NEET UG (2024)
Chemistry
Quiz-15

SECTION-A

51. An element having electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$ is:

(1) An inert gas
(2) A transition element
(3) An inner transition element
(4) A representative element

52. Which of the following has largest size?

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

53. The octet rule is observed in:

(1) PCl_5 (2) CO_2
(3) BCl_3 (4) SF_6

54. The element with the highest first ionization potential is:

(1) Boron
(2) Carbon
(3) Nitrogen
(4) Oxygen

55. Considering the elements B, Al, Mg and K, the correct order of their metallic character is:
(1) B > Al > Mg > K
(2) Al > Mg > B > K
(3) Mg > Al > K > B
(4) K > Mg > Al > B

56. Which of the following is the correct order of gradually decreasing basic nature of oxides?
(1) $Al_2O_3 > MgO > Cl_2O_7 > SO_3$
(2) $MgO > Al_2O_3 > SO_3 > Cl_2O_7$
(3) $Cl_2O_7 > SO_3 > Al_2O_3 > MgO$
(4) $SO_3 > Cl_2O_7 > MgO > Al_2O_3$

57. In which of the following the energy change corresponds to first ionization enthalpy?
(1) $X(g) \rightarrow X^+(g) + e^-$
(2) $2X(g) \rightarrow 2X^+(g) + 2e^-$
(3) $X(s) \rightarrow X^+(g) + e^-$
(4) $X(aq) \rightarrow X^+(aq) + e^-$

58. Element X is strongly electropositive and Y is strongly electronegative. Both are univalent. Then the formula of the compound formed would be:
(1) $X^+ Y^-$ (2) X – Y
(3) $X^- Y^+$ (4) $X \rightarrow Y$

59. If atomic number of an element is 33, then it will be placed in periodic table in the:
(1) 1^{st} group (2) 3^{rd} group
(3) 15^{th} group (4) 17^{th} group

60. In which molecules/ion co-ordinate bond is present.
(1) NH_4^+ (2) BF_3
(3) PCl_5 (4) H_2O

61. What is the name and symbol of the element with atomic number 112?
(1) Ununbium, Uub
(2) Unnilbium, Unb
(3) Ununnilium, Uun
(4) Ununtrium, Uut

62. The radii of the F, F^-, O and O^{2-} is the order:
(1) $O^{2-} > O > F^- > F$
(2) $F^- > O^{2-} > F > O$
(3) $O^{2-} > F^- > F > O$
(4) $O^{2-} > F^- > O > F$

63. The valence electron are involved in formation of covalent bonds is/are called:
(1) Non-bonding electrons
(2) Lone pairs
(3) Unshared pairs
(4) None of these

64. **Statement I:** The first ionization enthalpy of aluminium is smaller than that of magnesium.
Statement II: Ionic radius of aluminium is smaller than that of magnesium.
(1) Both statement I and statement II are true but statement II is not the correct explanation of statement I
(2) Statement I is true but statement II is false
(3) Statement I is false but statement II is true
(4) Both statement I and statement II are true and statement II is the correct explanation of statement I

65. The correct order of electron gain enthalpy is:
(1) O > S > Se > Te
(2) Te > Se > S > O
(3) S > O > Se > Te
(4) S > Se > Te > O

66. Which among the following is an electron deficient compound?
(1) NH_3 (2) CO_2
(3) BH_3 (4) CH_4

67. How many groups and periods respectively are found in mendeleev's periodic table?
(1) 7, 8 (2) 18, 7
(3) 8, 7 (4) 7, 18

68. Which of the following is not a representative element?
(1) Z = 37 (2) Z = 31
(3) Z = 54 (4) Z = 24

69. The formal charge on oxygen atom in N_2O molecule is: $:N \equiv N - \ddot{O}:$
(1) 0 (2) +1
(3) –1 (4) –2

70. Which of the following is an exothermic process?
(1) $O^-(g) + e^- \rightarrow O^{2-}(g)$
(2) $N(g) + e^- \rightarrow N^-(g)$
(3) $Na(g) + e^- \rightarrow Na^-(g)$
(4) $Na(g) \rightarrow Na^+(g) + e^-$

