BASIC EXERCISE

Development of periodic table

1. Mendeleev's periodic table is based on :-

(1) Atomic number (2) Increasing order of number of protons

(3) Electronic configuration (4) None of the above

Ans. 4

2. Which of the following is/are Dobereiners triad :-

(a) P, As, Sb (b) Cu, Ag, Au (c) Fe, Co, Ni (d) S, Se, Te

Correct answer is :-

(1) a and b (2) b and c (3) a and d (4) All

Ans. 3

3. Which of the following sets of elements follows Newland's octave rule :-

(1) Be, Mg, Ca (2) Na, K, Rb (3) F, Cl, Br (4) B, Al, Ga

Ans. 1

4. Which are correct match :-

(a) Eka silicon – Be (b) Eka aluminium – Ga (c) Eka mangenese – Tc (d) Eka scandium – B

(1) b, c (2) a, b, d (3) a, d (4) All

Ans. 1

5. Atomic wt. of P is 31 and Sb is 120. What will be the atomic wt. of As, as per dobereiner triad rule :-

(1) 151 (2) 75.5 (3) 89.5 (4) Unpredictable

Ans. 2

6. The places that were left empty by Mendeleev's were, for:-

(1) Aluminium & Silicon (2) Gallium and Germanium

(3) Arsenic and Antimony (4) Molybdenum and Tungsten

Ans. 2

7. Which is not anomalous pair of elements in the Medeleeves periodic table:-

(1) Ar and K (2) Co and Ni (3) Te and I (4) Al and Si

Ans. 4

8. The law of triads is applicable to :-

(1) Os Ir Pt (2) Ca Sr Ba (3) Fe Co Ni (4) Ru Rh Pt

Ans. 2

9. Elements which occupied position in the Lother Meyer curve, on the peaks, were :–

(1) Alkali metals (2) Highly electro positive elements

(3) Elements having large atomic volume (4) All

Ans. 4

10. In a period the elements are arranged in :–

(1) Decreasing order of nuclear charge (2) Decreasing order of No. of electrons

(3) Increasing order of nuclear charge (4) In order of same nuclear charge

Ans. 3

11. Which of the following statement is wrong :-

(1) No inert gas is present in 7^{th} period (2) 3^{rd} period contains 18 elements

(3) 1^{st} period contains two non metals (4) In p–block, metal, nonmetal and metalloids are present

Ans. **2**

12. Which of the following element was absent in the Mendeleev's periodic table :-

(1) Tc (2) Si (3) B (4) F

Ans. **1**

13. IUPAC name of the element placed just after actinide series :-

(1) Unniltrium (2) Unnilpentium (3) Unnilquadium (4) Ununbium

Ans. **3**

14. Which statement is wrong for the long form of periodic table :-

(1) Number of periods are 7 and groups 18

(2) No. of valence shell electrons in a period are same

(3) III^{rd} B group contains 32 elements

(4) Lanthanides and actinides are placed in same group

Ans. **2**

15. The elements which are cited as an example to prove the validity of Mendeleev's periodic law are

(1) H, He (2) Ga, Sc (3) Co, Ni (4) Zr, Hf

Ans. **2**

16. Which pair of successive elements follows increasing order of atomic weight in Mendeleev's periodic table

(1) Argon and Potassium (2) Lithium and Berylium (3) Cobalt and Nickel (4) Tellurium and Iodine

Ans. **2**

17. Which of the following statement is false :-

(1) Elements of ns^2np^6 electronic configuration lies in 1^{st} to 6^{th} period

(2) Typical elements lies in 3^{rd} period

(3) The seventh period will accommodate thirty two elements

(4) Boron and silicon are diagonally related

Ans. **1**

18. Among the Lanthanides the one obtained by synthetic method is :–

(1) Lu (2) Pm (3) Pr (4) Ce

Ans. **2**

Period, Group and Block

19. Which of the following set of elements belongs to same period :-

(1) Zn, Cd, Hg (2) Fr, Ra, U (3) K, Ca, Ag (4) None

Ans. **2**

20. Elements upto atomic no. 112 have been discovered till now. What will be the electronic configuration of the element possessing atomic no. 108 :-

(1) $[Rn]5f^{14}\ 6d^6\ 7s^2$ (2) $6f^{14}\ 7d^8\ 7s^2$ (3) $[Rn]\ 5f^{14}\ 6d^8\ 7s^0$ (4) $[Xe]\ 4f^{14}\ 5d^8\ 6s^2$

Ans. **1**

21. In 6th period of the modern periodic table, electronic energy levels is in the order :-

(1) 6s, 4f, 5d, 6p (2) 6s, 6p, 4f, 5d (3) 4f, 5d, 6s, 6p (4) None

Ans. 1

22. Out of first 100 elements no. of elements having electrons in 3d orbitals (in their complete electronic configuration) are :-

(1) 80 (2) 100 (3) 40 (4) 60

Ans. 1

23. The IUPAC name of the element which is placed after Ha_{105} is the periodic table, will be :-

(1) Un nil pentium (2) Un un nilium (3) Un nil hexium (4) Un nil quadium

Ans. 3

24. The element with the electronic configuration $ns^2(n-1)s^2p^6d^0(n-2)s^2p^6d^{10}f^7$ lies in the :-

(1) s - block (2) p - block (3) d - block (4) f - block

Ans. 4

25. The element with atomic number Z=118 will be :–

(1) Noble gas (2) Transition metal (3) Alkali metal (4) Alkaline earth metal

Ans. 1

26. The atom having the valence shell electronic configuration $4s^2\ 4p^2$ would be in:-

(1) Group II A and period 3 (2) Group II B and period 4

(3) Group IV A and period 4 (4) Group IV A and period 3

Ans. 3

27. The electronic configuration of the element with atomic number 109 if discovered will be:-

(1) $(n–1)d^7ns^2$ (2) $(n–1)d^9ns^2$ (3) nd^7ns^2 (4) $(n–1)d^5ns^2np^2$

Ans. 1

28. The element having electronic configuration $4f^{14}\ 5d^0\ 6s^2$ belongs to :-

(1) d–block, 12^{th} group (2) f–block, III B group (3) f–block, 14^{th} group (4) s–block, 2^{nd} group

Ans. 4

29. Element with the electronic configuration given below, belong to which group in the periodic table $1s^2$, $2s^22p^6$, $3s^23p^63d^{10}$, $4s^24p^64d^{10}$, $5s^25p^3$

(1) 3^{rd} (2) 5^{th} (3) 15^{th} (4) 17^{th}

Ans. 3

30. Which of the following general electronic configuration for transition elements is not correct

(1) $(n+1)\ s^{1–2}\ nd^{1–10}$

(2) $ns^{1–2}\ (n–1)d^{1–10}$(Where n = 2, 3, 4 .....)

(3) $ns^{0,1,2}\ (n–1)s^2\ p^6\ d^{1–10}$

(4) $(n–1)d^{1–10}\ ns^{0–2}$

Ans. 2

31. Which of the following electronic configuration belongs to inert gas elements :-

(1) $ns^2\ (n–1)d^{10}$ (2) $ns^2\ (n–1)s^26$ (3) ns^2np^6 (4) None

Ans. 3

32. From atomic number 58 to 71, elements are placed in :-

(1) 5th period and III A group (2) 6th period and III B group

(3) Seperate period and group (4) 7th period and IV A group

Ans. **(2)**

33. True statement is :-

(1) All the transuranic elements are synthetic elements.

