EXERCISE-I

Extended or long form of periodic table

- 1. The elements having the electronic configuration, $[Kr] 4d^{10}f^{14}, 5s^2p^6d^2, 6s^2$ belongs to
 - (A) *s*-block (B) *p*-block
 - (C) d-block (D) f-block
- **2.** Chemical property of *Li* and *Mg* similar because
 - (A) These belong to same group
 - (B) Both ionisation potential is same
 - (C) Shows diagonal relationship
 - (D) Both electron affinity is same
- **3.** According to the periodic law of elements, the variation in properties of elements is related to their
 - (A) Atomic masses
 - (B) Nuclear masses
 - (C) Atomic numbers
 - (D) Nuclear neutron-proton number
- **4.** The element with atomic number 36 belongs to block in the periodic table

| (A) <i>p</i> | (B) <i>s</i> |
|--------------|--------------|
| (C) <i>f</i> | (D) <i>d</i> |

5. Which group of the periodic table contains only metals

| (A) IIA | (B) |) IB |
|---------|-----|------|
|---------|-----|------|

| (C) IA | (D) None of these |
|--------|-------------------|
|--------|-------------------|

- 6. The elements in which *s* and *p*-orbitals are present
 - (A) Common elements
 - (B) Inert gases
 - (C) Halogens
 - (D) Transitional elements
- 7. Aluminium is diagonally related to (in periodic table)

$$(A) Li (B) C (D) P$$

(C) B (D) Be

- 8. An element has the electronic configuration $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^5, 4s^1$. It is a (A) *s*-block element (B) *p*-block element (C) *d*-block element (D) Inert gas
- 9. Which of the following show diagonal relationship
 - (A) B and Si (B) B and Al
 - (C) B and Ga (D) B and C
- **10.** Which of the following dinegative anion is quite common
 - (A) S^{2-} (B) Se^{2-} (C) Te^{2-} (D) O^{2-}
- **11.** In the modern periodic table, elements are arranged in
 - (A) Increasing mass
 - (B) Increasing volume
 - (C) Increasing atomic number
 - (D) Alphabetically
- **12.** Alkali metals in each period have
 - (A) Smallest size
 - (B) Lowest ionization potential
 - (C) Highest ionization potential
 - (D) Highest electronegativity
- **13.** The elements on the right side of the periodic table are
 - (A) Metals
 - (B) Metalloids
 - (C) Non-metals
 - (D)Transition elements
- 14. The screening effect of *d*-electons is
 - (A) Equal to that of *p*-electrons
 - (B) More than that of *p*-electrons
 - (C) Same as *f*-electrons
 - (D) Less than *p*-electrons
- 15. Chemical behaviour of an atom is determined by
 - (A) Atomic number
 - (B) Mass number
 - (C) Binding energy
 - (D) Number of isotopes

