the following is the smallest cation?

A. Na^{+}

B. Mg^{2+}

C. Ca^{2+}

D. Sc^{3+}

Answer: B

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63. Which of the following is the biggest ion?

A. Al^{3+}

B. Ba^{2+}

C. Mg^{2+}

D. Na^{+}

Answer: B

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64. Na^{+}, Mg^{2+}, Al^{3+}, and Si^{4+} are isoelectronic ions. Their ionic size will follow the order

A. $Na^{+} < Mg^{2+} < Al^{3+} < Si^{4+}$

B. $Na^{+} > Mg^{2+} < Al^{3+} < Si^{4+}$

C. $Na^{+} < Mg^{2+} > Al^{3+} > Si^{4+}$

D. $Na^{+} > Mg^{2+} > Al^{3+} > Si^{4+}$

Answer: D

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65. Atomic radius depends upon

A. anionic nature

B. nature of bonding

C. cation nature

D. metalic nature

Answer: B

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66. Among elements with the following electromic configurations, the one with the largest radius is

A. $[Ne]3s^2$

B. $[Ne]3s^2 3p^1$

C. $[Ne]3s^2 3p^3$

D. $[Ne]3s^2 3p^5$

Answer: A

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67. Lanthanoid contraction is caused due to:

A. The imperfect shielding on outer electrons by 4f-electrons from the nuclear charge

B. The appreciable shielding on outer electrons by 4f-electrons from the nuclear charge

C. The apperciable shielding on outer electrons by 5d-electrons from nuclear charge

D. The same effective nuclear charge from Ce to Lu

Answer: A

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68. A reduction in atomic size the increases in atomic number is a characterstitic of elements of:

A. f-block

B. p-block

C. High atomic mass

D. d-block

Answer: A

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69. Identify the correct order in which the ionic radius of the following ions increases

(I) F^{-} (II) Na^{+} (III) N^{3-}

A. III, I, II

B. I, II, III

C. II, III, I

D. II, I, III

Answer: D

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70. The radii of F, F^{-}, O and O^{-2} are in the order of

A. $O^{2-} > F^{-} > O > F$

B. $O^{2-} > F^{-} > F > O$

C. $F^{-} > O^{2-} > F > O$

D. $O^{2-} > O > F^{-} > F$

Answer: A

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71. Of the folowing, the one with largest size is

A. Cl^{-}

B. Ar

C. K^{+}

D. Ca^{2+}

Answer: A

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72. The order of decreasing atomic radii for Be, Na & Mg is

A. $Na > Mg > Be$

B. $Mg > Na > Be$

C. $Be > Na > Mg$

D. $Be > Mg > Na$

Answer: A

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73. Which of the following has the highest ionic radius?

A. F^{-}

B. B^{3+}

C. O^{2-}

D. Li^{+}

Answer: C

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74. The value of 1 eV/ atom is

A. 23.06 kcal /mole

B. 96.45 kJ/mole

C. 1.60210^{-19} Joules/atom

D. All of these

Answer: D

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75. For any atom, the order of ionization potential value is

A. $I_1 < I_2 < I_3$

B. $I_{1_{\, > \, I_2 > I_3}}$

C. $I_1 < I_2 > I_3$

D. $I_1 > I_2 < I_3$

Answer: A

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76. The high ionistion potential of magnesium compared with aluminium, is due to

A. Filled orbitals in magnesium

B. High nuclear charge in magnesium

C. Low radius of magnesium atom

D. Low effective nuclear charge in magnesium

Answer: A

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77. The correct order of ionization values of Be, B, Li, C atom is

A. $Be < B < Li < C$

B. $Li < Be < B < C$

C. $Li < Be > B < C$

D. $Li > Be > B < C$

Answer: C

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78. The ionisation energy is lowest for

A. Nitrogen

B. Oxygen

C. Fluorine

D. Neon

Answer: B

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79. The element with highest ionisation potential is

A. Na

B. Ar

C. Cl

D. P

Answer: B

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80. Which one of the following is correct order of second ionisation potential of Na, $NeMg$ and Al?

A. $Al < Na < Mg < Ne$

B. $Ne < Al < Na < Mg$

C. $Na < Mg < Ne < Al$

D. $Mg < Al < Ne < Na$

Answer: D

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81. The I_1 value of potassium is less than the I_1 value of sodium. This is due to

A. Large size of potassium atom

B. Small size of potassium atom

C. Low density of potassium

D. Univalent nature of potassium

Answer: A

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82. The ionization potential of elements in any group decreases from top to bottom. This is due to

A. Increase in size of atom

B. Increase in atomic number

C. Increase in screening effect

D. Both increase in size of atom and increase in screening effect

Answer: D

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83. The first ionization energy of lithium will be

A. Greater than Be

B. Less than Be

C. Equal to that of Na

D. Equal to that of F

Answer: B

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Watch Video Solution

84. Which has maximum first ionization potential?

A. C

B. N

C. B

D. O

Answer: B

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85. Which has the highest second ionization potential?

A. Nitrogen

B. Carbon

C. Oxygen

D. fluorine

Answer: C

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86. Which has least ionization potential?

A. Li

B. Cs

C. Cl

D. I

Answer: B

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87. The first ionization energy value of an element area 191, 578,872 and 5692 kcals. The number of valence electrons in the element are

A. 5

B. 2

C. 3

D. 4

Answer: C

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88. The peaks in ionisation potential curves are occupied by

A. Alkali metals

B. Inert gases

C. Transition metals

D. Halogens

Answer: B

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89. Ionisation potential of Boron is less than that of Beryllium. This is because

A. B has $1s^2 2s^2 2p^1$ configuration

B. B has small atomic size

C. B has higher nuclear charge

D. B has more number of shells

Answer: A

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90. An alkaline earth element has the I_1, I_2 and I_3 values 9.2 eV/atom, 18.5 eV/atom and x' eV/ atom. Then 'x' is

A. 3e V/atom

B. 154 eV/atom

C. 20 eV/atom

D. 10 eV/atom

Answer: B

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91. The screening effect of d-electron is

A. Equal to the p-electrons

B. Much more than the p-electrons

C. Same as f-electrons

D. Less than the p-electrons

Answer: D

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92. Which is least for an element

A. I_1

B. I_2

C. I_3

D. I_4

Answer: A

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93. Element with lowest and highest I.P values in each period respectively.

A. Alkali metals, Noble gases

B. Alkali metals, Halogens

C. Halogens, Alkalimetals

D. Noble gases, Alkalimetals

Answer: A

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94. Which of the following relation is correct with respect first (I) and second (II) ionisation of sodius and magnesium?

A. $I_{Na} > I_{Mg}$

B. $I_{Mg} > II_{Na}$

C. $II_{Mg} > II_{Na}$

D. $II_{Na} > II_{Mg}$

Answer: D

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95. Which of the following elements has the lowest ionization potential ?

A. Nitrogen

B. Oxygen

C. Fluorine

D. Neon

Answer: B

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96. Which one of the following order is correct for the first ionisation energies of the elements?

A. $B < Be < N < O$

B. $Be < B < N < O$

C. $B < Be < O < N$

D. $B < O < Be < N$

Answer: C

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97. The energy released when a neutral gasous atom, takes up an electron and forms a uninegative ion is called its

A. Effective nuclear charge

B. Polarising power

C. Electron affinity

D. Ionization potential

Answer: C

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98. The units of Electron Affinity are

A. k cal/ mole

B. erg. Sec

C. A°

D. no units

Answer: A

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99. Among fluorine and chlorine, the electron affinity of the latter is high. This is due to

A. high electronegativity of fluorine

B. low dissociation energy of fluorine

C. due to small size repulsion between valence electrons and added electron

D. small size of chlorine atom

Answer: C

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100. Which of the following will have almost positive EA_1

A. Chlorine

B. Oxygen

C. Magnesium

D. Sulphur

Answer: C

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101. The element having electron affinity is

A. Fluorine

B. Nitrogen

C. Chlorine

D. Oxygen

Answer: C

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102. The energy released when an electron is added to a neutral gaseous atom would be highest if the element belongs to

A. VII A group

B. V A group

C. VI A group

D. II A group

Answer: A

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103. The element with high electron affinity is

A. Nitrogen

B. Oxygen

C. Sulphur

D. Phosphorous

Answer: C

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104. The electron affinity of an atom is numerically equal to the

A. ionization potential of its uni negative ion

B. effective nuclear charge of its uni positive ion

C. ionization potential of its di negative ion

D. ionization potential of it uni positive ion

Answer: A

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105. $X_{(g)} + e \rightarrow X^{-}_{(g)} + E$, Here "E" is

A. First electron affinity

B. First ionisation energy

C. Second electron affinity

D. Second ionisation energy

Answer: A

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106. The electron affinity of sulphur is $-200 \quad \mathrm{kJ/mole}$. Then the electron affinity of oxygen is

A. -142 kJ/mole

B. -702 kJ/mole

C. -332 kJ/mole

D. -348 kJ/mole

Answer: A

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107. Among the following electronic configurations which one will have highest electron affinity value

A. $1s^2$

B. $1s^2 2s^2$

C. $1s^2 2s^2 2p^4$

D. $1s^2 2s^2 2p^5$

Answer: D

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108. The electron affinity of X is equal in magnitude with the ionisation potential of

A. X^+

B. X^-

C. X

D. X^{2-}

Answer: B

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109. The magnitude of electron affinity depends upon

A. Electron affinity

B. Polarising power

C. Ionization potential

D. The nuclear charge

Answer: D

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110. Among the following electronic configurations which one will have low electron affinity value

A. $1s^2$

B. $1s^2 2s^2$

C. $1s^2 2s^2 2p^4$

D. $1s^2 2s^2 2p^5$

Answer: A

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111. The electron affinities of N, O, S and Cl are such that:

A. $N < O < S < Cl$

B. $O < N < Cl < S$

C. $O = Cl < N = S$

D. $O < S < Cl < N$

Answer: A

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112. In which of the following process maximum energy is released

A)$S_{(g)} + e^{-} \rightarrow S^{-}_{(g)}$ B)$O^{-}_{(g)} + e^{-} \rightarrow O^{-2}_{(g)}$ C) $S^{-}_{(g)} + e^{-} \rightarrow S^{-2}_{(g)}$

A. $O_{(g)} + e^{-} \rightarrow O^{-}_{(g)}$

B. $S_{(g)} + e^{-} \rightarrow S^{-}_{(g)}$

C. $O^{-}_{(g)} + e^{-} \rightarrow O^{-2}_{(g)}$

D. $S^{-}_{(g)} + e^{-} \rightarrow S^{-2}_{(g)}$

Answer: B

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113. Which of the following elements have relatively high electronegativities

A. Alkali metals

B. Halogens

C. Alkamine earth metals

D. All the above

Answer: B

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114. The element with high electronegative is

A. Chlorine

B. Sulphur

C. Oxygen

D. Nitrogen

Answer: C

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115. Element with lowest electronegativity is

A. Nitrogen

B. Chlorine

C. Fluorine

D. Hydrogen

Answer: D

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116. A correct variation in the electronegativity value of atoms is

A. $F > N < O > C$

B. $F > O > N > C$

C. $F < N < O < C$

D. $F > N > O < C$

Answer: B

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117. Which of the following is the most polar bond