(2) Elements of third group are called bridge elements.

(3) Element of $1s^2$ configuration is placed in IIA group.

(4) Electronic configuration of elements of a group is same.

Ans. **(1)**

34. Which of the following match is correct:-

(1) Last natural element – Uub

(2) General electronic configuration of IA group – ns^2

(3) Inert gas elements lies in 2nd – 6th period

(4) Typical elements – 3rd period elements

Ans. **(4)**

35. Uranium (At. No. - 92) is the last natural element in the periodic table. The last element of the periodic table which is recently discovered is Uub. What will be the total number of transuranic elements in the periodic table :-

(1) 21 (2) 20 (3) 11 (4) 12

Ans. **(2)**

36. Which two elements are in same period as well as same group of modern periodic table :-

(1) Z = 23, Z = 31 (2) Z = 65, Z = 66 (3) Z = 52, Z = 87 (4) Z = 58, Z = 46

Ans. **(2)**

37. Which of the following statement is not correct given electronic configuration

$1s^2$, $2s^2\ 2p^6$, $3s^2\ 3p^6\ 3d^{10}$, $4s^2\ 4p^6\ 4d^{10}\ 4f^{14}$, $5s^2 5p^6\ 5d^{10}$, $6s^2$

(1) It belongs to IIB group and 6^{th} period

(2) It is liquid at room temperature

(3) It is a transition element

(4) It is used in high temperature thermometer

Ans. **(3)**

38. Total number of p block elements among given atomic number 83, 79, 42, 64, 37, 54, 34 :-

(1) 3 (2) 4 (3) 5 (4) 6

Ans. **(1)**

39. General electronic configuration of outermost and penultimate shell is $(n-1)\ s^2\ (n-1)\ p^6\ (n-1)\ d^x\ ns^2$. If n = 4 and x = 5, then number of protons in the nucleus will be :

(1) > 25 (2) < 24 (3) 25 (4) 30

Ans. **(3)**

40. What is the atomic number of element having maximum no. of unpaired e^- in 4p subshell :-

(1) 33 (2) 17 (3) 53 (4) 15

Ans. **(1)**

Zeff, Screening Constant & Atomic Radius

41. The formula for effective nuclear charge is (if σ is screening constant)

(1) $Z - \sigma$ (2) $Z + \sigma$ (3) $Z\,\sigma^{-1}$ (4) $Z\,\sigma$

Ans. **1**

42. Effective nuclear charge in group generally :–

(1) Increases down the group (2) Decreases down the group

(3) Remains constant (4) First increases than decreases

Ans. **3**

43. In sodium atom the screening is due to :-

(1) $3s^2, 3p^6$ (2) $2s^1$ (3) $1s^2, 2s^2, 2p^6$ (4) $1s^2, 2s^2$

Ans. **3**

44. If the difference in atomic size of :

$Na - Li = x$ $Rb - K = y$ $Fr - Cs = z$

Then correct order will be:-

(1) $x = y = z$ (2) $x > y > z$ (3) $x < y < z$ (4) $x < y << z$

Ans. **2**

45. The correct order of size would be:-

(1) $Ni < Pd \simeq Pt$ (2) $Pd < Pt < Ni$ (3) $Pt > Ni > Pd$ (4) $Pd > Pt > Ni$

Ans. **1**

46. Which of the following is not isoelectronic series :-

(1) Cl^-, P^{3-}, Ar (2) N^{3-}, Ne, Mg^{+2} (3) B^{+3}, He, Li^+ (4) N^{3-}, S^{2-}, Cl^-

Ans. **4**

47. Which group of atoms have nearly same atomic radius:-

(1) Na, K, Rb, Cs (2) Li, Be, B, C (3) Fe, Co, Ni (4) F, Cl, Br, I

Ans. **3**

48. Atomic radii of Fluorine and Neon in Angstrom units are given by :-

(1) 0.72, 1.60 (2) 1.60, 1.60 (3) 0.72, 0.72 (4) None of these

Ans. **1**

49. Which of the following order of atomic/ionic radius is not correct :–

(1) $I^- > I > I^+$ (2) $Mg^{+2} > Na^+ > F^-$ (3) $P^{+5} < P^{+3}$ (4) $Li > Be > B$

Ans. **2**

50. In the lithium atom screening effect of valence shell electron is caused by-

(1) Electrons of K and L shell (2) Electrons of K shell

(3) Two electrons of 1^{st} and one of 2^{nd} shell (4) None

Ans. **2**

51. The radius of potassium atom is 0.203 nm. The radius of the potassium ion in nanometer will be :–

(1) 0.133 (2) 0.231 (3) 0.234 (4) 0.251

Ans. **1**

52. S^{-2} is not isoelectronic with :-

(1) Ar (2) Cl^- (3) HS^- (4) Ti^{+3}

Ans. **4**

53. The best reason to account for the general tendency of atomic diameters to decrease as the atomic numbers increase within a period of the periodic table is the fact that

(1) Outer electrons repel inner electrons

(2) Closer packing among the nuclear particles is achieved

(3) The number of neutrons increases

(4) The increasing nuclear charge exerts a greater attractive force on the electrons

Ans. **4**

54. Maximum size of first member of a period is due to

(1) Maximum number of shells (2) Maximum screening effect

(3) Minimum Z_{eff} (4) All

Ans. **3**

55. Which of the following ion has largest size :-

(1) F^- (2) Al^{+3} (3) Cs^+ (4) O^{-2}

Ans. **(3)**

56. In which of the following pair radii of second species is smaller than that of first species :-

(1) Li, Na (2) Na^+, F^- (3) N^{-3}, Al^{+3} (4) Mn^{+7}, Mn^{+4}

Ans. **(3)**

57. Which of the following orders of ionic radii are correct :-

(a) Li < Be < Na (b) Ni < Cu < Zn (c) Ti > V > Cr (d) Ti > Zr $\simeq$ Hf

Correct answer is :-

(1) All (2) a, b (3) b, c (4) b, d

Ans. **(3)**

58. Which electronic configuration of an atom is smallest in size :-

(1) $3s^2$ (2) $3s^23p^3$ (3) $3s^1$ (4) $3s^23p_x^2p_y^2p_z^1$

Ans. **(4)**

59. Decreasing order of size of ions is :-

(1) $Br^- > S^{-2} > Cl^- > N^{-3}$ (2) $N^{3-} > S^{-2} > Cl^- > Br^-$ (3) $Br^- > Cl^- > S^{-2} > N^{-3}$ (4) $N^{-3} > Cl^- > S^{-2} > Br^-$

Ans. **(1)**

60. Which of the following statement is wrong

(1) Zeff in group remains constant (2) In a period atomic size decreases

(3) Valency in a period remains constant (4) In a period atomic radius of inert gas element is maximum

Ans. **(3)**

61. The covalent and vander Waal's radii of hydrogen respectively are :-

(1) 0.37 Å, 0.8 Å (2) 0.37 Å, 0.37 Å (3) 0.8 Å, 0.8 Å (4) 0.8 Å, 0.37 Å

Ans. **(1)**

62. Which of the following sequence is correct for decreasing order of ionic radius :–

(1) Se^{-2}, I^-, Br^-, O^{-2}, F^- (2) I^-, Se^{-2}, O^{-2}, Br^-, F^- (3) Se^{-2}, I^-, Br^-, F^-, O^{-2} (4) I^-, Se^{-2}, Br^-, O^{-2}, F^-