| 16. | Which of the following | is a inert element | 23. | Cause of diagonal relation | onship is |
|-----|--|------------------------|-----|------------------------------|-------------------------|
| | (A) <i>Na</i> | (B) <i>Fe</i> | | (A) Similar electronic | configuration of the |
| | (C) Li | (D) <i>He</i> | | elements | |
| 17. | The lightest metal is | | | (B) Similar e/r ratio of | f the elements |
| | (A) Li | (B) <i>Mg</i> | | (C) Same number of va | lency electrons in the |
| | (C) <i>Ca</i> | (D) <i>Na</i> | | elements | 2 |
| 18. | Choose the typical element | ent | | (D) Same atomic weight | s of the elements |
| | (A) <i>K</i> | (B) <i>Na</i> | 24. | From which of the fol | llowing the hydration |
| | (C) <i>Sc</i> | (D) <i>He</i> | | energy of Mg^{2+} is large | r |
| 19. | Of the following pairs | , the one containing | | | $(D) (1)^{3+}$ |
| | example of metalloid el | ements in the periodic | | (A) <i>Na</i> | (B) Al^{2} |
| | table is | | | (C) Be^{2+} | (D) Cr^{3+} |
| | (A) Sodium and potassiu | Im | 25. | Group comprising of all | metals is |
| | (B) Fluorine and chlorin | e | | (A) IIIA | (B) IVA |
| | (C) Calcium and magnes | sium | | (C) VIIA | (D) IIA |
| 20 | (D) DOTOIL and Shicoli The number of element | s in each of the long | 26. | Whose name is not | associated with the |
| 20. | periods in the periodic table is | | | development of Periodic | Table |
| | (A) 2 | (B) 8 | | (A) Prout's | (B) Newlands |
| | (C) 18 | (D) 32 | | (C) Rutherford | (D) Loother Meyer |
| 21. | Hydrogen can be put in halogen group because (A) It has deuterium and tritium as isotopes (B) It forms hydrides like chlorides (C) It contains one electron only (D) It is light | | 27. | Element of atomic num | ber 23 is placed in the |
| | | | | periodic table in | |
| | | | | (A) s - block | (B) p – block |
| | | | | (C) d - block | (D)f - block |
| | | | 28. | In which of the following | ng groups all the three |
| | | | | members are of the | alkaline earth metals |
| 22. | In the main group elem | ents (i) as we proceed | | family | |
| | down the same group in the periodic table and (ii) as we proceed from left to right in the same period, the atomic radius (A)(i) Increase continuously; (ii) Decreases continuously (B)(i) Decreases continuously; (ii) Increases continuously (C)(i) Increases continuously; (ii) Decreases upto the group IV and then increases upto | | | (A) Al, Sr, Ti | (B) Li, Na, K |
| | | | | (C) Mg, Ba, Ca | (D) Rb, Cs, Fr |
| | | | 29. | Astatine is a | |
| | | | | (A) Halogen | |
| | | | | (B) Rare earth element | |
| | | | | (C) Alkaline earth metal | |
| | | | | (D) None of these | |
| | | | 30. | The nitride ion in lithiu | m nitride is composed |
| | the end of the period | | | of | |
| | (D)(i) Decreases contin | uously; (ii) Decreases | | (A) $7P + 7e$ | (B) $10P + 7e$ |
| | upto the group IV an | nd then increases upto | | (C) $7P + 10e$ | (D) $10P + 10e$ |
| | the end of the period | | | | |

Atomic and Ionic radii

31. The unit representing atomic radii and ionic radii is

| (A) <i>nm</i> | (B) <i>cm</i> |
|---------------|---------------|
| (C) Å | (D) <i>m</i> |

- **32.** The atomic radii in periodic table among elements from right to left
 - (A) Decreases
 - (B) Increases
 - (C) Remain constant
 - (D) First decreases and then increases
- **33.** Of the following the ion with the smallest ionic radius is
 - (A) K^+ (B) Ca^{2+}

(C)
$$Ti^{3+}$$
 (D) Ti^{4-}

- **34.** Which of the following does not represent 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
- **35.** The order of magnitude of ionic radii of ions Na^+, Mg^{2+}, Al^{3+} and Si^{4+} is
 - (A) $Na^+ < Mg^{2+} < Al^{3+} < Si^{4+}$
 - (B) $Mg^{2+} > Na^+ > Al^{3+} > Si^{4+}$
 - (C) $Al^{3+} > Na^+ > Si^{4+} > Mg^{2+}$
 - (D) $Na^+ > Mg^{2+} > Al^{3+} > Si^{4+}$
- **36.** The order of the magnitude of ionic radii of ions N^{3-}, O^{2-} and F^{-} is
 - (A) $N^{3-} > O^{2-} > F^-$ (B) $N^{3-} < O^{2-} < F^-$ (C) $N^{3-} > O^{2-} > F^-$ (D) $N^{3-} < O^{2-} > F^-$
- **37.** Which statement is correct
 - (A)For potassium, the atomic radius < ionic radius; but for bromine, the atomic radius > ionic radius
 - (B) For potassium and bromine both, the atomic radii > ionic radii
 - (C) For potassium and bromine both, the atomic radii < ionic radii
 - (D)For potassium, the atomic radius > ionic radius but for bromine, the atomic radius < ionic radius

