R5

NEET 2024

Chemistry

Section – A (Compulsory)

51. Match List I with List II.

	List I (Process)		List II (Conditions)
A.	Isothermal process	I.	No heat exchange
B.	Isochoric process	II.	Carried out at constant temperature
C.	Isobaric process	III.	Carried out at constant volume
D.	Adiabatic process	IV.	Carried out at constant pressure

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-III, D-I

(2) A-I, B-II, C-III, D-IV

(3) A-II, B-III, C-IV, D-I

(4) A-IV, B-III, C-II, D-I

52. Arrange the following elements in increasing order of first ionization enthalpy:

Li, Be, B, C, N

Choose the correct answer from the options give below:

(1) Li < B < Be < C < N

(2) Li < Be < C < B < N

(3) Li < Be < N < B < C

(4) Li < Be < B < C < N

53. Match List I with List II.

	List I (Molecule)		List II (Number and types of bond/s between two carbon atoms)
A.	ethane	I.	one σ-bond and two π-bonds
B.	ethene	II.	two π-bonds
C.	carbon molecule, C_2	III.	one σ-bond
D.	ethyne	IV.	one σ-bond and one π-bond

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-II, D-I

(2) A-III, B-IV, C-II, D-I

(3) A-III, B-IV, C-I, D-II

(4) A-I, B-IV, C-II, D-III

54. The Henry's law constant (K_H) values of three gases (A, B, C) in water are 145, 2×10^{-5} and 35 kbar, respectively. The solubility of these gases in water follow the order:

(1) B > C > A

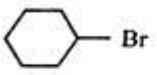
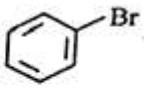
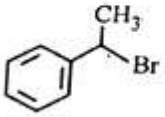
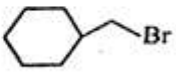
(2) A > C > B

(3) A > B > C

(4) B > A > C

55. Arrange the following elements in increasing order of electronegativity:
N, O, F, C, Si
Choose the correct answer from the options given below:
(1) Si < C < O < N < F
(2) O < F < N < C < Si
(3) F < O < N < C < Si
(4) Si < C < N < O < F

56. The compound that will undergo S_N1 reaction with the fastest rate is

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

Ans: (3)

57. In which of the following processes entropy increases?
A. A liquid evaporates to vapour.
B. Temperature of a crystalline solid lowered from 130 K to 0 K
C. $2\ NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D. $Cl_{2(g)} \rightarrow 2\ Cl_{(g)}$
Choose the correct answer from the options given below:
(1) A, B and D
(2) A, C and D
(3) C and D
(4) A and C

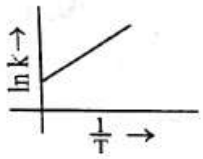
58. Given below are two statements:
Statement I: Aniline does not undergo Friedel- Crafts alkylation reaction.
Statement II: Aniline cannot be prepared through Gabriel synthesis.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and-Statement II are false.
(2) Statement I is correct but Statement II is false.
(3) Statement I is incorrect but Statement II is true.
(4) Both Statement I and Statement II are true.

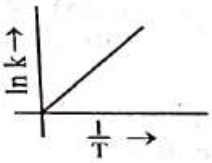
59. Match List I with List II.

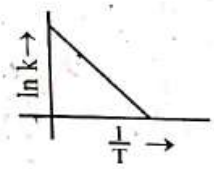
	List I (Conversion)		**List II (Number of Faraday required)**
A.	1 mol of H_2O to O_2	I.	3F
B.	1 mol of MnO_4^- to Mn^{2+}	II.	2F
C.	1.5 mol of Ca from molten $CaCl_2$	III.	1F
D.	1 mol of FeO to Fe_2O_3	IV.	5F

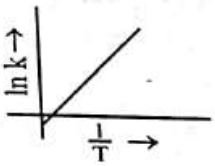
Choose the correct answer from the options given below:
(1) A-III, B-IV, C-I, D-II
(2) A-II, B-III, C-I, D-IV
(3) A-III, B-IV, C-II, D-I
(4) A-II, B-IV, C-I, D-III

60. Which plot of In k vs $\frac{1}{T}$ is consistent with Arrhenius equation?

(1) 

(2) 

(3) 

(4) 

Ans: (3)

61. Given below are two statements:

Statement I: The boiling point of three isomeric pentanes follows the order n-pentane > isopentane > neopentane

Statement II: When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

62. Match List I with List II.

	List I (Complexes)		**List II (Type of isomerism)**
A.	$[Co(NH_3)_5(NO_2)]Cl_2$	I.	Solvate isomerism
B.	$[Co(NH_3)_5(SO_4)]Br$	II.	Linkage isomerism
C.	$[Co(NH_3)_6]$ $[Cr(CN)_6]$	III.	Ionization isomerism
D.	$[Co(H_2O)_6]Cl_3$	IV.	Coordination isomerism

