

Chemistry

51. Which of the following is not a reaction intermediate?

- (a) Carbenes
- (b) Nitrenes
- (c) Electrophiles
- (d) Hydrophiles

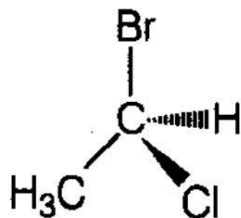
Correct: d

52. Which of the following cations has the strongest tendency towards complex formation?

- (a) Sm^{3+}
- (b) Lu^{3+}
- (c) Gd^{3+}
- (d) Yb^{3+}

Correct: b

53. The configuration of the compound



- (a) R
- (b) S
- (c) Z
- (d) E

Correct: a

54. Which of the following metal ions is expected to be coloured?

- (a) Zn^{2+}
- (b) Ti^{3+}
- (c) Sc^{3+}
- (d) Ti^{4+}

Correct: b

55. The best reducing agent among the following is

- (a) NH_3
- (b) SbH_3
- (c) PH_3
- (d) AsH_3

Correct: b

56. The EAN value of $[\text{Ti}(\sigma - \text{C}_6\text{H}_5)_2(\pi - \text{C}_5\text{H}_5)_2]^0$ is

- (a) 32
- (b) 33
- (c) 34
- (d) 35

Correct: c

57. The major product of nitration of benzoic acid is

- (a) 3-nitrobenzoic acid
- (b) 4-nitrobenzoic acid
- (c) 2-nitrobenzoic acid
- (d) 2, 4-dinitrobenzoic acid

Correct: a

58. Which of the following complexes is optically active?

- (a) $[\text{Co}(\text{NH}_3)_5\text{Cl}]^+$
- (b) $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{3-}$
- (c) *cis* – $[\text{Co}(\text{en})_2\text{Cl}_2]$
- (d) *trans* – $[\text{Co}(\text{en})_2\text{Cl}_2]$

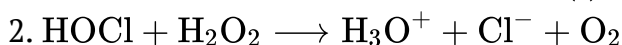
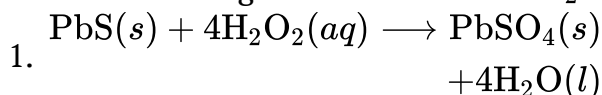
Correct: c

59. Which of the following will exhibit highest boiling point?

- (a) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
- (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- (c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{OH}$
- (d) $\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{OH}$

Correct: b

60. The following reactions show the H_2O_2 behaviour in I and II reactions as:



- (a) Oxidising in acidic medium and reducing in basic medium
- (b) Reducing in acidic medium and oxidising in basic medium
- (c) Oxidising in acidic medium and reducing in acidic medium
- (d) Reducing in acidic medium and oxidising in acidic medium

Correct: c

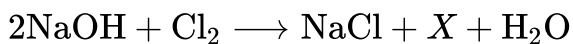
61. The correct arrangement of following in their decreasing order of basic strength is

- (a) $\text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2$
- (b) $\text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_6\text{H}_5\text{NH}_2 > \text{NH}_3$
- (c) $(\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2$
- (d) $\text{C}_6\text{H}_5\text{NH}_2 > \text{NH}_3 > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH}$

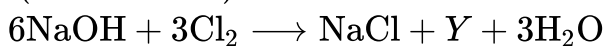
Correct: c

62. Products (X and Y) of the following reactions

(I and II) are :



1. (Cold and di.)



2. (Hot and conc.)

(a) $X = \text{NaClO}_3$ and $Y = \text{NaOCl}$

(b) $X = \text{NaClO}$ and $Y = \text{NaOCl}_3$

(c) $X = \text{NaHClO}_3$ and $Y = \text{NaOCl}$

(d) $X = \text{NaClO}_3$ and $Y = \text{NaHClO}_3$

Correct: b

63. The polymer used as a substitute for wool in making commercial fibres is

(a) glyptal

(b) novolac

(c) neoprene

(d) polyacrylonitrile

Correct: d

64. An example of non-stoichiometric hydride is

(a) sodium hydride

(b) beryllium hydride

(c) lanthanum hydride

(d) diborane

Correct: c

65. Which one of the following is not the use of SO_2 ?

(a) Preservative

(b) Anti-chlor

(c) Disinfectant

(d) Insecticide

Correct: d

66. Which of the following will not give iodoform test?

(a) Isopropyl alcohol

(b) Ethanol

(c) Ethanal

(d) Benzyl alcohol

Correct: d

67. Structure anions of acids HNO_3 , H_3PO_4 and H_2SO_4 are, respectively

(a) tetrahedral, tetrahedral and trigonal bipyramidal

(b) angular, tetrahedral and trigonal bipyramidal

- (c) tetrahedral, tetrahedral and angular
(d) planar, tetrahedral and tetrahedral