38. Which of the following ion is the smallest ion

- (A) O_2^+ (B) O_2^- (C) O_2 (D) O_2^{-2}
- **39.** The correct order of radii is
 - (A) N < Be < B (B) $F^- < O^{2-} < N^{3-}$
 - (C) Na < Li < K (D) $Fe^{3+} < Fe^{2+} < Fe^{4+}$
- **40.** Which one of the following should be most stable
 - (A) H_2^+ (B) H^+ (C) H (D) H^-
- **41.** Arrange the following in increasing order of their atomic radius : *Na*,*K*,*Mg*,*Rb*
 - (A) Mg < K < Na < Rb
 - (B) Mg < Na < K < Rb
 - (C) Mg < Na < Rb < K
 (D) Na < K < Rb < Mg
- **42.** In the isoelectronic species the ionic radii (Å)of N^{3-} , O^{2-} and 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
- **43.** Al^{3+} has a lower ionic radius than Mg^{2+} because
 - (A) Mg atom has less number of neutrons than Al
 - (B) Al^{3+} has a higher nuclear charge than Mg^{2+}
 - (C) Their electronegativities are different
 - (D) Al has a lower ionisation potential than Mg atom
- **44.** When a neutral atom is converted into cation, there is
 - (A) Decrease in the atomic number
 - (B) An increase in the atomic number
 - (C) A decrease in size
 - (D) An increase in size
- **45.** A trend common to both groups I and VII elements in the periodic table as atomic number increases is
 - (A) Oxidising power increases
 - (B) Atomic radius increases
 - (C) Maximum valency increases
 - (D) Reactivity with water increases

- 46. Increasing order of atomic radii is
 - (A) $Mg^{2+} < Na^+ < Ne < F^- < O^{2-}$
 - (B) $Na^+ < Mg^{++} < Ne < F^- < O^{2-}$
 - (C) $O^{2-} < F^{-} < Ne < Na^{+} < Mg^{2+}$
 - (D) $Ne < O^{2-} < F^- < Na^+ < Mg^{2+}$
- **47.** Chloride ion and potassium ion are isoelectronic. Then
 - (A) Potassium ion is relatively bigger
 - (B) Depends on the other cation and anion
 - (C) Their size are same
 - (D) Chloride ion is bigger than potassium ion
- **48.** Which of the following has the largest ionic radius
 - (A) Na^+ (B) Ni^+ (C) Cs^+ (D) Mg^{+2}
- **49.** The ionic radii of Li^+ , Na^+ , K^+ are in which of the following order
 - (A) $K^+ > Na^+ > Li^+$ (B) $K^+ > Na^+ < Li^+$ (C) $K^+ < Na^+ < Li^+$ (D) $Li^+ > Na^+ < K^+$
- **50.** Which of the following has smallest size

| (A) Mg^{2+} | (B) <i>Na</i> ⁺ |
|---------------|----------------------------|
| (C) Al^{3+} | (D) Si^{4+} |

Ionisation energy

51. Which of the following element has the lowest ionization potential

| (A) Fe | (B) <i>H</i> |
|--------|---------------|
| (C) Li | (D) <i>He</i> |

- **52.** As one moves along a given row in the periodic table, ionization energy
 - (A) Remains same
 - (B) Increases from left to right
 - (C) First increases, then decreases
 - (D) Decreases from left to right
- 53. Ionization energy is highest for
 - (A) Noble gases
 - (B) Platinum metals
 - (C) Transition elements
 - (D) Inner-transition elements

- **54.** 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) $[Ar]3d^{10} 4s^2 4p^2$