Ans. **(4)**

63. Element having maximum number of low shielding electrons :-

(1) [Xe] $4f^{14}$, $5d^{10}$, $6s^2$, $6p^2$ (2) [Rn] $5f^{14}$, $6d^1$, $7s^2$ (3) [Ar] $3d^{10}$, $4s^2$ (4) [Ne] $3s^2$, $3p^1$

Ans. **(2)**

64. Incorrect order of ionic radius is :-

(1) $La^{+3} > Gd^{+3} > Eu^{+3} > Lu^{+3}$ (2) $V^{+2} > V^{+3} > V^{+4} > V^{+5}$

(3) $In^+ > Sn^{+2} > Sb^{+3}$ (4) $K^+ > Sc^{+3} > V^{+5} > Mn^{+7}$

Ans. **(1)**

65. According to Slater's rule, order of effective nuclear for last electron in case of Li, Na and K :-

(1) Li > Na > K (2) K > Na > Li (3) Na > Li > K (4) Li < Na = K

Ans. **(4)**

66. Rank the 4p, 4d and 4f orbitals of increasing order to which the electrons present in them are shielded by inner electrons

(1) 4d < 4f < 4p (2) 4f < 4d < 4p (3) 4p < 4d < 4f (4) 4d < 4p < 4f

Ans. **(3)**

Ionisation Potential

67. Correct orders of I^{st} I.P. are :-

(a) Li < B < Be < C (b) O < N < F (c) Be < N < Ne

(1) a, b (2) b, c (3) a, c (4) a, b, c

Ans. **4**

68. The ionisation potential of isotopes of an element will be :-

(1) Same (2) Different

(3) Depends on atomic masses (4) Depends on number of neutrons

Ans. **1**

69. The second ionisation potentials in electron volts of oxygen and fluorine atoms are respectively given by :-

(1) 35.1, 38.3 (2) 38.3, 38.3 (3) 38.3, 35.1 (4) 35.1, 35.1

Ans. **3**

70. A sudden large jump between the values of 2^{nd} and 3^{rd} IP of an element would be associated with the electronic configuration :-

(1) $1s^2, 2s^2\ 2p^6, 3s^1$ (2) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^5$ (3) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^2$ (4) $1s^2, 2s^2\ 2p^6\ 3s^2$

Ans. **4**

71. In which of the following pairs, the ionisation energy of the first species is less than that of the second :-

(1) O^-, O^{2-} (2) S, P (3) N, P (4) Be^+, Be

Ans. **2**

72. The correct order of stability of Al^+, Al^{+2}, Al^{+3} is :-

(1) $Al^{+3} > Al^{+2} > Al^+$ (2) $Al^{+2} > Al^{+3} > Al^+$ (3) $Al^{+2} < Al^+ > Al^{+3}$ (4) $Al^{+3} > Al^+ > Al^{+2}$

Ans. **4**

73. Mg forms Mg(II) because of :-

(1) The oxidation state of Mg is + 2

(2) Difference between $I.P_1$ and $I.P_2$ is greater than 16.0 eV

(3) There are only two electrons in the outermost energy level of Mg

(4) Difference between $I.P_1$ and $I.P_2$ is less than 11 eV

Ans. **4**

74. Minimum first ionisation energy is shown by which electronic configuration:-

(1) $1s^2, 2s^2, 2p^5$ (2) $1s^2, 2s^2, 2p^6, 3s^2, 3p^2$ (3) $1s^2, 2s^2, 2p^6, 3s^1$ (4) $1s^2, 2s^2, 2p^6$

Ans. **3**

75. Successive ionisation energies of an element 'X' are given below (in K. Cal)

IP_1	IP_2	IP_3	IP_4
165	195	556	595

Electronic configuration of the element 'X' is:-

(1) $1s^2, 2s^2 2p^6, 3s^2 3p^2$ (2) $1s^2, 2s^1$ (3) $1s^2, 2s^2 2p^2$ (4) $1s^2, 2s^2 2p^6, 3s^2$

Ans. **4**

76. II^{nd} IP of which of the element is maximum–

(1) Lithium (2) Oxygen (3) Nitrogen (4) Fluorine

Ans. **1**

77. The energy needed to remove one electron from unipositive ion is abbreviated as :-

(1) I^{st} I.P. (2) 3^{rd} I.P. (3) 2^{nd} I.P. (4) 1^{st} E.A.

Ans. **3**

78. Among the following elements (Whose electronic configuration is given below) the one having the highest ionisation energy is

(1) (Ne) $3s^2 3p^3$ (2) (Ne) $3s^2 3p^4$ (3) (Ne) $3s^2 3p^5$ (4) (Ar) $3d^{10} 4s^2 4p^2$

Ans. **3**

79. The correct order of decreasing first ionization energy is :-

(1) Si > Al > Mg > Na (2) Si > Mg > Al > Na (3) Al > Si > Mg > Na (4) Mg > Li > Al > Si

Ans. **2**

80. Out of Na^+, Mg^{+2}, O^{-2} and N^{-3}, the pair of species showing minimum and maximum IP would be.

(1) Na^+, Mg^{+2} (2) Mg^{+2}, N^{-3} (3) N^{-3}, Mg^{+2} (4) O^{-2}, N^{-3}

Ans. **3**

81. The element having highest I.P. in the two series C, N, O and Si, P, S :–

(1) P (2) N (3) S (4) O

Ans. **2**

82. Lowest IP will be shown by the element having the configuration :–

(1) [He] $2s^2$ (2) $1s^2$ (3) [He] $2s^2 2p^2$ (4) [He] $2s^2 2p^5$

Ans. **1**

83. Which ionisation potential (IP) in the following equations involves the greatest ammount of energy:-

(1) $K^+ \rightarrow K^{+2} + e^-$ (2) $Li^+ \rightarrow Li^{+2} + e^-$ (3) $Fe \rightarrow Fe^+ + e^-$ (4) $Ca^+ \rightarrow Ca^{+2} + e^-$

Ans. **2**

84. Values of first four ionisation potential of an elements are 68, 370, 400, 485. It belongs to which of the following electronic configuration:-

(1) $1s^2 2s^1$ (2) $1s^2 2s^2 2p^1$ (3) $1s^2 2s^2 2p^6 3s^1$ (4) (1) and (3) both

Ans. **3**

85. (a) $M^-_{(g)} \rightarrow M_{(g)}$ (b) $M_{(g)} \rightarrow M^+_{(g)}$ (c) $M^+_{(g)} \rightarrow M^{+2}_{(g)}$ (d) $M^{+2}_{(g)} \rightarrow M^{+3}_{(g)}$

Minimum and maximum I.P. would be of :-

(1) a, d (2) b, c (3) c, d (4) d, a

Ans. **1**

86. Which of the following electronic configuration belongs to least and most metallic character respectively:-

(a) $1s^2\ 2s^1$ (b) $5s^2\ 5p^5$ (c) $3s^2\ 3p^6\ 4s^1$ (d) $1s^2\ 2s^2\ 2p^5$

(1) a, b (2) d, c (3) b, a (4) c, d

Ans. **2**

87. Triad - I [N^{3-} , O^{-2}, Na^+]

Triad - II [N^+ , C^+ , O^+]

Choose the species of lowest IP from triad–I and highest IP from triad–II respectively