A. $O - H$

B. $N - H$

C. $H - Cl$

D. $H - F$

Answer: D

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118. Electronegativity is a measure of the capacity of an atom to

A. Attract electrons

B. Attract protons

C. Repel electrons

D. Repel protons

Answer: A

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119. Of the following elements, which one has the low electronegativity

A. I

B. Br

C. Cl

D. F

Answer: A

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120. Valency and oxidation number of nitrogen in N_2O_5

A. 2, 5

B. 4, 5

C. 3, 4

D. 5, 4

Answer: B

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121. Two elements A and B have the following electronic configurations. The formula of the compound formed between them can be

$A = 1s^2 2s^2 2p^6 3s^2 3p^1$, $B = 1s^2 2s^2 2p^4$

A. AB

B. AB_2

C. A_2B_3

D. A_3B_2

Answer: C

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122. A metal forms a chloride with the formula MCl_2. Formula of Phosphoric acid is H_3PO_4 Formula of the phosphate of the metal is

A. M_3PO_4

B. MPO_4

C. $M_3(PO_4)_2$

D. M_2PO_4

Answer: C

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123. The correct order of electropositive nature of Li,Na and K is

A. $Li > Na > K$

B. $Li > K > Na$

C. $Na > K > Li$

D. $K > Na > Li$

Answer: D

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124. As the alkaline earth metals (except Be) tend to lose their valence electrons readily they act as

A. Weak oxidising agent

B. Weak reducing agent

C. Strong oxidising agent

D. Strong reducing agent

Answer: D

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125. The order in which the following oxides are arranged according to decreasing basic nature is A) CuO, Na_2O, MgO, Al_2O_3 B) Al_2O_3, MgO, CuO, Na_2O C) MgO, Al_2O_3, CuO, Na_2O D) Na_2O, MgO, Al_2O_3, CuO

A. CuO, Na_2O, MgO, Al_2O_3

B. Al_2O_3, MgO, CuO, Na_2O

C. MgO, Al_2O_3, CuO, Na_2O

D. Na_2O, MgO, Al_2O_3, CuO

Answer: D

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126. Chloride of an element A gives neutral solution in watt . In the periodic table, the elements A belong to

A. First group

B. Third group

C. Fifth group

D. First transition series

Answer: A

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127. The increasing order of acidic nature of the following oxides is

A. $SiO_2 < P_2P_5 < Cl_2O_7 < SO_3$

B. $SiO_2 < P_2P_5 < SO_3 < Cl_2O_7$

C. $Cl_2O_7 < SO_3 < P_2P_5 < SiO_2$

D. $SO_3 < Cl_2O_7 < SiO_2 < P_2O_5$

Answer: B

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Level-II (H.W)

1. Which of the following pair has both members from the same group of the periodic table?

A. $Na - Ca$

B. $Na - Cl$

C. $Ca - Cl$

D. $Cl - Br$

Answer: D

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2. The element having electronic configuration $[Kr]4d^{10}4f^{14}5s^2 5p^6 5d^2 6s^2$ belongs to

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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3. An atom with atomic number 21 belongs to the category of

A. s- block elements

B. p-block elements

C. d-block elements

D. f-block elements

Answer: C

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4. Which of the following is general is general electron configuration of 4d series?

A. $4s^{1 \text{ to } 2}3d^{1 \text{ to } 10}$

B. $4s^{1 \text{ to } 2}4d^{1 \text{ to } 10}$

C. $5s^{1 \text{ to } 2}5d^{1 \text{ to } 10}$

D. $5s^{1 \text{ to } 2}4d^{1 \text{ to } 10}$

Answer: D

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5. In a given transition series the elements differ generally in the number of electrons of

A. p

B. d

C. p, d & f

D. p & d

Answer: B

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6. Transition elements are placed in the periodic table between the group

A. IA and IIA

B. IIA and IIIA

C. IIIA and IVA

D. VII and zero

Answer: B

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7. Regarding transitional elements the wrong statement is

A. They exhibit variable valencies

B. They possess low M.P's

C. They are good catalysts

D. They form coloured complexes.

Answer: B

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8. The electron configuration of the element 'M' is $[Ar]3d^{10}4s^2 4p^3$.

Then 'M' belong to

A. VB group

B. VIII group

C. VA group

D. 0 group

Answer: C

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9. Which of the following is the smallest in size?

A. Br

B. I^-

C. I

D. Br^-

Answer: A

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10. The correct order of atomic radii is

A. $Ce > Sn > Yb > Lu$

B. $Sn > Ce > Lu > Yb$

C. $Lu > Yb > Sn > Ce$

D. $Sn > Yb > Ce > Lu$

Answer: A

Watch Video Solution

11. The element with the following atomic number may be bigger than aluminium atom is

A. 12

B. 14

C. 16

D. 17

Answer: A

Watch Video Solution

12. Which among the following group elements are smaller in size

A. IA group

B. II A group

C. VII A group

D. VI A group

Answer: C

Watch Video Solution

13. Which of the following is an example of a positive ion and negative ion that is isoelectronic with Argon

A. K^{+} and Cl^{-} or Ca^{2+} and S^{2-}

B. Na^{+} and F^{-} or Mg^{2+} and O^{2-}

C. K^{+} and I^{-} or Mg^{2+} and S^{2-}

D. K^{+} and I^{-} or Ca^{2+} and O^{2-}

Answer: A

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14. The ionization potential (I_1) of nitrogen $(Z=7)$ is more than oxygen $(Z=8)$. This is explained with

A. Hund's rule

B. Excitation rule

C. Pauli principle

D. Auf-bau principle

Answer: A

Watch Video Solution

15. Second ionization potential value is very low for

A. Sodium

B. Magnesium

C. Fluorine

D. Oxygen

Answer: B

Watch Video Solution

16. I_1 of an element X is 899 kJ mole^{-1} and that of another element Y is 801 kJ mole^{-1}. Then X and Y may be

A. Li, Be

B. Be, B

C. B, C

D. C, N

Answer: B

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17. The first ionisation potential in electron volts of nitrogen and oxygen atoms are respectively given by

A. 14.6, 13.6

B. 13.6, 14.6

C. 13.6, 13.6

D. 14.6, 14.6

Answer: A

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18. The second ionisation energy of N and O in electron volt are respectively given by:

A. 29, 29

B. 34, 34

C. 29, 34

D. 34, 29

Answer: C

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19. The first ionisation potential 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. $Na > Mg > Al < Si$

Answer: A

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20. Electrons which have the highest penetrating power through lower orbits are

A. p-electrons

B. s-electrons

C. d-electrons

D. f-electrons

Answer: B

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21. A sudden large jump between the values of second and third ionisation energies of an element would be associated with the electronic configuration

A. $1s^2 2s^2 2p^6 3s^1$

B. $1s^2 2s^2 2p^6 3s^2 3p^1$

C. $1s^2 2s^2 2p^6 3s^2$

D. $1s^2 2^s 22p^6 3s^2 3p^3$

Answer: C

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22. The atomic number of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are respectively $23, 24, 25, 26.$

Which out of these may be expected to have the jump in second ionisation enthalpy?

A. Mn

B. Fe

C. V

D. Cr

Answer: D

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23. The ionisation potential of $X^{-}_{(g)}$ is numerically equal to

A. E.A. of $X_{(g)}$

B. EA of $X^{+}_{(g)}$

C. E.A. of $X^{2-}_{(g)}$

D. E.A of $X^{2+}_{(g)}$

Answer: A

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24. the correct order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number $9, 17, 35$ and 53 respectively is

A. $I > Br > Cl > F$

B. $F > Cl > Br > I$

C. $Cl > F > Br > I$

D. $Br > Cl > I > F$

Answer: C

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25. Regarding electron affinity, the wrong statement is

A. The E.A. of "Cl" is more than that of "F"

B. The E.A. of "S" is more than that of "P"

C. The E.A. of "Si" is more than that of "C"

D. The E.A. of "Ne" is more than that of "F"

Answer: D

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26. Electron affinity of chlorine is -348 kJ/mol. Then the electron affinity of Fluorine is .... In kJ/mol

A. -333

B. -348

C. -384

D. -428

Answer: A

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27. The 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

Answer: C

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28. The ionisation potential and electron affinity of an element "X" are 275 and 86 kcal/mole. Then the electronegativity of "X" according to Mulliken scale is

A. 4

B. 3.5

C. 2.8

D. zero

Answer: C

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29. Which of the following does not be considered as a fixed quantity A)Electronegativity B)First ionisation potential C)Electron affinity D)Second ionisation potential

A. Electronegativity

B. First ionisation potential

C. Electron affinity

D. Second ionisation potential

Answer: A

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30. The electronegativity of $K = 0.8$ and $Cl = 3.0$. The type of bond formed between "K" and "Cl" is

A. Pure covalent bond

B. Hydrogen bond

C. Metallic bond

D. Electrovalent bond

Answer: D

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31. An element "X" has $IP = 1681$ kJ/mole and $EA = -333$ kJ/mole then its electronegativity is

A. $1681 + 333 / 544$

B. $1681 - 333 / 544$

C. $1681 + 333 / 2$

D. $\dfrac{0.208\sqrt{1681 + 333}}{544}$

Answer: A

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32. Which of the following has zero electronegativity

A. Ar

B. Si

C. N

D. F

Answer: A

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33. Which of the following elements posses zero electron affinity (theriotically) and zero electronegativity values?

A. Halogens

B. Alkali metals

C. Chalcogens

D. Rare gases

Answer: D

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34. The electronegativities of two elements A and B are 2.1 and 1.8. Then the type of bond formed between them is

A. Ionic bond

B. Pure covalent bond

C. Polar covalent bond

D. Hydrogen bond

Answer: C

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35. In a compound XY, the electronegativity difference between X and Y is greater than 1.7, then compound XY soluble in

A. Benzene

B. CCl_4

C. H_2O

D. CS_2

Answer: C

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36. The stable oxide state of Thallium, a III A group element is

A. $+1$

B. $+3$

C. -3

D. $+5$

Answer: A

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37. The stable oxidation sate (+8) is exhibited by

A. Co & Ni

B. Ru & Os

C. Cl & I

D. Te & I

Answer: B

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38. The formula of the compound formed by the pair of elements Al & S is:

A. Al_2S_3

B. Al_3S_2

C. Al_4S_3

D. AlS_3

Answer: A

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39. The oxidation state and valency of Al in $\left[AlCl(H_2O)_5\right]^{2+}$

A. $+6$ & 3

B. $+3$ & 6

C. $+6, 6$

D. $+3,$ & 3

Answer: B

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40. An element has nine positive charges in its nucleus its common oxidation state is

A. $+7$

B. $+5$

C. -1

D. $+1$

Answer: C

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41. The outermost electronic configuration of most electropositive element is

A. ns^1

B. ns^2np^2

C. ns^2np^3

D. ns^2np^5

Answer: A

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42. The tendency if an element to lose an electron is called

A. Electronegativity

B. Non-metallic character

C. Electropositive character

D. Electron affinity

Answer: C

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43. Oxide that is most acidic