55. Which of the following elements has the lowest ionistion potential

- (A) N (B) O(C) F (D) Ne
- **56.** Which of the following has lowest first ionisation potential
 - (A) *B* (B) *C* (C) *N* (D) *O*
- **57.** If first orbit energy of He^+ is -54.4 eV, then the second orbit energy will be
 - $(A) 54.4 \ eV \qquad (B) 13.6 \ eV$
 - (C) $-27.2 \ eV$ (D) $+27.2 \ eV$
- **58.** The screening effect of inner electrons of the nucleus causes
 - (A) A decrease in the ionisation potential
 - (B) An increase in the ionisation potential
 - (C) No effect on the ionisation potential
 - (D) An increase in the attraction of the nucleus to the electrons
- **59.** Which of the following has highest first ionization energy
 - (A) Sulphur (B) Oxygen
 - (C) Nitrogen (D) Phosphorus
- **60.** The second ionization potential is
 - (A) Less than the first ionization potential
 - (B) Equal to the first ionization potential
 - (C) Greater than the first ionization potential
 - (D) None of these
- **61.** In view of their low ionisation energies the alkali metals are
 - (A) Weak oxidising agents
 - (B) Strong reducing agents
 - (C) Strong oxidising agents
 - (D) Weak reducing agents
- **62.** Of the following iso-electronic ions, the one which has the lowest ionisation potential is
 - (A) Na^+ (B) Mg^{++}
 - (C) F^{-} (D) O^{--}

- **63.** Ionisation energy in group I-A varies in the decreasing order as
 - (A) Li > Na > K > Cs (B) Na > Li > K > Cs(C) Li > Cs > K > Na (D) K > Cs > Na > Li
- **64.** Which of the following relation is correct with respect to first (*I*) and second (*II*) ionization potentials of sodium and magnesium

(A)
$$I_{Mg} = II_{Na}$$
 (B) $I_{Na} > I_{Mg}$
(C) $II_{Mg} > II_{Na}$ (D) $II_{Na} > II_{Mg}$

- **65.** The order of the magnitude of first ionisation potentials of *Be*, *B*, *N* and *O* is
 - (A) N > O > Be > B (B) N > Be > O > B(C) Be > B > N > O (D) B > Be > O > N
- **66.** Which of the following transitions involves maximum amount of energy

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

- (C) $M^+(g) \to M^{2+}(g)$ (D) $M^{2+}(g) \to M^{3+}(g)$
- **67.** Which of the following species has lowest ionization potential

| (A) <i>O</i> | (B) <i>O</i> ₂ |
|--------------|---------------------------|
| (C) O_2^+ | (D) O_2^- |

68. Which of the following has minimum ionization energy

| (A) Ge | | (B |) Se |
|----------------------------------|------|----|------|
| (C) As | | (D |) Br |
| D ¹ J D | 0.16 | .1 | |

69. First I.P. of Mg is than Al

| (A) Less | (B) More |
|-----------|-------------------|
| (C) Equal | (D) None of these |

70. The element with highest value of ionization potential is

| (A) Potassium | (B) Helium |
|---------------|------------|
| (C) Hydrogen | (D) Xenon |

- 71. Order of first ionization potentials of elements *Li*, *Be*, *B*, *Na* is
 - (A) Li > Be > B > Na
 - (B) Be > B > Li > Na
 - (C) Na > Li > B > Be
 - (D) Be > Li > B > Na

- **72.** The ionization energy of nitrogen is larger than that of oxygen because of
 - (A) Greater attraction of electrons by the nucleus
 - (B) The size of nitrogen atom being smaller
 - (C) The half-filled *p*-orbitals possess extra stability
 - (D) Greater penetration effect
- 73. If the IP of Na is 5.48 eV, the ionisation potential of K will be (A) Same as that of Na (B) 5.68 eV(C) 4.34 eV (D) 10.88 eV
- 74. Mg and Li are similar in their properties due to(A) Same e/m ratio
 - (B) Same electron affinity
 - (C) Same group
 - (D) Same ionic potential
- **75.** The formation of the oxide ion $O_{(g)}^{2-}$ requires first an exothermic and then an endothermic step as shown below