71. Match the following:

Column – I (Element)		**Column – II (Periodic properties)**	
(A)	F	(P)	Maximum ionization energy
(B)	Cl	(Q)	Maximum electronegativity
(C)	Fe	(R)	Maximum electron affinity
(D)	He	(S)	Variable oxidation state

	A	**B**	**C**	**D**
(1)	Q	P	S	R
(2)	Q	R	S	P
(3)	R	P	S	Q
(4)	R	S	P, S	Q, R

72. Which one of the following element will never obey octet rule?
(1) Na (2) F
(3) S (4) H

73. The correct order of the shielding effect of s, p, d and f orbitals is:
(1) s > p > d > f (2) s < p < d > f
(3) s < p < d < f (4) s > p < d < f

74. The correct order of increasing atomic radii of the following elements is:
(1) S < O < Se < C (2) O < C < S < Se
(3) O < S < Se < C (4) C < O < S < Se

75. Which of the following is neither hypervalent nor hypovalent?
(1) PCl_5 (2) BF_3
(3) SF_6 (4) CH_4

76. In the modern periodic table, a period indicates the value of:
(1) Atomic number
(2) Atomic mass
(3) Principal quantum number
(4) Azimuthal quantum number

77. Match list-I with list-II and choose the correct option:

	List-I (Atomic No.)		**List-II (IUPAC name)**
(a)	108	(i)	Unnilseptium
(b)	114	(ii)	Ununhexium
(c)	107	(iii)	Unniloctium
(d)	116	(iv)	Ununquadium

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

78. What are the exceptions of the octet rule?
(1) The incomplete octet of central atom
(2) An odd number of electrons on central atom
(3) Expanded octet of the central atom
(4) All of these

79. The element which has highest second ionization energy is:
(1) Na (2) Mg
(3) Ca (4) Ar

80. Which of the following represents the correct sequence of 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) $MgO < K_2O < Al_2O_3 < Na_2O$

81. Lewis-dot structure of carbon dioxide which has the formula CO_2 is:
(1) $:\ddot{O}=C=\ddot{O}:$
(2) $:\ddot{\underset{\cdot\cdot}{O}}-C-\ddot{\underset{\cdot\cdot}{O}}:$
(3) $:\ddot{C}=O-\ddot{O}:$
(4) $:\ddot{O}-\ddot{\underset{\cdot\cdot}{C}}-\ddot{O}:$

82. Which of the following shows diagonal relationship?
(1) Boron and Silicon
(2) Boron and Aluminium
(3) Boron and Gallium
(4) Boron and Carbon

83. **Statement I:** Newland's law of octaves is valid only up to mass number 20.
Statement II: Li, Na, K forms a Dobereiner's triad.
(1) Both statement I and statement II are true but statement II is not the correct explanation of statement I
(2) Statement I is true but statement II is false
(3) Statement I is false but statement II is true
(4) Both statement I and statement II are true and statement II is the correct explanation of statement I

84. Calculate the formal charge on the nitrogen atom in NH_4^+
(1) 1 (2) –1
(3) 0.25 (4) –0.25

85. Which pair of atomic numbers represents s-block elements?
(1) 7, 15 (2) 6, 12
(3) 9, 17 (4) 4, 12

SECTION-B

86. The element that shows anomalous behaviour in group 13 is:
(1) Boron (2) Aluminium
(3) Gallium (4) Thallium

87. Which of the folowing oxides is most basic?
(1) Na_2O (2) Al_2O_3
(3) SiO_2 (4) SO_2

88. The periodic repetition of the properties of the elements is due to:
(1) Recurrence of similar valence shell electronic configuration
(2) Recurrence of same types of oxides formed
(3) The same number of isotopic forms
(4) Both (1) and (2)

89. When we move from left to right in a period, the electropositive character:
(1) Increases
(2) Decreases
(3) No change
(4) First increases, then decreases

90. Which of the following species show deviation from the octet's rule?
(1) $AlCl_3$ (2) SF_6
(3) NO (4) All of the above

91. The correct order of first ionisation enthalpy is:
(1) Al < Mg < S < P
(2) Mg < Al < P < S
(3) Mg < S < Al < P
(4) Mg < Al < S < P