A. Cl_2O_7

B. SO_3

C. P_4O_{10}

D. N_2O_5

Answer: A

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44. Three elements, X, Y and Z belong to the same period. Their oxides are acidic, amphoteric and basic respectively. The order of electronegative of these elements in the periodic table is

A. X, Y, Z

B. Y, Z, X

C. X, Z, Y

D. Z, Y, X

Answer: D

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45. The elements 'X', 'Y' and 'Z' form oxides which are acidic, basic and amphoteric respectively. The correct order of their electro negativity is

A. $X > Y > Z$

B. $Z > Y > X$

C. $X > Z > Y$

D. $Y > X > Z$

Answer: C

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46. Chemical similarity between Be and Al is due to

A. Diagonal relationship

B. Both belong to same period

C. Similar outer electronic configuration

D. Inert pair effect

Answer: A

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47. Pair of ions with polarising power

A. Li^{+}, Mg^{2+}

B. Li^{+}, Na^{+}

C. Mg^{2+}, Ca^{2+}

D. Mg^{2+}, K^{+}

Answer: A

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LEVEL-V

1. Four elements P,Q,R & S have ground state electronic configuration as:

$P \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^3$ $\quad Q \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^1$

$R \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^3$ $\quad S \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^1$

Comment which of the following option represent the correct order of true (T) & false (F) statement I size of $P <$ size of Q

II size of $R <$ size of S

III size of $P <$ size of R (appreciable difference)

IV size of $Q <$ size of S (appreciable difference)

A. TTTT

B. TTTF

C. FFTT

D. TTFF

Answer: A

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2. The strength of an oxyacid $E(OH)_n$, where E is the central atom , depends upon

A. Electronegative of E but not on atomic size

B. Atomic size of E but not on electronegative of E

C. Not on oxidation state of E in oxyacids

D. Atomic size electronegativity and oxidation state of E

Answer: D

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3. Consider the following ionization energies for a metal M

$M_{(g)} \rightarrow M^{+}_{(g)} + e^{-}, \quad \Delta H = +580$ kJ / mole

$M^{+}_{(g)} \rightarrow M^{+2}_{(g)} + e^{-}, \quad \Delta H = +1815$ kJ / mole

$M^{+2}_{(g)} \rightarrow M^{+3}_{(g)} + e^{-}, \quad \Delta H = +2740$ kJ / mole

$M^{+3}_{(g)} \rightarrow M^{+4}_{(g)} + e^{-}, \quad \Delta H = +11600$ kJ / mole

Select correct order

A. $M^{+2}_{(g)} < M^{+4}_{(g)}$ (size)

B. $M^{+4}_{(g)} < M^{+3}_{(g)}$ (ionization energy)

C. $M^{+3}_{(g)} < M^{+4}_{(g)}$ (electron affinity)

D. All given orders are correct

Answer: C

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4. In general , the configuration of lanthanides in $(n-2)f^{1-14}(n-1)s^2p^6d^{0-1}ns^2$. It has been observed that , with increase in atomic number of lanthanides , there is a gradual decrease in ionic radii from La $(1.22A^{\circ})$ to $Lu(0.99A^{\circ})$. The reason for decrease in ionic radii is an increase in

A. Electronegative character

B. Valency electrons and number of shells

C. Atomic and ionic volumes

D. Nuclear attraction for valence electrons leading to inward shrinking of shell

Answer: D

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5. An increase in both atomic and ionic radii with atomic number occurs in any group of the periodic table and in accordance with this the ionic radii of Ti(IV) and Zr (IV) ions are $0.68A^{\circ}$ and $0.74A^{\circ}$ respectively , but for Hf(IV) ion, the ionic radius is $0.75A^{\circ}$, which is almost the same as that for Zr(IV) ion . This is due to

A. Greater degree of covalency in compounds of Hf^{4+}

B. Lanthanide contraction

C. Actinide contraction

D. Difference in co-ordinates nubmer of Zr^{4+} and Hf^{4+} in their compounds

Answer: B

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6. Mercury is the only metal which is liquid at $0^\circ C$. This is due to its

A. Very high ionisation energy and weak metallic bond

B. Low ionisation potential and high electronegativity

C. High atomic mass and small size

D. High electronegativity and low ionisation potential

Answer: A

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7. Arrange the following ions in order of their inceasing radii : $Na^{+}, Mg^{2+}, K^{+}, Al^{3+}$

A. $Na^{+} > Al^{3+} > Mg^{2+} > K^{+}$

B. $Mg^{2+} < Al^{3+} < Na^{+} < K^{+}$

C. $Al^{3+} < Mg^{2+} < Na^{+} < K^{+}$

D. $Na^{+} < K^{+} < Mg^{2+} < Al^{3+}$

Answer: C

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8. Which is the correct order of ionisation energies ?

A. $F^{-} > F > Cl^{-} > Cl$

B. $F > F^{-} > Cl > Cl^{-}$

C. $F > F^{-} > Cl^{-} > Cl$

D. $F^{-} > F > Cl > Cl^{-}$

Answer: A

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9. Fluorine was discovered very late because of its high reactivity . It is always found in combined state in which it cannot be identified easily . The fact that accompanied with the high reactivity of fluorine is A)Low ionization potential B)The smallest size amongst halogen C)Low F- F bond-energy & high electronegativity D)The higher ionisation potential

A. Low ionization potential

B. The smallest size amongst halogen

C. Low F- F bond-energy & high electronegativity

D. The higher ionisation potential

Answer: C

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10. Which of the following is correct

A. IP_2 of Cu is more than the IP_2 of Zn

B. The order of non-metallic character is : $N < P < O < S$

C. IE_2 of Cu is greater than IE_2 of K

D. The order of ionic mobility in aqueous solution

$Na^{+} < Mg^{2+} < Al^{3+}$

Answer: A

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11. Aqueous solution of two compounds $M_1 - O - H$ and $M_2 - O - H$ are prepared in two different beakers . If electronegativity of

$M_1 = 3.4, M_2 = 1.2, 0 = 3.5$ and $H = 2.1,$ then the nature of two solution will be respectively

A. Acidic , basic

B. Acidic , acidic

C. Basic , acidic

D. Basic , basic

Answer: A

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12. The correct order of the first ionisation potentials is

A. $Ne > Cl > P > S > Al > Mg$

B. $Ne > Cl > P > S > Mg > Al$

C. $Ne > Cl > S = P > Mg > Al$

D. $Ne > Cl < S > P < Al > Mg$

Answer: B

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13. Three elements X , Y and Z have atomic numbers 19 , 37 and 55 respectively . Then the correct statements (s) is / are

A. Their ionisation potential would increase with increasing atomic numbers

B. Y would have an ionisation potential between those X and Y

C. Y would have the highest ionisation potential

D. Z would have the highest ionisation potential

Answer: B

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14. Which of the following pairs is chemically similar ?

A. Zr-Hf

B. Cu-Ag

C. Fe-Au

D. Hf-La

Answer: A

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15. The statement which is not correct for periodic classification of elements is A)The properties of elements are a periodic function of their atomic numbers B)Non-metallic elements are less in number than metallic elements C)The first ionisation energies of elements along a period of vary in a regular manner with increase in atomic number D)Generally electronegativity and electron affinity increase across the period

A. The properties of elements are a periodic function of their atomic numbers

B. Non-metallic elements are less in number than metallic elements

C. The first ionisation energies of elements along a period of vary in a regular manner with increase in atomic number

D. Generally electronegativity and electron affinity increase across the period

Answer: C

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16. Be and Mg have zero values of electron affinity because

A. Their 2s and 3s-orbitals are fully occupied

B. Their first ionisation - energies are very small

C. Their electronegativity are very high

D. Their electro- affinity are very high in Mg^{2+} and Be^{2+}

Answer: A

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17. The percentage ionic character in H-Br bond in HBr molecule is ________________, given the electronegativity of H and Br are 2.1 and 2.8 respectively . A)12.9 B)16.9 C)9

A. 12.9

B. 16.9

C. 23.9

D. 9

Answer: A

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18. Which one of the following arrangements is the incorrect representation of the property indicated with it ? A)$Br < Cl < F$: Electronegativity B)$F < Br < Cl$: Electron - affinity C) $F_2 < Br_2 < Cl_2$: Bond energy D)$Br_2 < Cl_2 < F_2$: Oxidising strength

A. $Br < Cl < F$: Electronegativity

B. $F < Br < Cl$: Electron - affinity

C. $F_2 < Br_2 < Cl_2$: Bond energy

D. $Br_2 < Cl_2 < F_2$: Oxidising strength

Answer: B

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19. The C-C single bond length is $1.54A^{\circ}$ and that of Cl-Cl is $1.98A^{\circ}$. If the electronegativity of Cl and C are 3.0 and 2.5 respectively , the C-Cl bond -length will be equal to

A. $3.12A^{\circ}$

B. $1.67A^{\circ}$

C. $1.71A^{\circ}$

D. $2.12A^{\circ}$

Answer: C

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20. The transition elements (d-blocks elements) show variable oxidation states because

A. Of the presence of ns ,np and nd electrons

B. The energy difference between (n-1)d and ns electrons is very less , thus (n-1)d electrons also behave like valence electrons

C. Of the presence of ns and nd orbitals

D. Of the presence of electrons in np and nd orbitals

Answer: B

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

A. $O > C > N > B$

B. $B < N > C > O$

C. $O > C > B > N$

D. $O < B > C > N$

Answer: C

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22. The electronegativity of oxygen and an element A on Pauling 's scale are 3.5 and 1.1 respectively . The nature of oxide of A will be

A. Acid or neutral

B. Basic

C. Amphoteric

D. Given information is not sufficient

Answer: B

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23. The IE_1 of Cs is 376 kj/mole . The number of Cs atoms that can be converted to Cs^+ ions by 1J energy is

A. 1.60×10^{18}

B. 6.023×10^{18}

C. 1.505×10^{23}

D. 3.011×10^{18}

Answer: A

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24. It has been found that the atoms combine to form bonds in order to keep 8 valance electrons for stability . Hypothetically , if stability is attained with 7 electrons instead of 8 electrons , the formula of the stable nitride ion would be

A. N^{+}

B. N^{2-}

C. N^{2+}

D. N^{3-}

Answer: B

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25. Which of the following is wrong .

A. The maximum covalency of Boron is 4 where as that of Al is 6

.