Choose the correct answer from the options given below:

(1) A - I, B - III, C - IV, D - II

(2) A - I, B - IV, C - III, D - II

(3) A - II, B - IV, C - III, D - I

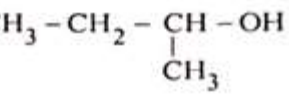
(4) A - II, B - III, C - IV, D – I

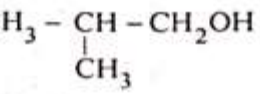
63. 1 gram of sodium hydroxide was treated with 25 ml. of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

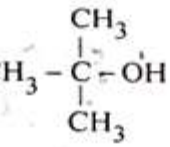
(1) 250 mg (3) 200 mg

(2) Zero mg (4) 750 mg

64. Which one of the following alcohols reacts instantaneously with Lucas reagent?

(1) 

(2) 

(3) 

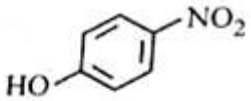
(4) 

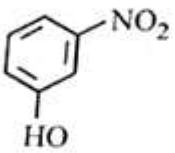
Ans: (3)

65. The E° value for the Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} due to change of

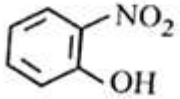
(1) d^5 to d^2 configuration
(2) d^4 to d^5 configuration
(3) d^3 to d^5 configuration
(4) d^5 to d^4 configuration

66. Intramolecular hydrogen bonding is present in

(1) 

(2) 

(3) HF

(4) 

Ans: (4)

67. Match List I with List II.

	List I (Compound)		**List II (Shape/ geometry)**
A.	NH_3	I.	Trigonal Pyramidal
B.	BrF_5	II.	Square Planar
C.	XeF_4	III.	Octahedral
D.	SF_6	IV.	Square Pyramidal

Choose the correct answer from the options given below:

(1) A-II, B-IV, C-III, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-II, B-III, C-IV, D-I
(4) A-I, B-IV, C-II, D-III

68. Among Group 16 elements, which one does NOT show -2 oxidation state?

(1) Se (2) Te
(3) Po (4) O

69. Given below are two statements:

Statement I: The boiling point of hydrides of Group 16 elements follow the order $H_2O > H_2Te > H_2Se > H_2S$.

Statement II: On the basis of molecular mass, H_2O is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in H_2O, it has higher boiling point.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are false.
(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.

70. 'Spin only' magnetic moment is same for which of the following ions?

A. Ti^{3+} B. Cr^{2+}
C. Mn^{2+} D. Fe^{2+}
E. Sc^{3+}

Choose the most appropriate answer from the options given below:

(1) A and E only (2) B and C only
(3) A and D only (4) B and D only

71. The reagents with which glucose does not react to give the corresponding tests/products are

A. Tollen's reagent
B. Schiff's reagent
C. HCN
D. NH_2OH
E. $NaHSO_3$

Choose the correct options from the given below:

(1) A and D (2) B and E
(3) E and D (4) B and C

72. Given below are two statements:

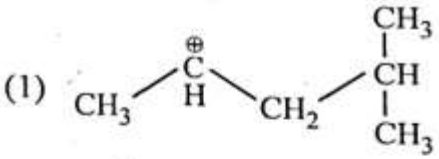
Statement I: Both $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.

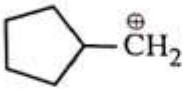
Statement II: $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic.

In the light of the above statements, choose the correct answer from the options given below:

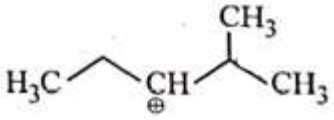
(1) Both Statement I and Statement II are false.
(2) Statement I is true' but Statement II is false.
(3) Statement I is false but Statement II is truè.
(4) Both Statement I and statement II are true.

73. The most stable carboçation among the following is

(1) 

(2) 

(3) 

(4) 

Ans: (3)

74. Fehling's solution 'A' is

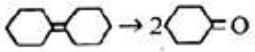
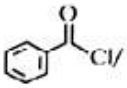
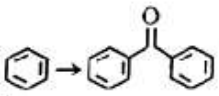
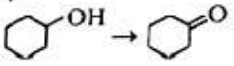
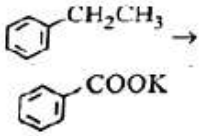
(1) alkaline copper sulphate
(2) alkaline solution, of sodium potassium tartrate (Rochelle's salt)
(3) aqueous sodium citrate
(4) aqueous copper sulphate

75. In which of the following equilibria, K_p and K_c are NOT equal?

(1) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2\,HI_{(g)}$
(2) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
(3) $2\,BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$
(4) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

76.