$$O_{(g)} + e^{-} = O_{(g)}^{-} \Delta H^{0} = -142 \ kJmol^{-1}$$

$$O_{(g)}^{-} + e^{-} = O_{(g)}^{2-} \Delta H^{0} = 844 \ kJmol^{-1}$$

This is because

- (A) O^- ion will tend to resist the addition of another electron
- (B) Oxygen has high electron affinity
- (C) Oxygen is more electronegative
- (D) *O*⁻ ion has comparatively larger size than oxygen atom
- 76. Which is correct about ionisation potential (A)It is independent of atomic radii
 - (B) It increases with increase in atomic radii
 - (C) It remains constant with increase in atomic radii
 - (D) It decreases with increase in atomic radii
- **77.** Flourine is the best oxidising agent because it has
 - (A) Highest electron affinity
 - (B) Highest E_{red}^0
 - (C) Highest E_{oxid}^0
 - (D) Lowest electron affinity

86. The electron affinity of

- **78.** Which among the following elements have lowest value of IE_1
 - (A) Pb (B) Sn
 - (C) Si (D) C
- 79. In a given shell, the order of screening effect is (A) s > p > d > f (B) f > d > p > s(C) p < d < s < f (D) d > f < s > p
- **80.** Which of the following has the highest first ionisation energy

| (A) Li | (B) <i>Be</i> |
|--------------|---------------|
| (C) <i>B</i> | (D) <i>C</i> |

Electron affinity

- **81.** Which of the following has the least electron affinity in $kJmol^{-1}$
 - (A) Oxygen (B) Carbon
 - (C) Nitrogen (D) Boron
- **82.** Fluorine has low electron affinity than chlorine because of
 - (A) Smaller radius of fluorine, high density
 - (B) Smaller radius of chlorine, high density
 - (C) Bigger radius of fluorine, less density
 - (D) Smaller radius of chlorine, less density
- **83.** For electron affinity of halogens which of the following is correct
 - (A) Br > F (B) F > Cl
 - (C) Br < Cl (D) F > I
- 84. Ionic compounds are formed most easily with
 - (A)Low electron affinity, high ionisation energy
 - (B) High electron affinity, low ionisation energy
 - (C) Low electron affinity, low ionisation energy
 - (D)High electron affinity, high ionisation energy
- **85.** In comparison with alkali metals, the electron affinity of halogens is
 - (A) Very high (B) Very low
 - (C) Nearly same (D) Exactly same

| | (A) Carbon is greater than oxygen(B) Sulphur is less than oxygen | | |
|-----|---|---------------------------------|--|
| | | | |
| | (C) Iodine is greater than bromine | | |
| | (D) Bromine is less than | chlorine | |
| 87. | The amount of energy which is released due | | |
| | to addition of extra elec | etron to the outermost | |
| | orbit of gaseous atom is | called | |
| | (A) Electron capacity | (B) Electron affinity | |
| | (C) Ionisation potential | (D) Electronegativity | |
| 88. | Which of the follow | ing species has the | |
| | highest electron affinity | | |
| | (A) <i>F</i> | (B) <i>O</i> | |
| | (C) <i>O</i> [−] | (D) <i>Na</i> ⁺ | |
| 80 | The electron offinity ve | blues (in $k I m o l^{-1}$) of | |

- 89. The electron affinity values (in kJ mol⁻¹) of three halogens X, Y and Z are respectively 349, 333 and 325. Then X, Y and Z are respectively [EAMCET 2003]
 (A) F₂, Cl₂ and Br₂
 (B) Cl₂, F₂ and Br₂
 (C) Cl₂, Br₂ and F₂
 (D) Br₂, Cl₂ and F₂
- **90.** Nitrogen has lower electron affinity than its preceeding element carbon because
 - (A) Electron affinity decreases along a period
 - (B) Electron affinity generally increases along a period
 - (C) Nitrogen atom has half-filled *p*-orbital
 - (D) Nitrogen is a *p*-block element