B. The order of EN of IIIA group elements is

$$B > Al < Ga < In < TI$$

C. Down the group the oxidising power increases .

D. The ordder of acidic nature :

$$N_2O_3 > P_2O_3 > As_2O_3 > Sb_2O_3 > Bi_2O_3$$

Answer: C

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26. A' Chloride of an element gives neutral solution in water . In the periodic table , the element 'A' belongs to group

A. 13

B. 15

C. 1

D. 16

Answer: C

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27. The correct order of radii is:

A. $N < Be < B$

B. $F^{-} < O^{2-} < N^{3-}$

C. $Fe^{3+} < Fe^{2+} < Fe^{4+}$

D. $N < Li < K$

Answer: B

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28. 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 first ionisation potential of Na is less than the first ionisation potential of Mg. C)The second ionisation potential of Mg greater than the second ionisation potential of Na D)The third ionisation potential of Mg greater than the third ionisation potential of Al

A. The first ionisation potential of Al is less than the first ionisation potential of Mg.

B. The first ionisation potential of Na is less than the first ionisation potential of Mg.

C. The second ionisation potential of Mg greater than the second ionisation potential of Na.

D. The third ionisation potential of Mg greater than the third ionisation potential of Al

Answer: C

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29. The decreasing order of the second ionisation potential of K , Ca and Ba is

(At. No : K = 19 , Ca = 20 , Ba = 56)

A. $K > Ca > Ba$

B. $Ca > Ba > K$

C. $Ba > K > Ca$

D. $K > Ba > Ca$

Answer: A

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30. In the descending order of a group in the periodic table which of the following would be true

1) All the atoms have the same number of valence electrons

2) Gram atomic volume increases

3) Electronegativity decreases

4) Metallic character decrease and basic nature of their oxides decreases

Select the correct answer using the codes

A. 1, 2 and 4

B. 1 , 3 and 4

C. 1 ,2 and 3

D. 2 , 3 and 4

Answer: C

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31. Which of the following represents second ionization potential ?

A. $Mg^{-}(g) \rightarrow Mg(g)$

B. $Mg^{2+}(g) \rightarrow Mg^{3+}(g)$

C. $Mg^{-}(g) \rightarrow Mg^{+}(g)$

D. $Mg^{+}(g) \rightarrow Mg^{2+}(g)$

Answer: D

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32. Ionisation energy values of an atom are 495 , 767 , 1250 and 4540 kJ mole^{-1} the formula of its sulphate is

A. MSO_4

B. M_2SO_4

C. $M_2(SO_4)_3$

D. $M(SO_4)_2$

Answer: C

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33. If electro negativity of x be 3.2 and that of y be 2.2 , the percentage ionic character of xy is

A. 19.5

B. 18.5

C. 9.5

D. 29.5

Answer: A

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34. The electronegativity of carbon from the following data is nearly

$E_{H-H} = 104.2 \text{kcal} mol^{-1}$,

$E_{C-C} = 83.1$ kcal mol^{-1} ,

$E_{C-H} = 98.8$ kcal mol^{-1}, $X_H = 2.1$

A. 3.0

B. 2.1

C. 2.5

D. 3.1

Answer: C

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35. Which of the following statements is incorrect ?

A. Oxide of aluminium (Al_2O_3) , and arsenic (As_2O_3) are amphoteric.

B. Oxide of chlorine (Cl_2O_7) is less acidic than oxide of nitrogen (N_2O_5) .

C. Oxide of carbon (CO_2) is more acidic than oxide of silica (SiO_2) .

D. The correct increasing order of basic character of various oxides is $H_2O < CuO < MgO < CaO$

Answer: B

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36. S-1 : Formation of Mg^{2+} and Al^{3+} , both require the absorption of energy .

S-2: The following set of elements represent the correct order of electron affinity values $S > Se > Te > O$

S-3 : The size of the isoelectronic species is affected by electron - electron interaction in the outer orbitals .

S-4: Chemistry of the elements depend on the valence shell electron configuration as well as nuclear masses .

A. TTFF

B. TFTF

C. TTFT

D. TTTT

Answer: A

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37. $N_0/2$ atoms of X(g) are converted into X^+ (g) by energy E_1. $N_0/2$ atoms of X(g) are converted into X^- (g) by the energy E_2. Hence ionisation potential and electron affinity of X(g) are :

A. $\frac{2E_1}{N_0}, \frac{2(E_1 - E_2)}{N_0}$

B. $\frac{2E_1}{N_0}, \frac{2E_2}{N_0}$

C. $\frac{(E_1 - E_2)}{N_0}, \frac{2E_2}{N_0}$

D. $\frac{E_1}{N_0}, \frac{2E_2}{N_0}$

Answer: B

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38. Which of the following triads have approximately equal size ?

A. Na^{+}, Mg^{2+}, Al^{3+} (iso-electronic)

B. F^{-}, Ne, O^{2-} (iso-electronic)

C. Fe , Co , Ni

D. Mn^{+}, Fe^{2+}, Cr (iso-electronic)

Answer: C

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39. Ionic radii of :

A. $Ti^{4+} < Mn^{7+}$

B. $^{35}Cl^{-} <^{37} Cl^{-}$

C. $K^{+} > Cl^{-}$

D. $P^{3+} > P^{5+}$

Answer: D

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40. When the following five anions are arranged in order of decreasing ionic radius , the correct sequence is :

A. $Se^{-2}, I^{-}, Br^{-}, O^{2-}, F^{-}$

B. $I^{-}, Se^{2-}, O^{2-}, Br^{-}, F^{-}$

C. $Se^{-2}, I^{-}, Br^{-}, F^{-}, O^{2-}$

D. $I^{-}, Se^{-2}, Br^{-1}, O^{2-}, F^{-}$

Answer: D

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41. (a),(b) and (c) are elements in the second short period. Oxide of (a) is ionic, that of (b) is amphoteric and of (c) of gaint molecule. (a),(b) and (c) have atomic number in the order-

A. $(A) < (B) < (C)$

B. $(C) < (B) < (A)$

C. $(A) < (C) < (B)$

D. $(B) < (A) < (C)$

Answer: A

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42. The sizes of the second and third row transition elements being almost the same . This is due to :

A. d- and f-orbitals do not shield the nuclear charge very effectively

B. Lanthanide contraction

C. Both are true

D. None

Answer: C

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43. EN of the element (A) is E_1 and EA is E_2 hence IP will be :

A. $2E_1 - E_2$

B. $E_1 - E_2$

C. $E_1 - 2E_2$

D. $(E_1 + E_2)/2$

Answer: A

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44. For the element X, student Surbhi measured its radius as $102nm$, Mr. Gupta as 113 nm and Mr. Agarwal as $100nm$ using same apparatus. Their teacher explained that measurements were correct by saying that recorded values by three students were

A. Crystal , vander Waal's and covalent radii

B. Covalent , crystal and van der Waal's radii

C. Van der Waals , ionic and covalent

D. None

Answer: A

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45. The effective nuclear charge on the added electron in F-atom , in the formation of negative ion is

A. 4.55

B. 5.2

C. 4.85

D. 5.85

Answer: C

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46. Covalent radius of F is $0.72A^{\circ}$. Calculate its Allred-Rochow's electronegativity .

A. 2.1

B. 3.539

C. 2.932

D. 4.35

Answer: D

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47. Covalent radius of oxygen is $0.74A^{\circ}$ and its A .R. electronegativity is 3.5 . What is the effective nuclear charge experienced by oxygen ?

A. 4.20

B. 5.30

C. 3.50

D. 2.92

Answer: A

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48. There are four elements 'P' , 'q' , 'r' and 's' having atomic numbers Z-1, Z, Z+1 and Z+2 respectively. If the element 'q' is an insert gas, select the correct answer from the following statements.

(i) 'p' has most negative electron gain enthalpy in the respective period.

(ii) 'r' is an alkali metal

(iii) 's' exists in stable +1 oxidation state.

A. I and ii

B. ii and iii

C. I and iii

D. I, ii and iii

Answer: A

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49. Which of the following statements are correct?

(i) Generally the radius trend and the ionisation energy trend across a period are exact opposites.

(ii) Electron affinity values of elements may be exothermic (negative) or endothermic (position)

(iii) The first ionisation energy of sulphur is higher than that of phosphorous

$Te^{2-} > I^{-} > Cs^{+} > Ba^{2+}$ represents the correct decreasing order of ionic radii.

A. I,ii and iv

B. ii,iii and iv

C. I,ii and iv

D. I, ii and iii

Answer: C

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50. The correct order of atomic radii of the following element $Sm(z=62), Eu(z=63), Gd(z=64), Lu(z=71)$

A. $Sm > Eu > Gd > Lu$

B. $Sm < Eu < Gd < Lu$

C. $Eu > Sm > Gd > Lu$

D. $Sm > Gd > Lu > Lu$

Answer: C

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51. Consider the following ionization steps :

$M(g) \rightarrow M^{+}(g) + e^{-}, \Delta H = 100 eV$

$M(g) \rightarrow M^{2+}(g) + 2e^{-}, \Delta H = 250 eV$

Select correct statement(s) a)$I.E._1$ of $M(g)$ is 100eV b) $M^{+}(g) \rightarrow M^{2+}(g) + e^{-}, \Delta H = 150 eV$ c)$I.E._2$ of $M(g)$ is 250eV d)$I.E._2$ of M(g) is 14=150eV

A. $I.E._1$ of $M(g)$ is 100eV

B. $M^{+}(g) \rightarrow M^{2+}(g) + e^{-}, \Delta H = 150 eV$

C. $I.E._2$ of $M(g)$ is 250eV

D. $I.E._2$ of M(g) is 14=150eV

Answer: A::B::D

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52. Which of the following show amphoteric behaviour? a) $Zn(OH)_2$ b)BeO c)Al_2O_3 d)$Pb(OH)_2$

A. $Zn(OH)_2$

B. BeO

C. Al_2O_3

D. $Pb(OH)_2$

Answer: A::B::C::D

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53. In which of the following arrangements, the order is not correct according to the property indicated against it. a)increase size :$Cu^{2+} < Cu^{+} < Cu$ b)increasing $IE_1 : B < C < N < O$

c)increasing $IE_1: Na < Al < Mg < Si$ d)increasing $IE_1: Li < Na < K < Rb$

A. increase size :$Cu^{2+} < Cu^{+} < Cu$

B. increasing $IE_1: B < C < N < O$

C. increasing $IE_1: Na < Al < Mg < Si$

D. increasing $IE_1: Li < Na < K < Rb$

Answer: B::D

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54. Which of the following statement(s) is /are correct?

A. Inonization energy may be negative for some elemetns

B. Second electron gain enthalpy always remains positive for all the elements

C. Negative value of electron gain enthalpy of Fluorine is minimum in its group

D. Ionization energy of Ga is slightly more than Al

Answer: B::D

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55. Which of the following statements is/are correct?

A. The second ionization energy of oxygen is greater than that of fluorine

B. The third ionization energy of phosphorous is greater than that of aluminium.

C. The first ionization energy of aluminium is slightly less than of gallium.

D. The second ionization energy of boron is greater than that of carbon.

Answer: A::C::D

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56. Which one of the following statements is/are incorrect : a)Atomic radius of Be is larger than that of Al. b) $\Delta_{eg}H$ of Se is -195 kJ/mol where as that of O is -141 KJ/mol. c)First ionization energy of N is greater than that of Ne d)CO, NO and N_2O are neutral oxides.

A. Atomic radius of Be is larger than that of Al.

B. $\Delta_{eg}H$ of Se is -195 kJ/mol where as that of O is -141 KJ/mol.

C. First ionization energy of N is greater than that of Ne

D. CO, NO and N_2O are neutral oxides.

Answer: A::C

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57. Poor shielding of nuclear charge by d or f-orbital elements is responsible for which of the following facts?