(1) N^{3-} , O^+ (2) Na^+ , C^+ (3) N^{3-} , N^+ (4) O^-, C^+

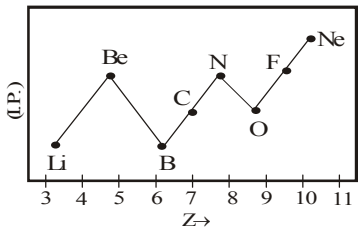
Ans. **1**

88. The correct values of ionization energies (in kJ mol^{-1}) of Be, Ne, He and N respectively are

(1) 786, 1012, 999, 1256 (2) 1012, 786, 999, 1256 (3) 786, 1012, 1256, 999 (4) 786, 999, 1012, 1256

Ans. **3**

89. Following graph shows variation of I.P. with atomic number in second period (Li – Ne). Value of I.P. of Na (11) will be :-



(1) Above Ne (2) Below Ne but above O (3) Below Li (4) Between N and O

Ans. **3**

90. In which of the following pairs, the ionization energy of the first species is less than that of the second

(1) N, P (2) Be^+, Be (3) N, N^- (4) Ne, Ne^+

Ans. **4**

91. Consider the following ionisation reactions

$A(g) \rightarrow A^+(g) + e^-$ IE in (KJ/molP) is A_1

$A^+(g) \rightarrow A^{+2}(g) + e^-$ IE in (KJ/molP) is A_2

$A^{+2}(g) \rightarrow A^{+3}(g) + e^-$ IE in (KJ/molP) is A_3

then correct order of IE is -

(1) $A_1 > A_2 > A_3$ (2) $A_1 = A_2 = A_3$ (3) $A_1 < A_2 < A_3$ (4) $A_3 = A_2 < A_1$

Ans. **3**

92. IE_1 IE_2 and IE_3 of an element are 10 eV, 15 ev, 45 eV respectively, the most stable oxidation state of the element will be:-

(1) +1 (2) +2 (3) +3 (4) +4

Ans. **2**

Electron Affinity

93. In which case the energy released is minimum:-

(1) $Cl \rightarrow Cl^-$ (2) $B \rightarrow B^-$ (3) $N \rightarrow N^-$ (4) $C \rightarrow C^-$

Ans. **3**

94. In the formation of a chloride ion, from an isolated gaseous chlorine atom, 3.8 eV energy is released, which would be equal to :-

(1) Electron affinity of Cl^- (2) Ionisation potential of Cl

(3) Electronegativity of Cl (4) Ionisation potential of Cl^-

Ans. **4**

95. Process in which maximum energy is released:-

(1) $O \rightarrow O^{-2}$ (2) $Mg^{+} \rightarrow Mg^{+2}$ (3) $Cl \rightarrow Cl^{-}$ (4) $F \rightarrow F^{-}$

Ans. 3

96. Which of the following is energy releasing process

(1) $X^{-} \rightarrow X(g) + e^{-}$ (2) $O^{-}(g) + e^{-} \rightarrow O^{2-}$ (3) $O(g) \rightarrow O^{+}(g) + e^{-}$ (4) $O(g) + e^{-} \rightarrow O^{-}(g)$

Ans. (4)

97. Which of the following element will form most stable bivalent anion.

(1) Fluorine (2) Oxygen (3) Chlorine (4) Nitrogen

Ans. (2)

98. Which of the following electronic configuration is expected to have highest electron affinity :-

(1) $2s^2\ 2p^0$ (2) $2s^2\ 2p^2$ (3) $2s^2\ 2p^3$ (4) $2s^2\ 2p^1$

Ans. (2)

99. Consider the following conversions

(i) $O(g) + e^{-} \rightarrow O^{-}(g)\ ;\ \Delta H_1$

(ii) $F(g) + e^{-} \rightarrow F^{-}(g)\ ;\ \Delta H_2$

(iii) $Cl(g) + e^{-} \rightarrow Cl^{-}(g)\ ;\ \Delta H_3$

(iv) $Na(g) \rightarrow Na^{+}(g)\ ;\ \Delta H_4$

incorrect statement is

(1) ΔH_1 and ΔH_2 is less negative than ΔH_3 (2) ΔH_2 is more negative than ΔH_1

(3) ΔH_2 , ΔH_3 are negative while ΔH_1 is positive (4) ΔH_1 , ΔH_2 and ΔH_3 are negative while ΔH_4 is positive

Ans. (3)

100. In which of the following process, least energy is required

(1) $F^{-}_{(g)} \longrightarrow F_{(g)} + e^{-}$ (2) $P^{-}_{(g)} \longrightarrow P_{(g)} + e^{-}$ (3) $S^{-}_{(g)} \longrightarrow S_{(g)} + e^{-}$ (4) $Cl^{-}_{(g)} \longrightarrow Cl_{(g)} + e^{-}$

Ans. (2)

Electronegativity

101. The correct set of decreasing order of electronegativity is :-

(1) Li, H, Na (2) Na, H, Li (3) H, Li, Na (4) Li, Na, H

Ans. 3

102. Polarity of a bond can be explained by :–

(1) Electron affinity (2) Ionisation potential (3) Electronegativity (4) All of the above

Ans. 3

103. Electronegativity values for elements are useful in predicting :-

(1) Bond energy of a molecule (2) Polarity of a bond

(3) Nature of an oxide (4) All

Ans. 4

104. Mulliken scale of electronegativity uses the concept of :-

(1) E. A. and EN of pauling (2) E. A. and atomic size

(3) E.A. and I.P. (4) E.A. and bond energy

Ans. 3

105. The pair with minimum difference in electronegativity is :-

(1) F, Cl (2) C,H (3) P, H (4) Na, Cs

Ans. 3

106. In which of the following pairs of elements the electronegativity of first element is less than that of second element:-

(1) Zr, Hf (2) K, Rb (3) Cl, S (4) None of the above

Ans. 1

107. The nomenclature of ICl is iodine chloride because

(1) Size of I < Size of Cl (2) Atomic number of I > Atomic number of Cl

(3) E.N. of I < E.N. of Cl (4) E. A. of I < E. A. of Cl

Ans. 3

108. Among the following least and most polar bonds are respectively :-

(a) C – I (b) N – O (c) C – F (d) P – F

(1) d and c (2) a and d (3) b and d (4) b and c

Ans. 2

109. If the ionisation potential is IP, electron affinity is EA and electronegativity is x then which of the following relation is correct :-

(1) 2X – EA – IP = 0 (2) 2EA – X – IP = 0 (3) 2IP – X – EA = 0 (4) All of the above

Ans. 1

110. The properties which are not common to both groups 1 and 17 elements in the periodic table are :-

(1) Electropositive character increases down the groups

(2) Reactivity decreases from top to bottom in these groups

(3) Atomic radii increases as the atomic number increases

(4) Electronegativity decreases on moving down a group

Ans. 2

111. Electronegativity of an element can be measured using :-

(1) Pauling's scale (2) Mulliken's scale (3) Both (4) None

Ans. 3

112. Which compound strongly absorb CO_2 ?

(1) BeO (2) K_2O (3) H_3PO_4 (4) P_4O_6

Ans. (2)

113. The electronegativities of the following elements : H, O, F, S and Cl increase in the order :-

(1) H < O < F < S < Cl (2) Cl < H < O < F < S (3) H < S < O < Cl < F (4) H < S < Cl < O < F

Ans. (4)

114. Which of the following is different from other three oxides :-

(1) MgO (2) SnO (3) PbO (4) ZnO

Ans. (1)

ANALYTICAL EXERCISE

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

(1) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ - increasing ionic size

(2) B < C < N < O - increasing first ionization energy

(3) I < Br < F < Cl - increasing electron gain enthalpy (with negative sign)

(4) Li < Na < K < Rb - increasing metallic radius

Ans. **2**

2. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides?