92. Total number of elements present in the 5th period of the modern periodic table is:
(1) 2 (2) 8
(3) 18 (4) 32

93. The formal charges on the atoms underlined are
$C_6H_5 - \underline{C} \equiv \underline{N} - \underline{O}$
(1) C = 0, N = –1,O = +1
(2) C = –1, N = +1, O = –1
(3) C = 0, N = +1, O = –1
(4) C = +1, N = 0, O = –1

94. Which of the following group of the modern periodic table contains halogen?
(1) Group 1 (2) Group 2
(3) Group 17 (4) None of the above

95. The correct order of the decreasing ionic radii among the following isoelectronic species is:
(1) $K^+ > Ca^{2+} > Cl^- > S^{2-}$
(2) $Ca^{2+} > K^+ > S^{2-} > Cl^-$
(3) $Cl^- > S^{2-} > Ca^{2+} > K^+$
(4) $S^{2-} > Cl^- > K^+ > Ca^{2+}$

96. Identify the element having zero valency.
(1) Chlorine (2) Helium
(3) Sodium (4) Oxygen

97. Which of the following element has zero electron affinity?
(1) He (2) F
(3) Cl (4) Br

98. Increase in atomic size down the group is due to _____.
(1) Increase in number of orbit
(2) Increase in number of protons and neutrons
(3) Increase in number of protons
(4) Increase in number of protons, neutrons and electrons

99. The correct order of electronegativity is:
(1) Cl > F > O > Br (2) F > O > Cl > Br
(3) F > Cl > Br > O (4) O > F > Cl > Br

100. When two atoms combine to form a molecule, ___.
(1) Energy is released.
(2) Energy is absorbed.
(3) Energy is neither released nor absorbed.
(4) Energy is either released or absorbed.

Solution

51. (4)

$1s^2 2s^2 2p^6 3s^2 3p^1$ is p-block element. p-block elements are also called as representative element.

(NCERT – Class 11th, Page 84)

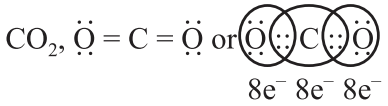
52. (1)

Size of sodium is greater than magneisum. Size of magnesium is greater than size of Mg^{2+}.

(NCERT – Class 11th, Page 85 – 87)

53. (2)

Octect rule states that each and every compound is stable if they have group of 8 electrons have noble gas configuration, i.e.,



(NCERT – Class 11th, Page 102 – 106)

54. (3)

$_7N = 1s^2 2s^2 2p^3$.

During first ionization of nitrogen electron is removed from 2p-subshell which is half filled and more stable. So, first I.P. of nitrogen is highest.

(NCERT – Class 11th, Page 87 – 89)

55. (4)

Metallic character decreases along a period and increases down the group.

K > Mg > Al > B

(NCERT – Class 11th, Page 91)

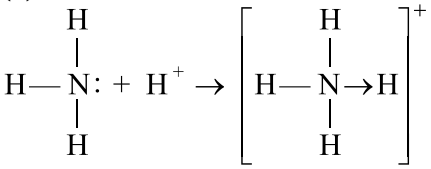
56. **(2)**
Decreasing basic nature of oxides will be
$MgO > Al_2O_3 > SO_3 > Cl_2O_7$
(NCERT – Class 11th, Page 94 – 95)

57. **(1)**
The energy change for the process
$X(g) \rightarrow X^+(g) + e^-$,
corresponds to first ionisation enthalpy.
(NCERT – Class 11th, Page 87 – 89)

58. **(1)**
Formula of the compound will be X^+Y^-.
(NCERT – Class 11th, Page 106)

59. **(3)**
Z = 33
$[Ar]3d^{10}4s^24p^3$
Block $\rightarrow$ p
Group $\rightarrow$ 15 (10 + valence electrons)
Period $\rightarrow$ 4
(NCERT – Class 11th, Page 84 – 85)

60. **(1)**



(NCERT – Class 11th, Page 109 – 110)

61. **(1)**
Z = 112, Ununbium (Uub)
(NCERT – Class 11th, Page 78 – 81)

62. **(4)**
Atomic/Ionic size $\propto \frac{1}{Z_{eff}}$
$\underbrace{O^{2-} > F^-}_{\text{Isoelectronic}} > O > F$
(NCERT – Class 11th, Page 85 – 87)

63. **(4)**
The valence electrons are involved in formation of covalent bonds is/are called bond pair electrons (bonding electrons).
(NCERT – Class 11th, Page 102)