A. Atomic radius of Nb (4d -series) is comparable to Ta (5d-series)

B. The 1 st ionisation enregy of copper is less than that of zinc.

C. The value of electron gain enthalpy is more negative for sulphur than for oxygen.

D. The 1 st ionization energy for gold is greater than that of silver.

Answer: A::D

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58. The correct order(s) of stability of oxidation state(s) for Ge, Sn and Pb is/are

A. $Ge^{4+} < Sn^{4+} < Pb^{4+}$

B. $Ge^{2+} < Sn^{2+} < Pb^{2+}$

C. $Pb^{2+} < Sn^{2+} < Ge^{2+}$

D. $Pb^{4+} < Sn^{4+} < Ge^{4+}$

Answer: B::D

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59. The screening effect of inner electrons of an atom can cause

A. decrease in ionization energy

B. increase in effective nuclear charge

C. increase in ionisation energy

D. decrease in atomic size

Answer: A

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60. Which of trhe following statements is not correct?

A. The first inoisation energies (in $KJ\text{mol}^{-1}$) of carbon, silicon , germanium , tin, and lead are 1086, 786,761,708 and 715 respectively:

B. Down the group , electronegativity dereases from B to T1 in boron family.

C. Among oxides of the elements of carbon family CO is neutral , GeO is acidic and SnO is amphoteric.

D. The 4f and 5f inner transition elements are placed seperately at the bottom of the periodic table to maintain its struction.

Answer: A::C::D

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61. The energy required to pull the most loosely bound electrons from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors :(i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells.

Ionization potential of Na would be numerically the same as

A. electron affinity of Na^+

B. electrongativity of Na^+

C. electron affinity of Na

D. ionization potential of Mg

Answer: A

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62. The energy required to pull the most loosely bound electrons from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors :(i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells.

Which of the following elements has the least ionization potential?

A. Lithium

B. Cesium

C. Magnesium

D. Calcium

Answer: B

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63. The energy required to pull the most loosely bound electrons from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors :(i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells.

Incorrect order of ionisation enegy is:

A. $Pb(I.E.) > Sn(I.E.)$

B. $Na^{+}(I.E.) > Mg^{+}(I.E.)$

C. $Li^{+}(I.E.) < O^{+}(I.E.)$

D. $Be^{+}(I.E.) < C^{+}(I.E.)$

Answer: C

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64. The second ionisation energies are higher than the first ionisation energies. This is mainly due to the fact that after the removal of the first electrons, the atom changes inot mono valent position ion. In the ion, the number of electrons decreases but the nuclear charge remains the same. As a result of this, the remaining electrons are held more tightly by the nucleus and it becomes difficult to remove the second electron . Therefore, the value of second ionisation energy .(IE_2) , is greater than that of the first ionisation energy (IE_1) . Similarly third ionisation energy (IE_3) is greater than that of second IE_2.

Successive ionisation energy of an atom is greater than previous one, because

A. $\frac{P}{e}$ ratio increase

B. $\frac{P}{e}$ ratio decrease

C. $\frac{P}{e}$ ratio remains constant

D. none of these

Answer: A

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65. The second ionisation energies are higher than the first ionisation energies. This is mainly due to the fact that after the removal of the first electrons, the atom changes inot mono valent position ion. In the ion, the number of electrons decreases but the nuclear charge remains the same. As a result of this, the remaining electrons are held more tightly by the nucleus and it becomes difficult to remove the second electron . Therefore, the value of second ionisation energy .(IE_2) , is greater than that of the first ionisation energy (IE_1) . Similarly third ionisation energy (IE_3) is greater than that of second IE_2.

Correct order of ionisation potential of coinage metals is :

A. $Au > Ag > Cu$

B. $Cu > Ag > Au$

C. $Au > Cu > Ag$

D. $Ag > Cu > Au$

Answer: C

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66. The second ionisation energies are higher than the first ionisation energies. This is mainly due to the fact that after the removal of the first electrons, the atom changes inot mono valent position ion. In the ion, the number of electrons decreases but the nuclear charge remains the same. As a result of this, the remaining electrons are held more tightly by the nucleus and it becomes difficult to remove the second electron . Therefore, the value of second ionisation energy .(IE_2) , is greater than that of the first ionisation energy (IE_1) . Similarly third ionisation energy (IE_3) is greater than that of second IE_2.

IE_1 and IE_2 of Mg metal are 178 and 348 kcal/mol respectively . The energy required for the given reaction is :

$Mg(g) \rightarrow Mg^{+2}(G) + 2e^{-}$

A. $+170$ kcal/mol

B. $+526$ kcal/mol

C. -170 kcal/mol

D. -526 kcal/mol

Answer: B

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67. Nuclear charge actually experienced by an electron is termed as effective nuclear charge The effective nuclear Z^* actually depends on type of shell and orbital in which electron is actually present. The relative extent to which the various orbitals penetrate is . $s > p > d > f$ (for the same value of n)

The phenomenon in which penulitmate shell electrons act as screen or shield in between nucleus adn valence shell electrons and there by reducing nuclear charge is known as sheilding effect. The penultimate shell electrons repel the valence shell electron to keep them loosely held with nucleus . It is thus evident that more is the shielding effect, lesser is the effective nuclear charge and lesser is the ionizatio energy.

In which of the following valence electron experience maximum effective nuclear charge?

A. K

B. Ga

C. Sr

D. N

Answer: B

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Which of the following is not concerned to effective nuclear charge?

A. Higher ionization potential of carbon than boron

B. Higher ionization potential of magnesium than aluminium

C. Higher values of successive ionization energy

D. Higher electronegativity of higher oxidation state

Answer: B

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69. Nuclear charge actually experienced by an electron is termed as effective nuclear charge The effective nuclear Z^* actually depends on type of shell and orbital in which electron is actually present. The relative extent to which the various orbitals penetrate is . $s > p > d > f$ (for the same value of n)

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Ionization energy is not influenced by :

A. size of atom

B. Effective nuclear charge

C. Electron present in inner shell

D. Change in entropy

Answer: D

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70. The main group elements complete their elctron configuration using s and p electrons in the periodic table. These elements range from the most metallic to the most non-metallic , with intermiediate properties of semi-metals, in between . The elements which occur at the two extremes of the periodic table are highly reactive and therefore , these highly reactive elements do not occur in free state, they usually occur in the combined forms.

Select the correct statement.

A. Chemical reactively of the elements is generally less in the centre of a period.

B. Most of the elements forming amphoteric oxides are placed in the centre of a period.

C. Metallic character increases with increasing atomic number in a group where as decrease form left to right in a period.

D. All of these

Answer: D

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71. The main group elements complete their elctron configuration using s and p electrons in the periodic table. These elements range from the most metallic to the most non-metallic , with intermiediate properties of semi-metals, in between . The elements which occur at the two extremes of the periodic table are highly reactive and therefore , these highly reactive elements do not occur in free state, they usually occur in the combined forms.

A compound (i.e, and oxide of metal) has an element in its lowest oxidation state. Then it will be :

A. highly acidic

B. highly basic

C. neutral

D. half acidic , half basic

Answer: B

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72. The main group elements complete their elctron configuration using s and p electrons in the periodic table. These elements range from the most metallic to the most non-metallic , with intermiediate properties of semi-metals, in between . The elements which occur at the two extremes of the periodic table are highly reactive and therefore , these highly reactive elements do not occur in free state, they usually occur in the combined forms.

Which of the following properties show opposite trend on moving along a period from left to right and from top to bottom in a group ? a)Atomic radius and electron gain enthalpy (negative value) b)Nuclear charge and ionisation enthalpy c)ionisation enthalpy and electron gain enthalpy (negative value) d)None of the above

A. Atomic radius and electron gain enthalpy (negative value)

B. Nuclear charge and ionisation enthalpy

C. ionisation enthalpy and electron gain enthalpy (negative value)

D. None of the above

Answer: A

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73. The periodicity is related to the electronic configuration. That is, all chemical and physical properties are a manifestation of the electronic configuratio of the elements. The atomic and ionic radii generally decrease in a period from left to right. As a consequence, the ionization enthalpes generally increase and electron gain enthalpies become more negative across a period. In order words, the ionization enthalpy of the extreme left element in a period is the least and the electron gain enthalpy of the element on the extreme right is the highest negative. This results into high chemical reactivity at the two extremes and the lowest in the centre. Similary, down the group, the increase in ionization enthalpies and a regular decrease (with exception in some third period elements) in electron gain enthalpies in the case of main group elements. The loss and gain of electrons can be co-related with the reducing and oxidising behaviour, and also with metallic and non-metallic character respectively of the elements.

The correct order of the non-metallic character is:

A. $B > Al > Mg > K$

B. $Al > Mg > B > K$

C. $Mg > Al > K > B$

D. $K > Mg > Al > B$

Answer: D

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74. The periodicity is related to the electronic configuration. That is, all chemical and phyical properties are a manifestation of the electronic configurfation of the elements.

The atomic and ionic radii generally decrease in a preiod from left or right. As a consequence , the ionisation enthalpies generally increase and electron gain enthalpies become more negative across a period. In other words, the ionisation enthalpy of the extreme left element in a period is the least and the electron left element on the extreme right is the highest negative. This results into high chemical reactivity at two extgremes and the lowest in the centre. Similarly down the group, the increase in atomic and ionic radii result in gradual decrease (with excetption in some third period elements) in electron gain enthalpies in the case of main group elements .

These properties can be related with the

(i) reducing and oxidising behacviour of the elements

(ii) metallic and no-metallic charcter of element

(iii) acidic, basic , amphoteric and neutral character of the oxides of the elements.

Which of the following statement is incorrect?

A. In general metallic character increases down the group and decrease across a period.

B. In general reducing property decreases down the group and increases across a period.

C. In general, the oxide formed by the element on extreme right of the periodic table is the most acidic.

D. Chemical reactivity of non-metals in terms of oxidisong power increases from nitrogen to fluroine across the period.

Answer: B

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75. The periodicity is related to the electronic configuration. That is, all chemical and phyical properties are a manifestation of the electronic configurfation of the elements.

The atomic and ionic radii generally decrease in a preiod from left or right. As a consequence , the ionisation enthalpies generally increase and electron gain enthalpies become more negative across a period. In other words, the ionisation enthalpy of the extreme left element in a period is the least and the electron left element on the extreme right is the highest negative. This results into high chemical reactivity at two extgremes and the lowest in the centre. Similarly down the group, the increase in atomic and ionic radii result in gradual decrease (with excetption in some third period elements) in electron gain enthalpies in the case of main group elements .

These properties can be related with the

(i) reducing and oxidising behacviour of the elements

(ii) metallic and no-metallic charcter of element

(iii) acidic, basic , amphoteric and neutral character of the oxides of the elements.

Among Al_2O_3, SiO_2, P_2O_3 and SO_2 the correct order of acid strenght is :

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. $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

Answer: D

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76. According to I.C slater effective nuclear charge, Z^*, due to screening, is not exactly equal to the actual nuclear charge Z of the nucleus of the atom. Z^* depends on the type of orbitals in which the electron is housed, and on the ability of other electrons in more penetrating orbitals to screen the electron in question from the nucleus.