Correct: d

68. Which of the following will not give iodoform test?

- (a) Isopropyl alcohol
(b) Ethanol
(c) Ethanal
(d) Benzyl alcohol

Correct: d

69. Aspartame is an

- (a) alkaloid
(b) insecticide
(c) artificial sweetener
(d) antiseptic

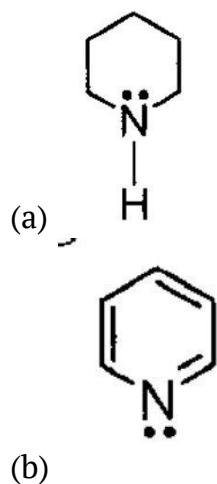
Correct: c

70. Sodium hydroxide is manufactured by

- (a) Solvay process
(b) Haber's process
(c) Castner-Kellner process
(d) Evaporating process

Correct: c

71. The strongest base in the following is





(c)



(d)

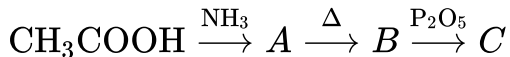
Correct: a

72. The oxidation number of Pt in $[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3\text{F}]$ ion is

- (a) + 1
- (b) + 2
- (c) + 3
- (d) + 4

Correct: b

73. Name the end product in the following series of reactions



- (a) Methane
- (b) Methanol
- (c) Acetonitrile
- (d) Acetamide

Correct: c

74. Which one acts as refrigerant?

- (a) CF_2Cl_2
- (b) CF_4
- (c) CFCl_3
- (d) CF_3Cl

Correct: a

75. The correct sequence of bond order is

- (a) $\text{O}_2^+ > \text{O}_2^- > \text{O}_2$
- (b) $\text{O}_2 > \text{O}_2^- > \text{O}_2^+$
- (c) $\text{O}_2^+ > \text{O}_2 > \text{O}_2^-$
- (d) $\text{O}_2^- > \text{O}_2^+ > \text{O}_2$

Correct: c

76. The reactant 'P' in the following reaction is

- (a) $\text{CH}_3\text{CHOHCH}_3$
- (b) CH_3COCH_3
- (c) $\text{CH}_3\text{CH}_2\text{OH}$
- (d) CH_3COOH

Correct: a

77. A β - hydroxy carbonyl compound is obtained by the action of NaOH on

- (a) $R_3\text{CCHO}$
- (b) $\text{C}_6\text{H}_5\text{CHO}$
- (c) CH_3CHO
- (d) HCHO

Correct: c

78. Correct formula for Wilkinson's catalyst is

- (a) $[(\text{Ph}_3\text{P})_3\text{RhCl}]$
- (b) $[(\text{Ph}_3\text{P})_2\text{RhCl}_2]$
- (c) $[(\text{Ph}_3\text{P})_3\text{RuCl}_3]$
- (d) $[(\text{Ph}_3\text{P})_2\text{RuCl}_2]$

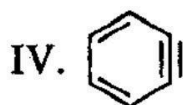
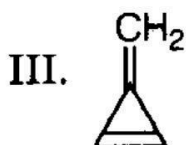
Correct: a

79. Which of the following is used for the estimation of halogens in organic compounds?

- (a) Carius method
- (b) Duma's method
- (c) Kjeldahl's method
- (d) Newman method

Correct: a

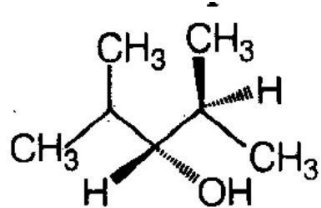
80. Which of the following structures contain sp -hybridised carbon atom(s)?



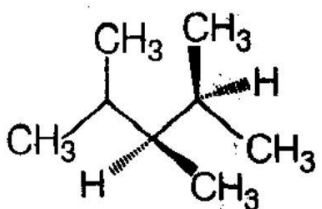
- (a) I, II and III
- (b) I, III and IV
- (c) II, III and IV
- (d) I, II and IV

Correct: d

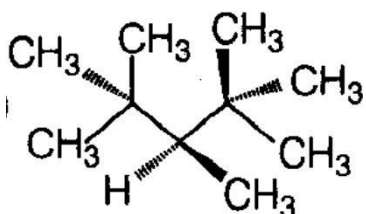
81. Which of the following structures represents a chiral compound?