(1) $Na_2O < K_2O < MgO < Al_2O_3$ (2) $K_2O < Na_2O < Al_2O_3 < MgO$

(3) $Al_2O_3 < MgO < Na_2O < K_2O$ (4) $MgO < K_2O < Al_2O_3 < Na_2O$

Ans. **3**

3. The outer electron configuration of Gd (Atomic No. : 64) is :-

(1) $4f^4\ 5d^4\ 6s^2$ (2) $4f^7\ 5d^1\ 6s^2$ (3) $4f^3\ 5d^5\ 6s^2$ (4) $4f^8\ 5d^0\ 6s^2$

Ans. **2**

4. 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 :-

(1) I > Br > Cl > F (2) F > Cl > Br > I (3) Cl > F > Br > I (4) Br > Cl > I > F

Ans. **3**

5. Atomic number of Ag is 47. In the same group the atomic number of elements placed above and below Ag will be :-

(1) 37, 67 (2) 29, 79 (3) 39, 69 (4) 29, 65

Ans. **2**

6. In the general electronic configuration -

$(n-2)f^{1-14}\ (n-1)d^{0-1}\ ns^2$, if value of n = 7 the configuration will be of -

(1) Lanthenides (2) Actinides (3) Transition elements (4) None

Ans. **2**

7. Which of the following statements is wrong :-

(1) Van der Waal's radius of iodine is more than its covalent radius

(2) All isoelectronic ions belong to same period of the periodic table

(3) IE_1 of N is higher than that of O while IE_2 of O is higher than that of N

(4) The electron affinity of N is less than that of P

Ans. **2**

8. The inter nuclear distance in H_2 and Cl_2 molecules are 74 and 198 pm. respectively. The bond length of HCl may be (EN of H = 2.1 Cl = 3.0)

(1) 136 pm (2) 272 pm (3) 135.919 pm (4) 271.919 pm

Ans. **3**

9. Electronegativity values of elements X and Y are 3.8 and 1.8 respectively Ionic percentage of compound XY is:-

(1) 50 (2) 46 (3) 64 (4) 25

Ans. **2**

10. Which of the following is correct match

	Atomic number	Group number	Periodic number
(A)	46	10	6
(B)	58	3	6
(C)	56	2	6
(D)	42	6	5

(1) Only B, C, D (2) Only A, B, C (3) Only B, C (4) Only A, C, D

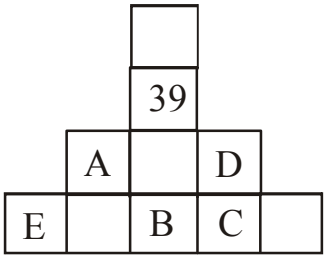
Ans. **(1)**

11. $_{92}U$(IIIB) chamges to $_{90}Th$ by emission of α-particle. Daughter element will be in -

(1) IB (2) IIA (3) IIIB (4) VB

Ans. **(3)**

12.



On the basis of given part of periodic table, incorrect statement is :-

(1) A is an alkaline earth metal

(2) Atomic number of B is 103 which belongs to III B group.

(3) Atomic number, group no. and period number of D are 72 IVB and 6th respectively.

(4) C is a transuranic element

Ans. **(2)**

13. If total 110 elements are present in periodic table than how many of them contain e^- in f subshell :-

(1) 28 (2) 57 (3) 58 (4) 53

Ans. **(4)**

14. These are 3 elements A, B and C. Their atomic number are Z_1, Z_2, Z_3 respectively. If $Z_3 - Z_1 = 2$ and $\frac{Z_1 + Z_3}{2} = Z_2$ and the electronic configuration of element C is [Ar] $3d^2\ 4s^2$ then correct order of atomic radius is :-

(1) $A^{+2} < B^{+3} < C^{+4}$ (2) $A^{+2} = B^{+3} = C^{+4}$ (3) $A^{+2} > B^{+3} > C^{+4}$ (4) $B^{+3} < A^{+2} = C^{+4}$

Ans. **(3)**

15. Successive ionisation energies of an element A are 100 eV, 150 eV, 181 eV, 2000 eV, 2200 eV correct statement regarding A is :-

(1) Element 'A' may be metal (2) Formula of oxide of A may be A_2O_3

(3) Oxide of element A may be amphoteric (4) All are correct

Ans. **(4)**

16. $K \xrightarrow{a} K^+ \xrightarrow{b} K^{+2}$ $Ca \xrightarrow{c} Ca^+ \xrightarrow{d} Ca^{+2}$

If a, b, c, d are ionisation energies, in the which of the following order is not correct –

(1) c > a (2) b > a (3) d > c (4) b < d

Ans. **(4)**

17. An ion X^- has configuration $2s^2 2p^6$, which is same for other ion Y^+. Then

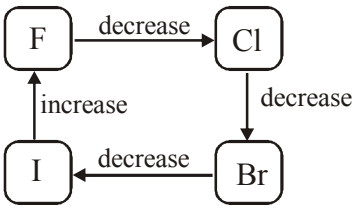
(1) IP of X = IP of Y (2) EA of X = EA = Y

(3) IP of X > EA of Y^+ (4) IP of X^- > IP of Y^+

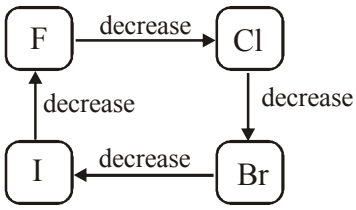
Ans. **(3)**

18. Which of the following diagrams is correct related to electron affinity of halogens :-

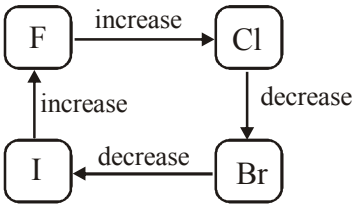
(1)



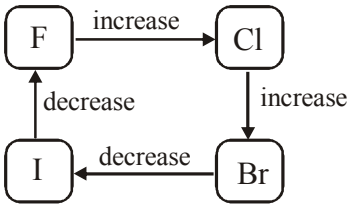
(2)



(3)



(4)



Ans. **(3)**

19. Elements of which group from anions most readily :-

(1) Oxygen family (2) Nitrogen group (3) Halogens (4) Alkali metals

Ans. **(3)**

20. Which is the weakest base among NaOH, $Ca(OH)_2$, KOH and $Zn(OH)_2$:-

(1) NaOH (2) KOH (3) $Ca(OH)_2$ (4) $Zn(OH)_2$

Ans. **(4)**

21. If electron affinity of an element M is x kJ/mol than ionisation potential of this element :-

(1) More than x (2) Less than x (3) Equal to x (4) More than 2x

Ans. **(1)**

22. Identify the incorrect are

(1) Shielding constant (σ) : Li < Na < K < Rb (2) Z_{eff} : Li > Na > K > Rb

(3) Ionic radius $O^{2-} > F^- > Na^+ > Mg^{2+}$ (4) Atomic size : Li < Na < K < Rb