The relative extent to which the various orbitals penetrate the electron clouds of other orbitals is $s > p > f$. The effective nuclear charge Z^* due to screening is given by $Z^* = Z - \sigma$, where Z is the atomic atomic number and σ is the slater screening constant values $0 < \sigma < Z$

Electrons in Orbitals	per electron in orbital		
	n	(n – 1)	(n – 2), (n – 3)etc.,
s or p-orbital	0.35	0.85	1.00
d or f orbital	0.35	1.00	1.00

Screening effect of one electron in the outermost orbitals, is not considered in calculate of σ.

What is the value of Z^* for Rb(37) ?

A. 1.7

B. 1.3

C. 2.2

D. 34.8

Answer: C

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77. According to I.C slater effective nuclear charge, Z^*, due to screening, is not exactly equal to the actual nuclear charge Z of the nucleus of the atom. Z^* depends on the type of orbitals in which the electron is housed, and on the ability of other electrons in more penetrating orbitals to screen the electron in question from the nucleus.

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s or p-orbital	0.35	0.85	1.00
d or f orbital	0.35	1.00	1.00

Screening effect of one electron in the outermost orbitals, is not considered in calculate of σ.

what is Z^* for Cu(29) ?

A. 29

B. 24.8

C. 2.2

D. 4.2

Answer: C

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78. According to I.C slater effective nuclear charge, Z^*, due to screening, is not exactly equal to the actual nuclear charge Z of the nucleus of the atom. Z^* depends on the type of orbitals in which the electron is housed, and on the ability of other electrons in more penetrating orbitals to screen the electron in question from the nucleus.

The relative extent to which the various orbitals penetrate the electron clouds of other orbitals is $s > p > f$. The effective nuclear charge Z^* due to screening is given by $Z^* = Z - \sigma$, where Z is the atomic atomic number and σ is the slater screening constant values $0 < \sigma < Z$

Electrons in Orbitals	per electron in orbital		
	n	(n – 1)	(n – 2), (n – 3)etc.,
s or p-orbital	0.35	0.85	1.00
d or f orbital	0.35	1.00	1.00

Screening effect of one electron in the outermost orbitals, is not considered in calculate of σ.

In which of the following cases the concept of Z^* is applicable?

A. Ionisation energy increases as Z^* increases

B. Electronegativity of the atom increases as Z^* increases

C. The ionisation energy of Na, K^-, Rb^- , are comparable because of equal Z^*

D. All of the above

Answer: C

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79. The number of elements among the followingb which have lower electro negatively than oxygen atom, based on Pauling scale, is _______ . $F, Cl, Br, I, H, S, P, K, Ca$

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80. The first four successive ionization energies for an element are 6 , 113 , 11.871, 50.908,67.01 (in eV) respectively . The number of velence shell electrons is ___ .

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81. The number of species among the following , having insert gas configuration is ___ .

$K^{+}, Ca^{2+}, S^{2-}, Br^{-}, Se^{2-}, H^{+}, H^{-}, Mn^{2+}$

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82. The number of elements among the following atomic numbers that are p block elements is _____. 83,79,42,64,37,54,34

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83. Among the following oxides, how many of them are amphoteric oxides?

$(a) B_2O_3$ $(b) AL_2O_3$ $(c) CaO$ $(d) ZnO$
$(e) Ga_2O(3)$ $(f) SnO_2$ $(g) PbO_2$ $(h) BeO$
$(i) CuO$ $(j) Fe_2O_3$

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84. The no. of elements which are more electropositive than 'Fe' in the following Sc,Rb,Te,F & Ca

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85. The no. of paramagnetic species in the following . $Na^{+}, Cl^{-}, Sn^{2+}, Co^{3+}, Cd, Zn^{2+}, Cr^{3+}$

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86. $1.0g$ of Mg atom $(\text{atomic mass} = 24.0\text{amu})$ in the vapour phase absorbs $50.0kJ$ energy. Find the composition of the final magnesium, if the first and the second IE of Mg are $740kJmol^{-1}$ and $1450kJmol^{-1}$respectively.

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87. The ionisation energy of Li is 500 KJ/mole. The amount of energy required to convert 70 mg of Li atoms required to convert 70 mg of Li atoms in gaseous state into Li^{+} ion (in KJ) is

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88. The first IP lithium is $5.41eV$ and electron gain enthalpy of Cl is $-3.61eV$. Calculate ΔH in $KJmol^{-1}$ for the reaction:

$Li_g + Cl_g \to Li_g^+ + Cl_g^-$.

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89. Consider the following orders :

i) $HF > HCl > HBr > HI$: Lewis basic character

ii) $CH_4 < \mathrm{CCl}_4 < CF_4$: Electronegativity of central 'C' -atom

iii) $Mg^{2+} < K^+ < S^{2-} < Se^{2-}$: Ionic radius

iv) $Ni > Pb > Pt$: Ionisation energy

v) $As^{5+} > Sb^{5+} > Bi^{5+}$: Stable oxidation state

vi) $LiF > NaF > KF > RbF$: Lattice energy

vii) $F_{aq}^- > Cl_{aq}^- > Br_{aq}^- > I_{aq}^-$: Electrical consuctance

viii) $Li^+ < Mg^{2+} > Al^{3+}$: Hydration energy

ix) $Cl > Br > F > I$: Electron affinity

x) $BeCl_2 < AlCl_3 < SiCl_4$: Lewis acidic character

Then calculate value of $|x - y|$, where x and y are correct and incorrrect orders respectively.

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90. How many of the following statements are correct according to Mendeleef's period table ?

(a) Mendeleef corrected the atomic weight of Be, In and Os

b) Ar-k, Te-I and Co-Ni are anomalous pairs.

c) Atomic weights of elements were corrected by using the relation

Atomic Wt. (Eq.Wt) (valency)

d) Eka baron is scandium

e) Eka silicon is germanium

f) Eka aluminium is galium

g)This classification is based on valency

h) Mendeleef's law is based on atomic weights

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91. Match the following columns

Column-I	Column-II
A) Increasing order of I.E.	P) $F < O < S < Se$
B) Increasing order of electron affinity	Q) $O < N < F < Ne$
C) Increasing order of atomic size	R) $Na < Mg < Al < Si$
	S) $O^{2-} < O^{-} < O < O^{+}$

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92. Match the following columns

Column-I	Column-II
A) $F > Cl > Br > I$	P) Ionisation energy
B) $Fe^{3+} > Fe^{2+} > Fe$	Q) Size
C) $I^{-} > I > I^{+}$	R) Magnitude of ΔH electron affinity
D) $O > C > B > N$	S) Effective nuclear charge

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93. Match the following columns

Column-I

	$(IE)_1$	$(IE)_2$
A)	2372	5251
B	520	7300
C)	900	1760
D)	1680	3380

Column-II

P) More reactive metal

Q) Reactive non-metal

R) Noble gas

S) Metal forms a stable binary halide of the formula AX_2

T) Exhibit + 2 electro valency

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94. Match the following columns

Column-I

A) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^1$

B) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^5$

C) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6, 4s^1$

D) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6$

Column-II

P) Largest $(IE)_1$

Q) Largest $(IE)_4$

R) Largest $(IE)_3$

S) Lowest $(IE)_1$

T) Largest $(IE)_2$

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95. Match the following columns

Column-I	Column-II
A) P_4O_{10}	P) Ionic
B) SiO_2	Q) Covalent
C) Al_2O_3	R) Basic
D) MgO	S) Amphoteric

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LEVEL-VI

1. The atomic radii of transition elements from Cr to Cu are almost equal because

A. Increased effective nuclear charge is balanced by decreased screening effect of (n-1)d or bitals.

B. Increased effective nuclear charge is balanced by increased screening effect of (n-1)d or bitals

C. Decreased effective nuclear charge is balanced by increased screening effect of (n-1)d orbitals

D. Decreased effective nuclear charge is balanced by decreased screening effect of (n-1)d orbitals

Answer: B

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2. Fluorine does not form oxyacids unlike other halogens because

A. It is the most electronegativeatom and thus it cannot show positive oxidation states.

B. It is the most electron affinitive

C. It has the highest ionisation potntial among halogens

D. It shows variable oxidation states.

Answer: A

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3. The screening effect of d-electrons is

A. Less than p - electrons but more than s and f - electrons

B. Less than p and s - electrones but more than f - electrons

C. Less than f - electrons but than s and p - electrons

D. Equal to s and p - electrons

Answer: B

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4. Which of the following is the correct order of increasing radius of species (atom/ion) ? a)$Mg < Na^{+} < F^{-} < Al$ b) $Na^{+} < Al < Mg < F^{-}$ c)$Na^{+} < F^{-} < Al < Mg$ d) $Na^{+} < F^{-} < Mg < Al$

A. $Mg < Na^{+} < F^{-} < Al$

B. $Na^{+} < Al < Mg < F^{-}$

C. $Na^{+} < F^{-} < Al < Mg$

D. $Na^{+} < F^{-} < Mg < Al$

Answer: B

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5. Two elements A and B belonging to same group have electrones affinity as $(EA)_A$ and $(EA)_B$ and ionistation potentials I_A and I_B.

If A is more electronegative element than B, then, there must be

A. $(EA)_A > (EA)_B$ and $I_A = I_B$

B. $(EA)_A + I_A < (EA)_B + I_B$

C. $(EA)_A + I_A > (EA)_B + I_B$

D. $(EA)_A > (EA)_B$ but $I_A < I_B$

Answer: C

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6. The effective nuclear charge for valence electron in $\underset{7}{N}^{14}$ will be

A. 3.25

B. 3.9

C. 2.25

D. 9.30

Answer: B

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7. Astatine is a radioactive halogen. It is a solid at room temperature because a)Of greater Van der Waal's force of attraction between large atoms of astatine b)Of less Van der waal's force of attraction between large atoms of astatine c)Of less Van der Waal's force of attraction between small atoms of astatine d)It shows non-metallic characters

A. Of greater Van der Waal's force of attraction between large atoms of astatine

B. Of less Van der waal's force of attraction between large atoms of astatine

C. Of less Van der Waal's force of attraction between small atoms of astatine

D. It shows non-metallic characters

Answer: A

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8. In which of the following arrangements, the order is correct according to the property indicated aganst it: a)Increasing size: $Al^{3+} > Mg^{2+} > Na^{+} > F^{-}$ b)Increasing $I.E._1$: $B < C < N > O$ c)Increasing $E.A._1$: $I > Br > F > Cl$ d)Increasing metallic radius : $Li > Na > K > Rb$

A. Increasing size: $Al^{3+} > Mg^{2+} > Na^{+} > F^{-}$

B. Increasing $I.E._1$: $B < C < N > O$

C. Increasing $E.A._1$: $I > Br > F > Cl$

D. Increasing metallic radius : $Li > Na > K > Rb$

Answer: B

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9. In the periodic table, the relation between Li-Mg, Be-Al, B-Si is called diagonal relationship. These pairs of elements show similarities. The factor responsible for this is

A. nearly equal electron affinity

B. nearly equal polarising power

C. nearly equal electronegativity

D. nearly equal ionistion potentials

Answer: B

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10. Which of the following is not correct order regarding the property indicated?