Match List I with List II.

List I (Reaction)	List II (Reagents/ Condition)
A. 	I.  Anhyd. $AlCl_3$
B. 	II. CrO_3
C. 	III. $KMnO_4$/ KOH, Δ
D. 	IV. (i) O_3 (ii) Zn-H_2O

Choose the correct answer from the options given below

(1) A-III, B-I, C-II, D-IV

(2) A-IV, B-I, C-II, D-III

(3) A-I, B-IV, C-II, D-III

(4) A-IV, B-I, C-III, D-II

77. A compound with a molecular formula of C_6H_{14} has two tertiary carbons. Its IUPAC name is:

(1) 2-methylpentane

(2) 2,3-dimethylbutane

(3) 2,2-dimethylbutane

(4) n-hexane

78. Activation energy of any chemical reaction can be calculated if one knows the value of

(1) probability of collision.

(2) orientation of reactant molecules during collision.

(3) rate constant at two different temperatures.

(4) rate constant at standard temperature.

79. On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for purification of such solid substances based on above principle is known as

(1) Sublimation

(2) Distillation

(3) Chromatography

(4) Crystallization

80. The energy of an electron in the ground state (n = 1) for He^+ ion is – x J , then that for an electrons in n = 2 state for Be^{3+} ion in J is:

(1) $-\frac{x}{9}$ (2) $-4x$

(3) $-\frac{4}{9}x$ (4) $-x$

81. Which reaction is NOT a redox reaction?

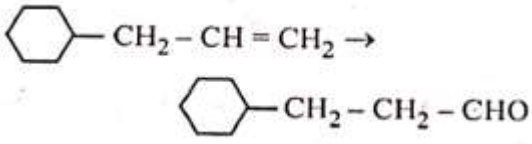
(1) $2\,KClO_3 + I_2 \rightarrow 2\,KIO_3 + Cl_2$

(2) $H_2 + Cl_2 \rightarrow 2\,HCl$

(3) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2\,NaCl$

(4) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

82. Identify the correct reagents that would bring about the following transformation.



(1) (i) BH_3; (ii) $H_2O_2/\bar{O}H$; (iii) PCC

(2) (i) BH_3; (ii) $H_2O_2/\bar{O}H$; (iii) alk. $KMnO_4$; (iv) H_3O^+

(3) (i) H_2O/H^+; (ii) PCC

(4) H_2O/H^+; (ii) CrO_3

83. Match List I with List II.

	List I Quantum Number		List II Information provided
A.	m_l	I.	shape of orbital
B.	m_s	II.	size of orbital
C.	l	III.	orientation of orbital
D.	n	IV.	orientation of spin of electron

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-I, D-II

(2) A-III, B-IV, C-II, D-I

(3) A-II, B-I, C-IV, D-III

(4) A-I, B-III, C-II, D-IV

84. For the reaction $2A \rightleftharpoons B + C$, $K_c = 4 \times 10^{-3}$. At a given time, the composition of reaction mixture is: [A] = [B] = [C] = 2×10^{-3}M.

Then, which of the following is correct?

(1) Reaction has a tendency to go in forward direction.

(2) Reaction has a tendency to go in backward direction.

(3) Reaction has gone to completion in forward direction.

(4) Reaction is at equilibrium.

85. The highest number of helium atoms is in

(1) 4 u of helium

(2) 4 g of helium

(3) 2.271098 L of helium at STP

(4) 4 mol of helium

Section – B (Attempt Any 10)

86. The pair of lanthanoid ions which are diamagnetic is

(1) Ce^{3+} and Eu^{2+}

(2) Gd^{3+} and Eu^{3+}

(3) Pm^{3+} and Sm^{3+}

(4) Ce^{4+} and Yb^{2+}

87. The products A and B obtained in the following reactions, respectively, are

$3ROH + PCl_3 \rightarrow 3RCl + A$

$ROH + PCl_5 \rightarrow RCl + HCl + B$

(1) $POCl_3$ and H_3PO_4

(2) H_3PO_4 and $POCl_3$

(3) H_3PO_3 and $POCl_3$

(4) $POCl_3$ and H_3PO_3

88. Given below are two statements:

Statement I: $[Co(NH_3)_6]^{3+}$ is a homoleptic complex whereas $[Co(NH_3)_4Cl_2]^{+}$ is a heteroleptic complex.

Statement II: Complex $[Co(NH_3)_6]^{3+}$ has only one kind of ligands but $[Co(NH_3)_4Cl_2]^{+}$ more than one kind of ligands.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are false.

(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.