Ans. **(2)**

23. Compare magnetic moment of Mn, Mn^+, Mn^{2+}, Mn^{3+}

(1) $Mn^{3+} > Mn > Mn^{2+} > Mn^+$ (2) $Mn^+ > Mn^{2+} > M^{3+} > Mn$

(3) $Mn = Mn^{2+} > Mn^{3+} > Mn^+$ (4) $Mn^+ > Mn = Mn^{2+} > Mn^{3+}$

Ans. **(4)**

24. Arrange Cl, F, F^-, Cl^- in increasing order of ionisation potential ?

(1) $F^- < Cl^- < Cl < F$ (2) $Cl^- < F^- < Cl < F$ (3) $Cl^- < F^- < F < Cl$ (4) $F^- < Cl^- < F < Cl$

Ans. **(1)**

25. The order of ionisation potential between He^+ ion and H-atom (both species are in gaseous state) is :-

(1) I.P. (He^+) = I.P. (H) (2) I.P. (He^+) < I.P. (H) (3) I.P. (He^+) > I.P. (H) (4) Cannot be compared

Ans. **(3)**

26. Electronic configuration are :

A – $1s^2 2s^2 2p^1$ B – $1s^2 2s^2 2p^6 3s^1 3p^2$ C– $1s^2 2s^1 2p^1$ D– $1s^2 2s^2 2p^5 3s^1$

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

(1) A & B (2) A, B, C (3) A, B, D (4) A, B, C, D

Ans. **(1)**

27. The IE_1 & IE_2 of three elements A, B & C are given as (IE in kJ/mol).

	A	B	C
IE_1	400	550	1150
IE_2	2650	1070	2090

Identify the element which represent a non-metal :-

(1) A (2) B (3) Both A & B (4) C

Ans. **(4)**

28. The maximum 2^{nd} I.E. is of :-

(1) Mn (2) Sc (3) Cr (4) Ti

Ans. **(3)**

29. The electronic configuration of the elements X, Y, Z and J are given below. Which element has the highest metallic character

(1) X = 2, 8, 4 (2) Y = 2, 8, 8 (3) Z = 2,8,8,1 (4) J = 2, 8, 8, 7

Ans. **(3)**

30. The electronegativity follows the order

(1) F > O > Cl > Br (2) F > Cl > Br > O (3) O > F > Cl > Br (4) Cl > F > O > Br

Ans. **(1)**

31. The symbol of element with atomic number Z = 109

(1) Unp (2) Uns (3) Uno (4) Une

Ans. **(4)**

32. Pd has exceptional electronic configuration of $4d^{10} 5s^0$. It belong to

(1) 4^{th} period, group 11 (2) 5^{th} period, group 10 (3) 6^{th} period, group 9 (4) 3^{th} period, group 16

Ans. **(2)**

33. All elements in the third period have

(1) Three complete shells (2) Three complete subshell

(3) Three valence electrons (4) Three electrons less than octet

Ans. **(2)**

34. Which one of the following represents a d-block element ?

(1) [Rn] $6d^{10} 7s^2 7p^2$ (2) [Xe] $4f^1 5d^1 6s^2$ (3) [Xe] $4f^{14} 5d^1 6s^2$ (4) [Xe] $5d^1 6s^2$

Ans. **(4)**

35. The correct order of shielding effect of s, p, d and orbital is

(1) s > p > d > f (2) s < p < d > f (3) s < p < d < f (4) s > p < d < f

Ans. **(1)**

36. Which of the following set of atomic number represents only representative elements?

(1) 55, 12, 48, 53 (2) 13, 23, 54, 83 (3) 3, 33, 53, 87 (4) 22, 33, 55, 66

Ans. **(3)**

37. Which of the following pairs of atomic numbers represents elements belonging to the same group ?

(1) 11 and 20 (2) 12 and 30 (3) 13 and 31 (4) 14 and 33

Ans. **(3)**

38. Total number of elements present in 5th period of modern periodic table is

(1) 2 (2) 8 (3) 18 (4) 32

Ans. **(3)**

39. In which of the following pairs the radii of second species is greater than that of first ?

(1) K, Ca (2) H, He (3) Mg^{+}, Mg^{2+} (4) O^{2-}, O^{-}

Ans. **(2)**

40. The successive ionization energies for element X is given below

IE_1 : 250 kJ mol^{-1}

IE_2 : 820 kJ mol^{-1}

IE_3 : 1100 kJ mol^{-1}

IE_4 : 1400 kJ mol^{-1}

Find out the number of valence electrons for the element X.

(1) 3 (2) 4 (3) 2 (4) 1

Ans. **(4)**

41. If you are given Avogadro's number of atoms of a gas 'X'. If half of the atoms are converted into $X_{(g)}^{+}$ by energy ΔH. The IE of X is

(1) $\frac{2\Delta H}{N_A}$ (2) $\frac{2N_A}{\Delta H}$ (3) $\frac{\Delta H}{2N_A}$ (4) $\frac{N_A}{\Delta H}$

Ans. **(1)**

42. Find the formula of halide of a metal whose successive ionization enthalpies are x, 2x, 5x, 100x kJ mol^{-1} respectively

(1) MX (2) MX_2 (3) MX_3 (4) M_2X

Ans. **(3)**

43. Which of the following equation represents first enthalpy of ionization ?

(1) $Hg_{(S)} \longrightarrow Hg^{+}_{(g)} + e^{-}$ (2) $Hg_{(l)} \longrightarrow Hg^{+}_{(g)} + e^{-}$

(3) $Hg_{(g)} \longrightarrow Hg^{+}_{(g)} + e^{-}$ (4) $Hg^{+}_{(g)} \longrightarrow Hg_{(g)}^{2+} + e^{-}$

Ans. **(3)**

44. The energy required to convert all atoms present in 1.2 g magnesium to Mg^{2+} ions if IE, and IE_2 of magnesium are 120 kJ mol^{-1} and 240 kJ mol^{-1} respectively

(1) 18 kJ (2) 36 kJ (3) 360 kJ (4) 24 kJ

Ans. **(1)**

45. Which of the following is correct order of metallic character for Si, Be, Mg, Na and P ?

(1) P < Si < Be < Na < Mg (2) P < Si < Be < Mg < Na

(3) Na > Be > Mg > Be > P (4) Na > Si > Mg > Be > P

Ans. **(2)**

1. The element Z = 114 has been discovered recently. It will belong to which of the following family group and electronic configuration : **[NEET - 2017]**

(1) Halogen family, [Rn] $5f^{14}6d^{10}7s^27p^5$

(2) Carbon family, [Rn] $5f^{14}6d^{10}7s^27p^2$

(3) Oxygen family, [Rn] $5f^{14}6d^{10}7s^27p^4$

(3) Nitrogen family, [Rn] $5f^{14}6d^{10}7s^27p^6$

Ans. **(2)**

2. Smallest ionic radius is :- **[AIIMS - 2015]**

(1) La^+ (2) U^{3+} (3) Yb^{3+} (4) Cf^{3+}

Ans. **(4)**

3. Second IP of La is most likely to second IP of which element :- **[AIIMS - 2015]**

(1) Be (2) Ba (3) Ca (4) Zn

Ans. **(3)**

4. Electronic configuration ofAl with excluding bonded electron in aluminate ion **[AIIMS - 2015]**

(1) [Ne] (2) [Ar] (3) $[Ne]3s^2$ (4) $[Ar]4s^2$

Ans. **(1)**

5. Gadolinium belongs of 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of Gadolinium ? **[Re - AIPMT 2015]**

(1) [Xe] $4f^75d^16s^2$ (2) [Xe] $4f^65d^26s^2$ (3) [Xe] $4f^86d^2$ (4) [Xe] $4f^95s^1$