A. $Sc^{3+} < Cr^{3+} < Fe^{3+} < Mn^{3+} - \text{ ionic radius}$

B. $Sc < Ti < Mn < Cr$ - number of unpaired electrons

C. $Mn^{2+} > Fe^{2+} > Co^{2+} > Ni^{2+}$ - spin only magnetic moments

D. $BeO < MgO < CaO < BaO$ - basic nature

Answer: A

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11. A_2 and B_2 are two diatomic molecules with bond energies of A-A and B-B bonds as x and y respectively. If the bond energy of the

molecule, A-B formed up from A_2 and B_2 is z. then, the responance energy of molecules A-B will be

A. $(\Delta E)_{A-B} = Z - \sqrt{xy}$

B. $(\Delta E)_{A-b} = x - y - z$

C. $(\Delta E)_{A-b} = z - x + y$

D. $(\Delta E)_{A-b} = \sqrt{xy - z}$

Answer: A

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12. Which of the following is correct statement?

A. The members of second period have lower electron affinity than the next member in their respective groups of p-block

B. The electron affinity of Si is greater than that of P

C. F^{-} is strongest reducing agent

D. Tl, Pb, & Bi exhibit inert pair effect.

Answer: C

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13. The correct values of ionization enthalpies(in KJ mol^{-1}) of Si, P, Cl, and S respectively are: a)$786, 1012, 999, 1256$ b) $1012, 786, 999, 1256$ c)$786, 1012, 1256, 999$ d)$786, 999, 1012, 1256$

A. $786, 1012, 999, 1256$

B. $1012, 786, 999, 1256$

C. $786, 1012, 1256, 999$

D. $786, 999, 1012, 1256$

Answer: C

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14. The first, second and third ionisation potentials (E1, E2, and E3) for an element are 7eV, 12.5eV and 142.3ev respectively. The most stable oxidation state of the element will be

A. $+1$

B. $+2$

C. $+3$

D. $+4$

Answer: B

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15. The set representing the correct order of ionic radius is : a)

$Na^{+} > Mg^{2+} > Al^{3+} > Be^{2+} > Li^{+}$ b)

$Na^{+} > Li^{+} > Mg^{2+} > Al^{3+} > Be^{2+}$ c)

$Na^{+} > Mg^{2+} > Al^{3+} > Li^{+} > Be^{2+}$ d)

$Na^{+} > Mg^{2+} > Li^{+} > Be^{2+} > Al^{3+}$

A. $Na^{+} > Mg^{2+} > Al^{3+} > Be^{2+} > Li^{+}$

B. $Na^{+} > Li^{+} > Mg^{2+} > Al^{3+} > Be^{2+}$

C. $Na^{+} > Mg^{2+} > Al^{3+} > Li^{+} > Be^{2+}$

D. $Na^{+} > Mg^{2+} > Li^{+} > Be^{2+} > Al^{3+}$

Answer: C

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16. Which of the following are wrong? a)Noble gases have highest IE in respective periods b)ZnO is amphoteric oxide c)Ionic radius is inversely proportional to effective nuclear charge d)Zn, Cd, Hg have high boiling points among d-block elements

A. Noble gases have highest IE in respective periods

B. ZnO is amphoteric oxide

C. Ionic radius is inversely proportional to effective nuclear charge

D. Zn, Cd, Hg have high boiling points among d-block elements

Answer: D

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17. Consider the following statements :

(I) The radius of an anion is larger than that of the parent atom

(II) The ionization energy generally increases with increasing atomic number in a period.

(III) The electronegativity of an element is the tendency of an isolated atom to at tract an electron.

Which of the above statements is/are correct?

A. I alone

B. II alone

C. I and II

D. II and III

Answer: C

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18. Which among the following factors is the most important in making fluorine oxidizing halongen?

A. Bond dissociation energy

B. Ionisation enthalpy

C. Hydration enthalpy

D. Electron affinity

Answer: C

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19. Which of the following statements is/are wrong?

A. van der Waal's radius of iodine is more than its covalent radius

B. All isoelectronic ions belong to same period of the periodic table

C. $I.E_1$ of N is higher than that of O while $I.E_2$ of O is higher than that of N

D. The electron gain enthalpy of N is almost zero while that of P is $74.3KJ/\text{mol}$

Answer: B

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20. If the same element is forming oxides in different oxidation states then : a)that oxide will be neutral in nature in which element will be in its highest oxidation state. b)that oxide will be highest acidc in nature in which element will be in its highest oxidation state. c)that oxide will be amphoteric in nature in which element will be in its highest oxidation state d)that oxide will be highly basic in nature in which element will be in its highest oxidation state.

A. that oxide will be neutral in nature in which element will be in its highest oxidation state.

B. that oxide will be highest acidc in nature in which element will be in its highest oxidation state.

C. that oxide will be amphoteric in nature in which element will be in its highest oxidation state.

D. that oxide will be highly basic in nature in which element will be in its highest oxidation state.

Answer: B

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21. S-1:- Long form of periodic table completely helps in predicting the oxidation state of elements.

S-2:- Metallic and covalent radii of potassium are 203pm and 230pm respectivley.

S-3:- The following set of elements does not represent the correct order of electron affinity values $C < Si > P > N$.

S-4:- Formation of Se^{2-} and Ar^{-}, both require the absorption of energy.

A. FFFT

B. TTFT

C. TTTF

D. TTTT

Answer: A

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22. S-1:- IE_1 of $Sr > Rb$ but IE_2 for $Rb > Sr$

S-2:- The ionic radii of Li^+, K^+, Mg^{2+} and Al^{3+} in A° are $0.76, 1.38, 0.720, \quad \text{and} \quad 0.535$ respectively.

S-3:- The negative value of electron gain enthalpy of $Cl > F$ because there is weak electron-electron repulsions in the bigger 3p-subshell of Cl as compared to compact 2p-subshell of F.

S-4:- The second ionisation energy of copper is less than potassium.

A. FFTT

B. TTFT

C. TTTF

D. TTTT

Answer: D

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23. S-1:- $Na_2O < MgO < ZnO < P_4O_{10}$: acidic property

S-2:- $Na < Si > Mg > Al$: First ionisation potential

S-3:- $F > Cl > Br$: Electron affinity.

S-:- $Te^{2-} > I^- > Cs^+ > Ba^{2+}$: Ionic size

A. TTTT

B. TTFT

C. TFFT

D. TFTT

Answer: B

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24. What is the ΔH of the following affinity.

$Mg_g + 2F_g \to Mg^{2+}_{(g)} + 2F^-_{(g)}$.

If the electron affinity of

$F_g = -328kJ \text{ mol}^{-1}$ and first ionisation energy of $Mg = 737.7kJ \text{ mol}^{-1}$ and second ionisation energy of $Mg = 1451kJ \text{ mol}^{-1}$

A. $1532.7kJ \text{ mol}^{-1}$

B. $1860.7kJ \text{ mol}^{-1}$

C. $2516.7kJ \text{ mol}^{-1}$

D. $2844.7kJ \text{ mol}^{-1}$

Answer: A

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25. First and second ionisation energies of magnesium are 5.7 and $15.035eV$ respectively. The amount of energy in kJ needed to convert all the atoms of magnesium into Mg^{+2} ions present in 12mg of magnesium vapour is $\left[1eV = 96.5kJ \quad \text{mol}^{-1}\right]$

A. 1kJ

B. 2kJ

C. 4kJ

D. 5kJ

Answer: A

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26. The elecron affinity of chlorine is $3.7eV$. How much energy in kcal is released when $2g$ chlorine is completely converted to cl^{-} ion in a gaseous state ?

$\left(1eV = 23.06kcal\text{mol}^{-10}\right)$.

A. 2

B. 4

C. 1.6

D. 5

Answer: D

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27. the amount of energy released when 10^6 atoms of iodine in vapour state are converted to I^- ions is $4.8 \times 10^{-13} J$. What is the electron affinity of iodine in ev/atom.

A. $6eV$

B. $3eV$

C. $5eV$

D. $1.5 eV$

Answer: B

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28. Which of the following best describes the relationship of electronegativity, bond energy and bond moment in a hetero diatomic molecule when the electronegativity difference increases

A. Both bond energy and bond moment increase.

B. bond energy decreases but moment increases.

C. bond energy increases but bond moment decreases.

D. both bond energy and bond moment decreases.

Answer: A

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29. The effective nuclear charge for an electrone for the outermost electron in $\frac{14}{7}N$ is

A. 3.25

B. 3.9

C. 2.25

D. 9.3

Answer: B

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30. The number of atoms you can ionise in the process $Cl \rightarrow Cl^{+} + e^{-}$ by the energy liberated for the process

$Cl + e^{-} \rightarrow Cl^{-}$ for the avagadro number of atoms

(given $IE = 13eV, EA = 3.6eV$)

A. $1.667X10^{23}$

B. $3.3X10^{23}$

C. $6.023X10^{22}$

D. $1.505X10^{22}$

Answer: A

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31. Which systematic diagram representsthe correct sequence of physical properties ?

No Property

1) Electronegativity

2) Metallic property

3) Atomic radius

A. $Li \xrightarrow[(2,3)\text{ Decrease}]{(1)\text{ Increase}} Be$

$\begin{matrix} (1)\text{Decrease} & (1)\text{Increase} \\ (2,3)\text{Increase} & (2,3)\text{Decrease} \end{matrix}$

$C \xrightarrow[(2,3)\text{ Increase}]{(1)\text{ Decrease}} B$

B. $Li \xrightarrow[(2,3)\text{ Increase}]{(1)\text{ Decrease}} Be$

$\begin{matrix} (1)\text{Increase} & (1)\text{Decrease} \\ (2,3)\text{Decrease} & (2,3)\text{Increase} \end{matrix}$

$C \xrightarrow[(2,3)\text{ Increase}]{(1)\text{ Decrease}} B$

C. $Li \xrightarrow[(2,3)\text{ Decrease}]{(1)\text{ Increase}} Be$

$\begin{matrix} (1)\text{Decrease} & (1)\text{Increase} \\ (2,3)\text{Increase} & (2,3)\text{Decrease} \end{matrix}$

$C \xrightarrow[(2,3)\text{ Decrease}]{(1)\text{ Increase}} B$

D. $Li \xrightarrow[(2,3)\text{ Increase}]{(1)\text{ Decrease}} Be$

$\begin{matrix} (1)\text{Decrease} & (1)\text{Increase} \\ (2,3)\text{Increase} & (2,3)\text{Decrease} \end{matrix}$

$C \xrightarrow[(2,3)\text{ Increase}]{(1)\text{ Decrease}} B$

Answer: C

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32. The X-X bond length is $1.00A^0$ and C-C bond length is $1.54A^\circ$.

If electronegativites of 'X' and 'C' are 3.0 and 2.0 respectively, the C-X bond length is likely to be:

A. $1.27Å$

B. $1.18Å$

C. $1.08Å$

D. $1.28Å$

Answer: B

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33. Choose the correct statement .