64. **(1)**
Statement I: The first ionization enthalpy of aluminium is smaller than that of magnesium. **(True)**
$Al(Z=13): 1s^2 2s^2 2p^6 3s^2 3p^1$
$Mg(Z=12): 1s^2 2s^2 2p^6 3s^2$
Statement II: Ionic radius of aluminium is smaller than that of magnesium. **(True)**
Ionic radius $\propto \frac{1}{+\text{ ve charge}}$
Thu ionic size order is $Al^{3+} < Mg^{2+}$
Thus, both statement I and statement II are true but statement II is not the correct explanation of statement I.
(NCERT – Class 11th, Page 87 – 89)

65. **(4)**
Electron gain enthalpy follows the order
$S > Se > Te > O$
(For 'O' electron gain enthalpy is least because addition of e^- in all 2nd shell is difficult due to more inter electron repulsions)
(NCERT – Class 11th, Page 89 – 90)

66. **(3)**
BH_3 has 6 electrons in the valence shell of B atom. As it has incomplete octet, so this is an electron deficient molecule
(NCERT – Class 11th, Page 105 – 106)

67. **(3)**
There are seven periods and eight groups in Mendeleev's periodic table.
(NCERT – Class 11th, Page 76)

68. **(4)**
$Z = 24$, represents chromium element, which is a transition element (d-block), not a representative element (s and p-block element).
(NCERT – Class 11th, Page 84)

69. **(3)**
Formula charge = Valence electrons
– Non-bonding electrons
$-\frac{1}{2}$ Bonding electrons
Valence electrons = 6
Lone pair = three (six electrons)
Total number of bonding electrons = 2
$\text{Formal charge} = 6 - 6 - \frac{1}{2} \times 2 = -1$
(NCERT – Class 11th, Page 104 – 105)

70. **(3)**
$Na(g) + e^- \rightarrow Na^-(g)$, Exothermic process
(NCERT – Class 11th, Page 87 – 90)

71. **(2)**
F = Maximum electronegativity
Cl = Maximum electron affinity
Fe = Variable oxidation state
He = Maximum ionization energy
(NCERT – Class 11th, Page 87 – 93)

72. (4)

Hydrogen will never obey octet rule.

(NCERT – Class 11th, Page 105 – 106)

73. (1)

The screening effect of electrons of different orbitals follows the order s > p > d > f.

(NCERT – Class 11th, Page 88 – 89)

74. (2)

Moving from left to right, the atomic radius decreases.

So, the radius of O < Radius of C

Moving from top to bottom, the atomic radius increases. Hence, the correct order of increasing atomic radius is $O < C < S < Se$

(NCERT – Class 11th, Page 85 – 87)

75. (4)

CH_4 is neither hypervalent nor hypovalent.

(NCERT – Class 11th, Page 105 – 106)

76. (3)

In the modern periodic table, each period begins with the filling of a new shell. Therefore, a period indicates the value of principal quantum number (n).

(NCERT – Class 11th, Page 81 – 82)

77. (4)

108 = Unniloctium

114 = Ununquadium

107 = Unnilseptium

116 = Ununhexium

(NCERT – Class 11th, Page 78 – 81)

78. (4)

According to octet rule, the central atom must have 8 electrons but in some compounds the number of electrons is more than 8, or less than 8 or an odd number of electrons is left on the central atom e.g., PF_5, BCl_3, NO.

(NCERT – Class 11th, Page 105 – 106)

79. (1)

Na has the highest second ionization energy.

(NCERT – Class 11th, Page 87 – 89)

80. (3)

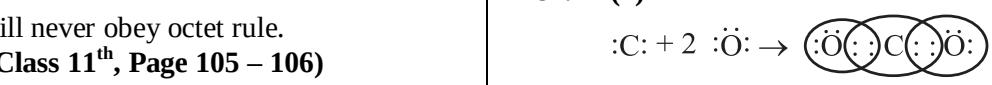
The basic strength of oxides increases down the group and decreases across a period from left to right. Among the given element, K is most metallic and Al is least metallic.

So, the correct order of basic nature of oxides metals is:

$Al_2O_3 < MgO < Na_2O < K_2O$

(NCERT – Class 11th, Page 94 – 95)

81. (1)



Valencies of C and O are 4 and 2 respectively.