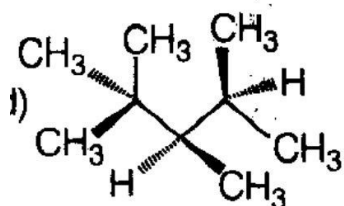
(a)



(b)



(c)



(d)

Correct: d

82. Which of the following oxides of nitrogen is blue in nature?

(a) NO

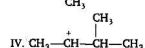
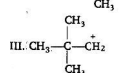
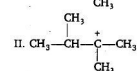
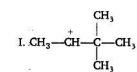
(b) N₂O₃

(c) N₂O₅

(d) NO₂

Correct: b

83. Which of the following carbocations is most stable?



(a) I

(b) II

- (c) III
- (d) IV

Correct: b

84. On heating an aldehyde with Fehling's reagent, a reddish brown precipitate is obtained due to the formation of

- (a) $RCOO^-$
- (b) CuO
- (c) Cu_2O
- (d) RCH_2OH

Correct: c

85. What is the number of nitrogen-nitrogen bonds in N_2O_5 ?

- (a) 1
- (b) 0
- (c) 1.5
- (d) None of these

Correct: b

86. What will be the pH of solution formed by mixing 10 mL 0.1 M NaH_2PO_4 and 15 mL 0.1 M Na_2HPO_4 .

[Given: $pK_1 = 2.12$, $pK_2 = 7.2$]

- (a) 7.0
- (b) 6.9
- (c) 7.4
- (d) 7.5

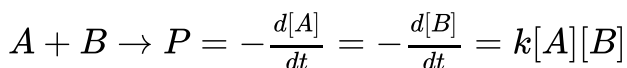
Correct: c

87. Which of the following has the highest coagulating power for As_2S_3 colloid?

- (a) PO_4^{3-}
- (b) SO_4^{2-}
- (c) Al^{3+}
- (d) Na^+

Correct: c

88. For the reaction



$kt = \frac{1}{[A]_0 - [B]_0} \ln \frac{[A][B]_0}{[B][A]_0}$ when, $[A]_0 \neq [B]_0$ and when, $[A]_0 = [B]_0$. If, $[A]_0 = [B]_0$ then the integrated rate law will be

- (a) $kt = \ln \frac{[A]}{[B]}$
 (b) $\frac{1}{[B]} = \frac{1}{[A]_0} + kt$
 (c) $\frac{1}{[A]} = \frac{1}{[B]_0} + kt$
 (d) $\frac{1}{[A]} = \frac{1}{[A]_0} + kt$ or $\frac{1}{[B]} = \frac{1}{[B]_0} + kt$

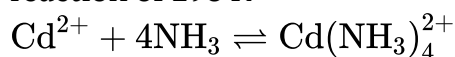
Correct: d

89. For a buffer of a mixture of 0.12molL^{-1} CH_3COOH and 0.12molL^{-1} CH_3COONa the buffer capacity is

- (a) 1.38
 (b) 0.130
 (c) 0.06
 (d) 0.60

Correct: d

90. The standard emf of the cell (E_{cell}°) and equilibrium constant (K_{eq}) of the following reaction of 298 K



- (a) $E_{\text{cell}}^\circ = 1.0\text{V}, K_{\text{eq}} = 1.26 \times 10^7$
 (b) $E_{\text{cell}}^\circ = 0.21\text{V}, K_{\text{eq}} = 1.26 \times 10^7$
 (c) $E_{\text{cell}}^\circ = 1.0\text{V}, K_{\text{eq}} = 6.60 \times 10^{33}$
 (d) $E_{\text{cell}}^\circ = 0.21\text{V}, K_{\text{eq}} = 6.60 \times 10^{33}$

Correct: b

91. 0.002 M solution of a weak acid has an equivalent conductance (Λ) $60 \text{ ohm}^{-1}\text{cm}^2 \text{eq}^{-1}$. What will be the pH?