A. Ce , Gd , U are Lanthanoids

B. Cu , Ag , Au are known as coinage metals

C. Li is strongest reducing agent in aq. solution

D. Reducing character decreases down the group

Answer: B::C

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34. Which of the following is/are correct statements (s) . a)All the actinide elements are radio active b)Alkali and Alkaline earth metals are s-block elements c)Chalcogens and halogens are p-block elements d)The first member of the lanthanide series is lanthanum

A. All the actinide elements are radio active

B. Alkali and Alkaline earth metals are s-block elements

C. Chalcogens and halogens are p-block elements

D. The first member of the lanthanide series is lanthanum

Answer: A::B::C

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35. Which of the following statement(s) is/are true

A. ionisation energy $\propto \frac{1}{\text{Screening effect}}$

B. The first ionisation energies of Be and Mg are more than ionisation energies of B and Al respectively

C. Atomic and ionic radii of Niobium and Tantalum are almost same

D. Metallic and covalent radii of potassium are $2.3A^{\circ}$ and $2.03A^{\circ}$ respectively .

Answer: A::B::C::D

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36. Which of the following is/are correct order regarding radius ?

a)$Al^{3+} < Mg^{2+} < Na^{+}$ b)$B^{3+} < Ga^{3+} < Al^{3+}$ c) $Be^{2+} < B^{3+} < Li^{+}$ d)$Cl^{-} < S^{2} < P^{3-}$

A. $Al^{3+} < Mg^{2+} < Na^{+}$

B. $B^{3+} < Ga^{3+} < Al^{3+}$

C. $Be^{2+} < B^{3+} < Li^{+}$

D. $Cl^{-} < S^{2} < P^{3-}$

Answer: A::D

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37. Choose the correct order a). $Si < P < Cl < S$ (2nd ionisation energy) b)$F < O < N < C$ (2nd ionsiation energy) c) $F > C > Br > I$ (electronegativity) d) $Be^{2+} < Li^{+} < Na^{+} < K^{+}$ (Mobility of ion in aqueous solution)

A. $Si < P < Cl < S$ (2nd ionisation energy)

B. $F < O < N < C$ (2nd ionsiation energy)

C. $F > C > Br > I$ (electronegativity)

D. $Be^{2+} < Li^{+} < Na^{+} < K^{+}$ (Mobility of ion in aqueous solution)

Answer: A::C::D

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38. Select the correct statement(s)

A. The value of electron gain enthalpy of an element can be -ve or +ve .

B. In the perodic table , metallic character of the elements increases down the group and decreases across the period

C. the Cl^{-} & S^{2-} are isoelectronic species but first one is not smaller in size than the second

D. Ionization enthalpy of an atom is equal to electron gain enthalpy of its cation .

Answer: A::B::D

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39. Pick out the statement(s) which is (are) not true about the diagonal relationship of Li and Mg.

(i)Polarising powers of Li^{+} and Mg^{2+} are almost same.

(ii) Like Li, Mg decoposes water very fast

(iii) LiCl and $MgCl_2$ are deliquescent.

(iv) Like Li,Mg does not form solid bicarbonates.

A. Polarising powers of Li^{+} and Mg^{2+} are almost same .

B. Like Li , Mg decomposes water very fast

C. LiCl and $MgCl_2$ are deliquescent

D. Like Li, Mg readily reacts with liquid bromine at ordinary temperature .

Answer: B::D

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40. Choose the correct order : a)$K > Ca > Mn$ (Reducing strength) b)$Mo(IV) > Mo(III) > Mo(II)$ (Electronegativity order) c)$Mo(II) > Mo(III) > Mo(IV)$ (Electronegativity order) d)$Fe(I) < Fe(II) < Fe(III)$ (Electronegativity order)

A. $K > Ca > Mn$ (Reducing strength)

B. $Mo(IV) > Mo(III) > Mo(II)$ (Electronegativity order)

C. $Mo(II) > Mo(III) > Mo(IV)$ (Electronegativity order)

D. $Fe(I) < Fe(II) < Fe(III)$ (Electronegativity order)

Answer: A::B::D

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41. Stability of trivalent and mono valent cation of group 13 (Boron family) will be in order :

A. $Ga^{3+} < In^{3+} < Tl^{3+}$

B. $Ga^{+} > In^{+} > Tl^{+}$

C. $Ga^{+} < In^{+} < Tl^{+}$

D. $Ga^{3+} > Ga^{+}$

Answer: C::D

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42. Which of the following statements is/are correct .

A. Tl^{3+} salts are oxidising agents

B. Ga^{+} salts are reducing agents

C. Pb^{4+} salts are better oxidising agents

D. As^{5+} salts are oxidising agents

Answer: A::B::C

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43. The first element of a group in many ways differ from the heavier memebers of group. This is due to a)the small size b)the high electronegativity c)high ionisation potential d)the unavailability of d-orbitals

A. the small size

B. the high electronegativity

C. high ionisation potential

D. the unavailability of d-orbitals

Answer: A::B::C::D

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44. An element of atom mass 39 has the electron configuration 2,8,8,1 which of the following statements are correct ? a)it is transition element b)its isotone is $._{18}^{38}Ar$ c)its isotone oxide is M_2O d)its first ionisation value is high

A. it is transition element

B. its isotone is $._{18}^{38}Ar$

C. its isotone oxide is M_2O

D. its first ionisation value is high

Answer: B::C

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45. Which of the following statements (s) is/are not true about the diagonal relationship of Be and Al?

A. Both reacts with alkali to liberate hydrogen

B. Their oxides are basic

C. They are made passive by nitric acid

D. Their carbides give acetylene on treatment with water .

Answer: B::D

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46. Which of the following is / are the correct order of mobility in aqueous solutions ? a)$Li^+ < Na^+ < K^+$ b) $Na^+ < Mg^{2+} < Al^{3+}$ c)$Al^{3+} < Mg^{2+} < Na^+$ d) $Li^+ > Na^+ > K^+$

A. $Li^+ < Na^+ < K^+$

B. $Na^+ < Mg^{2+} < Al^{3+}$

C. $Al^{3+} < Mg^{2+} < Na^{+}$

D. $Li^{+} > Na^{+} > K^{+}$

Answer: A::C::D

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47. Which of the following are correct ?

A. The configuration of Mo$(Z = 42)$ is [Kr] $4d^5 5s^1$

B. The configuration of Mo(Z= 42) is [Kr] $4d^4 5s^2$

C. The configurtion of Ag(Z = 47) is [Kr] $4d^{10} 5s^1$

D. The configurationof Ag (Z= 47) is [Kr] $4d^{10} 5s^2$

Answer: A::C::D

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48. Electron gain enthalpy of F atom is 333 kJ/mole and dissociation energy of F_2 is 158.8 kJ /mole . The energy released during the formation of 2g of F^- ions form 2g of F_2.

A. 26.69 J

B. 5.18 J

C. 6.35 k.cal

D. 12.7 k.cal

Answer: A::C::D

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49. According to Slater's rule , correct order of Z_{eff} on valence shell electron is :

A. $Fe > Fe^{2+} > Fe^{3+}$

B. $N^{3-} < O^{2-} < F^{-}$

C. $Na^{+} < Mg^{2+} < Al^{3+}$

D. $Tl^{2+} < V^{3+} < Mn^{5+}$

Answer: B::C::D

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50. Which of the following are wrong against the property mentioned

A. $C > Si > Ge > Sn > Pb$: Electronegativity

B. $Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+}$: hydration

C. $MnO > MnO_3 > Mn_2O_7$: acidic character

D. $La^{3+} > Ce^{3+} > Gd^{3+} > Lu^{3+}$: ionic size

Answer: C

51. Consider the successive ionisation energy for an element 'A' . $IE_1, IE_2, IE_3, IE_4, IE_5$ are 100 eV , 150 eV , 181eV , 2000 eV , 2200 eV . Select correct statement (s) for element 'A' : a)Element 'A' may be metal b)Element 'A' may from trivalent cation c)Oxide of element 'A' may be amphoteric d)Element 'A' may be non-metal

A. Element 'A' may be metal

B. Element 'A' may from trivalent cation

C. Oxide of element 'A' may be amphoteric

D. Element 'A' may be non-metal

Answer: A::B::C::D

52. Which of the following are correct .

A. IP_1 of He $< IP_2$ of Li

B. The element with highest IP_2 is Lithium

C. All d-block elements are transition elements

D. Across a transition series from left to right the IP values increase slowly .

Answer: A::B::D

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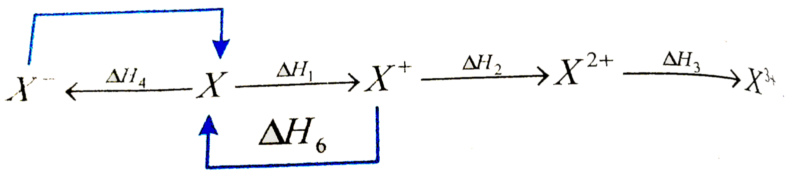
53. Consider the following sequence of reaction :



If electronic configuration of element X is $[Ne]3s^1$, then which of the following order is correct regarding given enthalpies ? A) $|\Delta H_4| = |\Delta H_5|$ B)$|\Delta H_2| > |\Delta H_1|$ C)$|\Delta H_2| > |\Delta H_3|$ D) $|\Delta H_1| = |\Delta H_6|$

A. $|\Delta H_4| = |\Delta H_5|$

B. $|\Delta H_2| > |\Delta H_1|$

C. $|\Delta H_2| > |\Delta H_3|$

D. $|\Delta H_1| = |\Delta H_6|$

Answer: A::B::D

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Others

1. How would you justify the presence of 18 elements in the 5th period of the Periodic Table?

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2. What would be the IUPAC name and symbol for the element with atomic no .120 ?

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3. The X-X bond length is $1.00A^0$ and C-C bond length is $1.54A^\circ$. If electronegativites of 'X' and 'C' are 3.0 and 2.0 respectively, the C-X bond length is likely to be:

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4. The first ionization enthalpy $(\Delta_t H)$ values of the third period elements, Na, Mg and Si are respectively 496, 737 and

$786kJmol^{-1}$. Predict whether the first $\Delta_t H$ valye for Al will be more close to 575 or $760kJmol^{-1}$? Justify your answer.

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5. The successive ionization enthalpies of an element M are 5.98, 18.82, 28.44, 119.96, 153.77, ...eV/atm. What is the formula of chloride of M?

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6. The ionization enthalpy of sodium is 5.14 eV. How many k cal of energy is required to ionize all atoms present in one gram of gaseous Na atoms?

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7. Process $(A): F_{2(g)} + 2e^- \rightarrow 2F^-_{(g)}$

Process $(B): Cl_{2(g)} + 2e^- \rightarrow 2CI^-_{(g)}$ Which of these processes is easy ? Why?

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8. Bond energies of H_2, Cl_2 and HCI are respectively 104, 58 and 100 kcal mol^{-1} calculate Pauling's electronegativivy of chlorine.

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9. Covalent radius of $._{82}Pb$ is 1.53Å. Calculate its electronegativity by Allred -Rochow scale .

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10. The ionization enthalpy of sulphur is $1014 kJ mol^{-1}$. If its electronegativity is 2.4, what is its electron gain enthalpy?

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11. Electronegativity of F on Pauling scale si 4.0 Calculate its value on Mulliken scale .

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12. Using the periodic table, predict the formula of compound formed between an element X of group 13 and another element Y of group 16.

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13. What is the valency and oxidation number of nitrogen in nitrogen pentoxide ?

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14. Are the oxidation state and covalency of Al in $\left[AlCl(H_2O)_5\right]^{2+}$ same ?

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