Electronegativity

- **91.** In third row of periodic table from *Na* to *Cl*
 - (A) Electronegativity increases
 - (B) Electronegativity decreases
 - (C) Ionization energy decreases
 - (D) Atomic volume increases
- **92.** Which of the following is the most electropositive element
 - (A) Aluminium (B) Magnesium
 - (C) Phosphorus (D) Sulphur

- 93. Which of the following sets of atoms is arranged order of increasing in electronegativity (A) S, Si, P (B) S. P. Si (C) Si, P, S(D) Si, S, P94. Which of the following property displays progressive increase with the rise in atomic number across a period in the periodic table (A) Electronegativity (B) Electron affinity (C) Ionization potential (D) Size of the atom 95. With respect to chlorine, hydrogen will be (A) Electropositive (B) Electronegative (C) Neutral (D) None of the above 96. 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**97.** Electronegativity is a measure of the capacity of an atom to (A) Attract electrons (B) Attract protons (D) Repel protons (C) Repel electrons 98. With increasing atomic number in a certain period (A) The chemical reactivity decreases (B) The chemical reactivity increases (C) The electropositive character increases (D) The electronegative character increases 99. Which of the following have maximum electronegativity (A) Al**(B)** *S* (C) Si (D) *P* **100.** Which element has the lowest electronegativity (B) *F* (A) Li
 - (C) Fe (D) Cl

Valency and oxidation state

101. Which of the following group of elements eliminates electron easily

| (A) <i>N</i> , <i>P</i> , <i>As</i> | (B) <i>O</i> , <i>S</i> , <i>Se</i> |
|--------------------------------------|--------------------------------------|
| (C) <i>Li</i> , <i>Na</i> , <i>K</i> | (D) <i>Cl</i> , <i>Ba</i> , <i>I</i> |

102. The maximum valency of an element with atomic number 7 is

| (A) 2 | (B) 5 |
|-------|-------|
| (C) 4 | (D) 3 |

- **103.** Which of the following metals exhibits more than one oxidation state
 - (A) *Na* (B) *Mg*
 - (C) Fe (D) Al
- **104.** Out of the following elements which one do you expect to be most reactive chemically
 - (A) *Mg* (B) *Ca*
 - (C) *Sr* (D) *Ba*
- **105.** Thalium shows different oxidation states because
 - (A) It is a transition element
 - (B) Of inert pair effect
 - (C) Of its amphoteric character
 - (D) Of its higher reactivity
- **106.**Oxidising action increases in halogen in the following order
 - (A) Cl < Br < I < F (B) Cl < I < Br < F(C) I < F < Cl < Br (D) I < Br < Cl < F
- **107.** Fluorine, chlorine, bromine and iodine are placed in the same group (17) of the periodic table, because
 - (A) They are non-metals
 - (B) They are electronegative
 - (C) Their atoms are generally univalent
 - (D) They have 7 electrons in the outermost shell of their atom
- **108.** Which of the following sequence correctly represents the decreasing acid nature of oxides
 - (A) $Li_2O > BeO > B_2O_3 > CO_2 > N_2O_3$
 - (B) $N_2O_3 > CO_2 > B_2O_3 > BeO > Li_2O_3$
 - (C) $CO_2 > N_2O_3 > B_2O_3 > BeO > Li_2O$
 - (D) $B_2O_3 > CO_2 > N_2O_3 > Li_2O > BeO$
- **109.** Which of the following aqueous acid is most acidic
 - (A) *HCl* (B) *HF* (C) *HI* (D) *HBr*
- **110.** The correct order of the increasing ionic character is
 - (A) $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$
 - (B) $BeCl_2 < MgCl_2 < BaCl_2 > CaCl_2$
 - (C) $BeCl_2 < BaCl_2 < MgCl_2 < CaCl_2$
 - (D) $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$