Ans. **(1)**

6. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii ? (Numbers in the brackets are atomic numbers). **[AIPMT - 2015]**

(1) Zr (40) and Nb (41) (2) Zr (40) and Hf (72) (3) Zr (40) and Ta (73) (4) Ti (22) and Zr (40)

Ans. **(2)**

7. The species Ar, K^+ and Ca^+ contain the same number of electrons. In which order do their radii increase ? **[AIPMT - 2015]**

(1) $K^+ < Ar < Ca^{2+}$ (2) $Ar < K^+ < Ca^{2+}$ (3) $Ca^{2+} < Ar < K^+$ (4) $Ca^{2+} < K^+ < Ar$

Ans. **(4)**

8. Correct order of atomic radius is :-0 **[AIIMS - 2014]**

(1) V > Ti (2) Cl > S (3) Rb > Cs (4) Ne > Be

Ans. **(4)**

9. Incorrect order of acidic strength is : **[AIIMS - 2014]**

(1) $H_2S > H_2Se$ (2) HI > HBr (3) HBr > HCl (4) $H_2Te > H_2S$

Ans. **(1)**

10. Reason of lanthanoid contraction is :- **[AIPMT - 2014]**

(1) Negligible screening effect of 'f' orbitals (2) Increasing nuclear charge

(3) Decreasing nuclear charge (4) Decreasing screening effect

Ans. **(1)**

11. Which of the following orders of ionic radii is correctly represented ? **[AIPMT - 2014]**

(1) $H^- > H^+ > H$ (2) $Na^+ > F^- > O^{2-}$ (3) $O^{2-} > F^- > Na^+$ (4) $Al^{3+} > Mg^{2+} > N^{3-}$

Ans. **(3)**

12. The 1st ionization enthalpy of Na, Mg and Si are 496, 737, 776 $kJmol^{-1}$ respectively then what will be the 1st ionisation enthalpy of Al in $kJmol^{-1}$:- **[AIIMS - 2013]**

(1) > 766 $kJmol^{-1}$ (2) > 496 and < 737 $kJmol^{-1}$

(3) > 737 and < 766 $kJmol^{-1}$ (4) > 496 $kJmol^{-1}$

Ans. **(2)**

13. Which of the following lanthanoid ions is dioamagnetic ? (Atoms, Ce = 58, Sm = 62, Eu = 63, Yb = 70) **[NEET-UG - 2013]**

(1) Yb^{2+} (2) Ce^{2+} (3) Sm^{2+} (4) Eu^{2+}

Ans. **(1)**

14. Identify the **wrong** statement in the following: **[AIPMT Prelims-2012]**

(1) Atomic radius of the elements increases as one moves down the first group of the periodic table

(2) Atomic radius of the elements decreases as one-moves across from left to right in the 2^{nd} period of the periodic table

(3) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius

(4) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius

Ans. **(3)**

15. What is the value of electron gain enthalpy of Na^+ if IE_1 of Na = 5.1 eV :- **[AIPMT Mains-2011]**

(1) +2.55 eV (2) +10.2 eV (3) –5.1 eV (4) –10.2 eV

Ans. **(3)**

16. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl ? **[AIPMT-2010]**

(1) Cl < F < O < S (2) O < S < F < Cl (3) F < S < O < Cl (4) S < O < Cl < F

Ans. **(2)**

17. The correct order of the decreasing ionic radii among the following isoelectronic species is :- **[AIPMT-2010]**

(1) $Ca^{2+} > K^+ > S^{2-} > Cl^-$

(2) $Cl^- > S^{2-} > Ca^{2+} > K^+$

(3) $S^{2-} > Cl^- > K^+ > Ca^{2+}$

(4) $K^+ > Ca^{2+} > Cl^- > S^{2-}$

Ans. **(3)**

18. Among the elements Ca, Mg, P and Cl, the order of increasing atomic radii is :- **[AIPMT-2010]**

(1) Mg < Ca < Cl < P

(2) Cl < P < Mg < Ca

(3) P < Cl < Ca < Mg

(4) Ca < Mg < P < Cl

Ans. **(2)**

19. Which is correct order of IP_1 :- **[AIIMS–2010]**

(1) Na > Al (2) Mg > Al (3) Ga > Ca (4) Mg > Be

Ans. **2**

20. Amongst the elements with following electronic configurations, which one of them may have the highest ionization energy ? **[AIPMT-2009]**

(1) $Ne[3s^23p^2]$ (2) $Ar[3d^{10}4s^24p^3]$ (3) $Ne[3s^23p^1]$ (4) $Ne[3s^23p^3]$

Ans. **(4)**

21. Identify the correct order of the size of the following **[AIPMT-2007]**

(1) $Ca^{2+} < Ar < K^{+} < Cl^{-} < S^{2-}$ (2) $Ca^{2+} < K^{+} < Ar < S^{2-} < Cl^{-}$

(3) $Ca^{2+} < K^{+} < Ar < Cl^{-} < S^{2-}$ (4) $Ar < Ca^{2+} < K^{+} < Cl^{-} < S^{2-}$

Ans. **(3)**

22. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species :- **[AIPMT 2005]**

(1) Cl < F < S < O (2) O < S < F < Cl (3) S < O < Cl < F (4) F < Cl < O < S

Ans. **(2)**

23. The pair of amphoteric hydroxide is **[AIIMS–2005]**

(1) $Al(OH)_3$, LiOH (2) $Be(OH)_2$, $Mg(OH)_2$ (3) $B(OH)_3$, $Be(OH)_2$ (4) $Be(OH)_2$, $Zn(OH)_2$

Ans. **4**

Question asked Prior to Medical Ent. Exams. 2005

24. Which one of the following arrangements represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, Al, F and O ?

(1) Ca < Al < C < O < F (2) Al < Ca < O < C < F

(3) Al < O < C < Ca < F (4) C < F < O < Al < Ca

Ans. **(1)**

25. The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^2$. What is the atomic number of the element, which is just below the above element in the periodic table ?

(1) 36 (2) 49 (3) 50 (4) 54

Ans. **(3)**

26. Which of the following ion is the largest in size ?

(1) K^{+} (2) Ca^{2+} (3) Cl^{-} (4) S^{2-}

Ans. **4**

27. The ions O^{2-}, $F^{—}$, Na^{+}, Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show **[AIPMT 2003]**

(1) an increase from O^{2-} to $F^{—}$ and then decrease from Na^{+} to Al^{3+}

(2) a decrease from O^{2-} to $F^{—}$ and then increase from Na^{+} to Al^{3+}

(3) a significant increase from O^{2-} to Al^{3+}

(4) a significant decrease from O^{2-} to Al^{3+}

Ans. **4**

28. The liquidified metal expanding on solidification is **[AIIMS–2004]**

(1) Ga (2) Al (3) Zn (4) Cu

Ans. **1**

29. The electronic configuration of inner transition element is

(1) ns^1 (2) $ns^2np^5nd^{10}$

(3) $ns^{0-2}(n-1)d^{1-10}(n-2)f^{1-14}$ (4) $ns^2(n-1)d^{0-1}\ (n-2)\ f^{1-14}$

Ans. **(4)**

30. Which of the following has the smallest size ?

(1) Al^{3+} (2) F^{-} (3) Na^{+} (4) Mg^{2+}

Ans. **(1)**

31. Which one of the following is correct order of the size of aluminium species ?

(1) $Al > Al^{+} > Al^{2+}$ (2) $Al^{2+} > Al^{+} > Al$ (3) $Al^{2+} = Al^{+} = Al$ (4) All of these

Ans. **(1)**

32. The first ionization potentials (eV) of N and O respectively are

(1) 8.29, 8.29 (2) 11.32, 11.32 (3) 8.29, 11.32 (4) 11.32, 8.21

Ans. **(4)**

33. Correct order of 1st ionization potential among elements Be, B, C, N, O is

(1) B < Be < C < O < N (2) B < Be < C < N < O (3) Be < B < C < N < O (4) Be < B < C < O < N

Ans. **(1)**

34. An atom has electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3\ 4s^2$, you will place it in which group of periodic table?