89. Identify the major product C formed in the following reaction sequence :

$CH_3 - CH_2 - CH_2 - I \xrightarrow{NaCN} A \xrightarrow[\text{Partial hydrolysis}]{OH^-} B \xrightarrow[Br_2]{NaOH} \underset{\text{(major)}}{C}$

(1) butylamine
(2) butanamide
(3) α-bromobutanoic acid
(4) propylamine

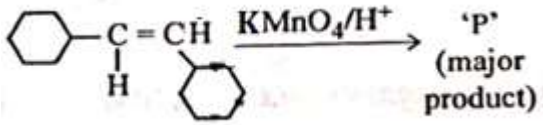
90. The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmosphere to 10 atmosphere is: (Given R = 2.0 cal K^{-1} mol^{-1})

(1) – 413.14 calories
(2) 413.14 calories
(3) 100 calories
(4) 0 calorie

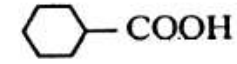
91. Identify the correct answer.

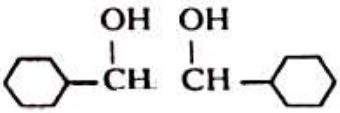
(1) BF_3 has non-zero dipole moment.
(2) Dipole moment of NF_3 is greater than that of NH_3.
(3) Three canonical forms can be drawn for CO_3^{2-} ion.
(4) Three resonance structures can be drawn for ozone.

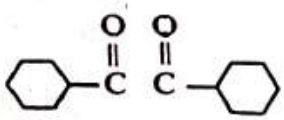
92. For the given reaction:

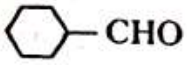


'P' is

(1) 

(2) 

(3) 

(4) 

Ans: (1)

93. During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of Fe^{2+} ion?

(1) concentrated sulphuric acid
(2) dilute nitric acid
(3) dilute sulphuric acid
(4) dilute hydrochloric acid

94. Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from 0 to VI.

A. Al^{3+} **B.** Cu^{2+}
C. Ba^{2+} **D.** Co^{2+}
E. Mg^{2+}

Choose the correct answer from the options given below:

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

95. **Consider the following reaction in a sealed vessel at equilibrium with concentrations of $N_2 = 3.0 \times 10^{-3}$ M, $O_2 = 4.2 \times 10^{-3}$ M and NO = 2.8×10^{-3}M**

$2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$

If 0.1 mol L^{-1} of $NO_{(g)}$ is taken in a closed vessel what will be degree of dissociation (α) of $NO_{(g)}$ at equilibrium?

(1) 0.0889 (2) 0.8889

(3) 0.717 (4) 0.00889

96. **Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:**

(Given: Molar mass of Cu: 63 g mol^{-1} 1F = 96487 C)

(1) 0.315 g (2) 31.5 g

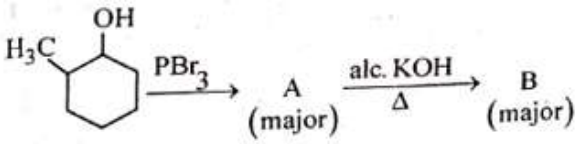
(3) 0.0315 g (4) 3.15 g

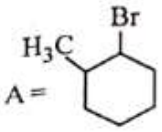
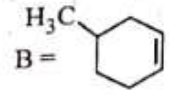
97. **The plot of osmotic pressure (Π) vs concentration (mol L^{-1}) for a solution gives a straight line with slope 25.73 L bar mol^{-1}. The temperature at which the osmotic pressure measurement is done is: (Use R = 0.083 L bar mol^{-1} K^{-1})**

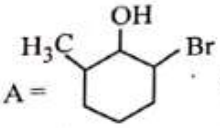
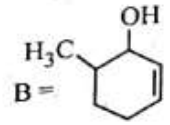
(1) 310°C (2) 25.73°C

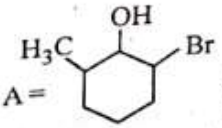
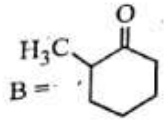
(3) 12.05°C (4) 37°C

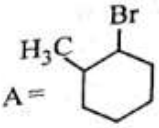
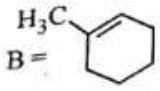
98. **Major products A and B formed in the following reaction sequence, are**



(1) A =  ; B = 

(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

Ans: (4)

99. **The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation.**

Given R = 8.314 JK^{-1} mol^{-1}, log 4 = 0.6021

(1) 380.4 kJ/mol (2) 3.80 kJ/mol

(3) 3804 kJ/mol (4) 38.04 kJ/mol

100. **A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is:**

(Given atomic masses of A = 64; B = 40; C = 32 u)

(1) ABC_3 (2) AB_2C_2

(3) ABC_4 (4) A_2BC_2