(NCERT – Class 11th, Page 102 – 106)

82. (1)

Boron and silicon will show diagonal relationship.

(NCERT – Class 11th, Page 93)

83. (3)

Newland's law of octaves is valid only up to mass number 40.

Li, Na, K forms a Dobereiner's triad. (True)

Statement I is false but statement II is true.

(NCERT – Class 11th, Page 74 – 75)

84. (1)

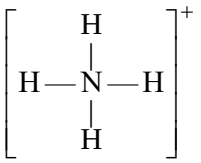
Formal charge $(FC) = V - L - \frac{B}{2}$

Where,

V = Total number of valence electrons in the atom.

L = Total number of non bonding (lone pair) electrons in the atom.

B = Total number of bonding (shared) electrons in that particular atom.



For the given structure,

we have $V = 5;\ L = 0;\ B = 8$

$\therefore$ Formal charge on the nitrogen atom in NH_4^+ (ammonium) ion is:

$$FC = 5 - 0 - \frac{1}{2} \times (8)$$

$\therefore\ FC = 1$

The formal charge on nitrogen in case of NH_4^+ (ammonium) ion is +1.

(NCERT – Class 11th, Page 104 – 105)

85. (4)

$Be(Z = 4)$ and $Mg(Z = 12)$ are s-block elements.

(NCERT – Class 11th, Page 82 – 84)

86. (1)

Boron show anomalous behaviour in group 13.

(NCERT – Class 11th, Page 93)

87. (1)

Na_2O will be most basic because Na is most electropositive among Na, Al, Si, S.

(NCERT – Class 11th, Page 94 – 95)

88. (1)

The repeating of similar electronic configuration of their atoms in the outermost energy shell after a regular interval is the reason for periodicity in element properties.

(NCERT – Class 11th, Page 81 – 85)

89. (2)

As the tendency to lose electrons decreases as we move from left to right in a period, the electropositive character decreases.

(NCERT – Class 11th, Page 91)

90. (4)

All three molecules, $AlCl_3$, SF_6 , and NO, deviate from the octet rule, as the central atom in them does not contain exactly 8 electrons. Thus, this is an example of an expanded octet.

The central atom in $AlCl_3$ has 6 valence electrons.

The central atom in SF_6 has 12 valence electrons.

The central atom in NO has 7 valence electrons.

(NCERT – Class 11th, Page 102 – 106)

91. (1)

$\Delta_i H \propto Z_{eff}$

$\Delta_i H \propto$ Stability of electronic configuration from which electron is to be removed.

P : $[Ne]3s^2 3p^3 \rightarrow$ (Stable half-filled subshell, e^- removal is difficult)

Al : $[Ne]3s^2 3p^1$

Mg : $[Ne]3s^2$ (e^- removal is difficult from more penetrating 3s subshell)

S : $[Ne]3s^2 3p^4$ (high Z_{eff})

$\Delta_i H_1 \Rightarrow Al < Mg < S < P$

(NCERT – Class 11th, Page 87 – 89)

92. (3)

The 5th period of the periodic table contains 18 elements.

(NCERT – Class 11th, Page 81 – 85)

93. (3)

For nitrogen, formal charge $= 5 - \frac{1}{2}(8) = +1$

For oxygen, formal charge $= 6 - 6 - \frac{1}{2}(2) = -1$

(NCERT – Class 11th, Page 105 – 106)

94. (3)

Group 17 of the modem periodic table contains halogens.

(NCERT – Class 11th, Page 84)

95. (4)

For isoelectronic species,

$$\text{size} \propto \frac{1}{\text{number of protons}}$$

(NCERT – Class 11th, Page 85 – 87)

96. (2)

Helium has a zero valency.

(NCERT – Class 11th, Page 101 – 102)

97. (1)

Helium has zero electron affinity.

(NCERT – Class 11th, Page 89 – 90)

98. (1)

On moving down the group number of shells are added.

$\therefore$ size increases.

(NCERT – Class 11th, Page 85 – 87)

99. (2)

F is the most electronegative element followed by O.

(NCERT – Class 11th, Page 90 – 91)

100. (1)

When two atoms combine to form a molecule, energy is released.

(NCERT – Class 11th, Page 101 – 102)