(1) Fifth (2) Fifteenth (3) Second (4) Third

Ans. **(1)**

35. Ionic radii are

(1) Inversely proportional to effective nuclear charge

(2) Inversely proportional to square of effective nuclear charge

(3) Directly proportional to effective nuclear charge

(4) Directly proportional to square of effective nuclear charge

Ans. **(1)**

36. Four successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionisation enthalpy ?

(1) Vanadium (Z = 23) (2) Chromium (Z = 24) (3) Manganese (Z = 25) (4) Iron (Z = 26)

Ans. **(3)**

37. The element with highest electronegativity will belong to

(1) Period 2, group 17 (2) Period 3, group 17 (3) Period 2, group 18 (4) Period 2, group 1

Ans. **(1)**

38. The first, second and third ionisation energies of Al are 578, 1817 and 2745 kJ mol^{-1} respectively. Calculate the energy required to convert all the atoms of Al to Al^{+3} present in 270 mg of Al vapours.

(1) 5140 kJ (2) 51.40 kJ (3) 2745 kJ (4) 514.0 kJ

Ans. **(2)**

39. The size of ionic species is correctly given in the order

(1) $Na^{+} > Mg^{2+} > Cl^{+7} > Si^{4+}$ (2) $Na^{+} > Mg^{2+} > Si^{4+} > Cl^{+7}$

(3) $Cl^{+7} > Si^{4+} > Mg^{2+} > Na^{+}$ (4) $Cl^{+} > Na^{+} > Mg^{2+} > Si^{4+}$

Ans. **(2)**

40. Match the following, regarding nature of the oxides

	Column-I	**Column-II**
a.	H_2O	(i) Basic
b.	Na_2O	(ii) Amphoteric
c.	ZnO	(iii) Acidic
d.	SO_3	(iv) Neutral

(1) a(ii), b(i), c(iii), d(iv) (2) a(iv), b(i), c(iii), d(ii) (3) a(iv), b(i), c(ii), d(iii) (4) a(ii), b(i), c(iv), d(iii)

Ans. **(3)**

41. Be^{2+} is isoelectronic with which of the following ions ?

(1) H^{+} (2) Li^{+} (3) Na^{+} (4) Mg^{2+}

Ans. **(2)**

ASSERTION & REASON QUESTIONS

These questions consist of two statements each, printed as *Assertion* and *Reason*. While answering these Questions you are required to choose any one of the following four responses.

A. **If both *Assertion* & *Reason* are True & the *Reason* is a correct explanation of the *Assertion*.**

B. **If both *Assertion* & *Reason* are True but *Reason* is not a correct explanation of the Assertion.**

C. **If *Assertion* is True but the *Reason* is False.**

D. **If both *Assertion* & *Reason* are False.**

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1. ***Assertion*** **:** Hydrogen is called notorious element.

Reason **:** Hydrogen contains one electron in its valence shell.

Ans. **B**

2. ***Assertion*** **:** Atomic size of Cs and Fr is almost same.

Reason **:** Cs and Fr belongs to same group.

Ans. **B**

3. ***Assertion*** **:** Electronegativity of inert gas element is 'zero'.

Reason **:** Inert gas elements have stable electronic configuration.

Ans. **B**

4. ***Assertion*** **:** Properties of Beryllium is similar to that of Aluminium

Reason **:** Both the elements belongs to same group

Ans. **C**

5. ***Assertion*** **:** I.P. of first element in a period is minimum.

Reason **:** Effective nuclear charge of first element in a period is minimum

Ans. **A**

6. ***Assertion*** **:** Size of anion is larger than their parent atom.

Reason **:** Zeff of anion is greater than that of their parent atom.

Ans. **C**

7. ***Assertion*** **:** Stable electronic configuration do not affects electronegativity.

Reason **:** EN is tendency to attract shared electrons, not to gain electrons.

Ans. **A**

8. ***Assertion*** **:** In the Lothar Meyer curve alkali metal occupied Peak position on the curve.

Reason **:** Density of alkali metals is more.

Ans. **C**

9. ***Assertion*** **:** Atomic radius, down the group increases.

Reason **:** Effective nuclear charge down the group increases.

Ans. **C**

10. ***Assertion*** **:** Atomic radius of inert gases is largest in the period

Reason **:** Effective nuclear charge of inert gases is minimum

Ans. **C**

11. ***Assertion*** **:** Second IP of oxygen is greater than that of fluorine

Reason **:** Oxygen aquires stable half filled electronic configuration after loosing one electron

Ans. **A**

12. ***Assertion*** **:** Electronegativity of nitrogen is greater than carbon.

Reason **:** Nitrogen has stable half filled electronic configuration.

Ans. **B**

13. ***Assertion*** **:** Alkali metals have least I^{st} I.P. in the respective period

Reason **:** Alkali metals have only one electron in the valence shell.

Ans. **B**

14. ***Assertion*** **:** Ionisation potential of Li^+ is greater than He.

Reason **:** Zeff of Li^+ is greater than He.

Ans. **A**

15. ***Assertion*** **:** 2^{nd} IP of alkali metals is maximum in the period.

Reason **:** Alkali metals has smallest atomic size in the period.

Ans. **C**

16. ***Assertion*** **:** Combining capacity of zero group element is zero.

Reason **:** Their valence shell is completely filled.

Ans. **A**

17. ***Assertion*** **:** Atomic size along a period decreases.

Reason **:** Zeff. in a period decreases.

Ans. **C**

18. ***Assertion*** **:** The I^{st} IP of Be is greater than that of B.

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

Ans. **C**

19. ***Assertion*** **:** First ionization energy of nitrogen is lower than oxygen. **[AIIMS-2005]**

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

Ans. **D**

20. ***Assertion :-*** H_2S is less acidic than H_2Te

Reason :- Te has larger radius than S **[AIIMS-2011]**

Ans. **B**

21. **Assertion :-** $La(OH)_3$ is more basic than $Al(OH)_3$

Reason :- Al has no d-electron. **[AIIMS-2012]**

Ans. **B**

22. **Assertion :-** H_2Se is less acidic than H_2S. **[AIIMS-2012]**

Reason :- S is less electronegative than Se.

Ans. **D**

23. ***Assertion*** **:** Atomic radii decreases in a period upto halogen.

Reason **:** van der Waal radii of Cl is larger than its covalent radii.

Ans. **B**

24. ***Assertion*** **:** Na_2O is more basic than Al_2O_3.

Reason **:** Sodium is less electropositive than Aluminium.

Ans. **C**