(Given $\Lambda^\circ = 400 \text{ ohm}^{-1}\text{cm}^2 \text{eq}^{-1}$)

- (a) 3.52
 (b) 2.52
 (c) 1.87
 (d) 2.7

Correct: a

92. Benzene freezes at 5.6°C . Its value for K_f is 5.1. The value of f is ΔH_{fus}

- (a) 30.24 cal
 (b) 2358.72 cal
 (c) 1179.36 cal
 (d) 15.12 cal

Correct: b

93. The rate constant, the activation energy and the Arrhenius parameter of a chemical reaction at 25°C are $3.0 \times 10^{-4}\text{s}^{-1}$, 104.4kJmol^{-1} and $6.0 \times 10^{14}\text{s}^{-1}$ respectively. The value of the rate constant at $T \rightarrow \infty$ is

- (a) $2.0 \times 10^{18}\text{s}^{-1}$
- (b) $60 \times 10^{14}\text{s}^{-1}$
- (c) $3.6 \times 10^{30}\text{s}^{-1}$
- (d) Infinity

Correct: b

94. An ideal gas initially at temperature, pressure and volume, 27°C , 1.00bar and 10L respectively is heated at constant volume until pressure is 10.0bar , it then undergoes a reversible isothermal expansion until pressure is 1.00bar what is the total work W during the process?

- (a) $-23.02 \times 10^3\text{J}$
- (b) $-14.0 \times 10^3\text{J}$
- (c) $14.0 \times 10^3\text{J}$
- (d) *Zero*

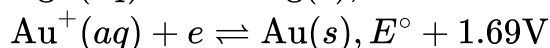
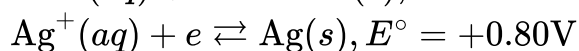
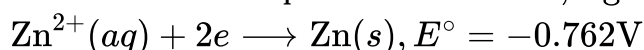
Correct: a

95. A better criterion for ideality of a gas than $\left(\frac{\partial U}{\partial V}\right)_T = 0$ is

- (a) $\left(\frac{\partial H}{\partial p}\right)_T < 0$
- (b) $\left(\frac{\partial H}{\partial p}\right)_T > 0$
- (c) $\left(\frac{\partial H}{\partial p}\right)_T = 0$
- (d) $\left(\frac{\partial H}{\partial p}\right)_T \neq 0$

Correct: c

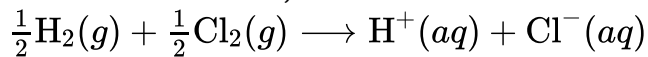
96. The electrode potential, E° for the reduction of MnO_4^- to Mn^{2+} in acidic medium is $+1.51\text{V}$. Which of the following metal(s) will be oxidised? The reduction reactions and standard electrode potentials for Zn^{2+} , Ag^+ and Au^+ are given as



- (a) Zn and Au
- (b) Ag and Au
- (c) Au
- (d) Zn and Ag

Correct: d

97. For the reaction,



$$\Delta G_{\text{reaction}}^{\circ} = -131.23\text{kJmol}^{-1}$$

The value of $\Delta G_{\text{formation}}^{\circ}$ of $\text{Ag}^+(aq)$ shall be given by, (if $\Delta G_f^{\delta}(\text{H}^+aq) = 0$)

- (a) -54.12kJmol^{-1}
- (b) -131.23kJmol^{-1}
- (c) $+77.11\text{kJmol}^{-1}$
- (d) $+5412\text{kJmol}^{-1}$

Correct: b

98. For $\text{NH}_4\text{HS}(s) \rightleftharpoons \text{NH}_3(g) + \text{H}_2\text{S}(g)$, the

observed pressure for the reaction mixture in equilibrium is 1.12 atm at 106°C . What is the value of K_p for the reaction?

- (a) 0.56atm^2
- (b) 0.3136atm^2
- (c) 1.25atm^2
- (d) 1.12atm^2

Correct: b

99. If χ_1 and χ_2 represent the mole fractions of a component A in the vapour phase and liquid mixture respectively, and p_A° and p_B° represent vapour pressures of pure A and pure B, then total vapour pressure of liquid mixture is

- (a) $\frac{p_A^{\circ}\chi_1}{\chi_2}$
- (b) $\frac{p_A^{\circ}\chi_2}{\chi_1}$
- (c) $\frac{p_B^{\circ}\chi_1}{\chi_2}$
- (d) $\frac{p_B^{\circ}\chi_2}{\chi_1}$

Correct: b

100. Number of electrons present in 3.6 mg of NH_4^+ are

- (a) 1.20×10^{21}
- (b) 1.20×10^{20}
- (c) 1.20×10^{22}
- (d) 2×10^{-3}

Correct: a