

Chemistry

51. Aniline is insoluble in water and possesses a vapour pressure of 10.15 mm Hg at 373 K. It can be conveniently purified by

- (a) sublimation
- (b) crystallisation
- (c) steam distillation
- (d) simple distillation

Correct: c

52. Which of the following has the maximum vapour pressure?

- (a) HCl
- (b) HBr
- (c) Hf
- (d) HI

Correct: a

53. IUPAC name of $(\text{CH}_3)_3\text{C} - \text{CH} = \text{CH}_2$ is

- (a) 3, 3, 3-trimethyl-1-propene
- (b) 1, 1, 1-trimethyl-2-propene
- (c) 3, 3-dimethylbut-1-ene
- (d) 2,2-dimethyl-3-butene

Correct: c

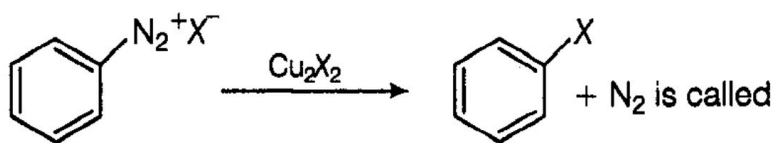
54. Which of the following is most soluble in water?

- (a) CsClO_4
- (b) NaClO_4
- (c) KClO_4

(d) LiClO_4

Correct: d

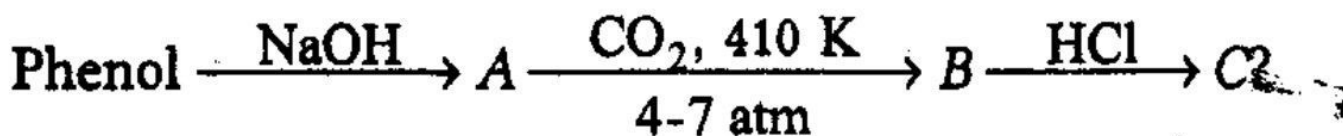
55. The reaction,



- (a) Etard's reaction
- (b) Sandmeyer's reaction
- (c) Wurtz-Fittig reaction
- (d) Perkin's reaction

Correct: b

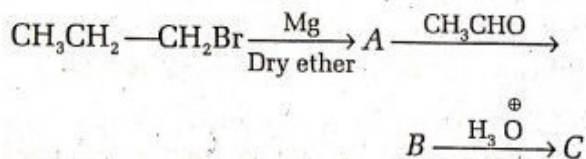
56. What is the compound 'C' in the following sequence of the reaction,



- (a) Benzoic acid
- (b) Salicylic acid
- (c) Benzaldehyde
- (d) Salicylaldehyde

Correct: b

57. In the reaction sequence



the product 'C' is

- (a) 1-propanol
- (b) 2-butanol
- (c) 2-butanol
- (d) 2-pentanol

Correct: d

58. Arrange the following carbanions in order of their decreasing stability

- (i) $\text{H}_3\text{C} - \text{C} \equiv \text{C}^-$
- (ii) $\text{H} - \text{C} \equiv \text{C}^-$
- (iii) $\text{H}_3\text{C} - \text{CH}_2^-$

- (a) $i > ii > iii$
- (b) $ii > i > iii$
- (c) $iii > ii > i$
- (d) $iii > ii > i$

Correct: b

59. The following reaction, $\text{R} - \text{X} + \text{NaI} \rightarrow \text{R} - \text{I} + \text{NaX}$ where, $\text{X} = \text{Cl}, \text{Br}$ is known as

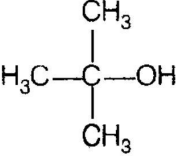
- (a) Swarts reaction
- (b) Finkelstein reaction
- (c) Sandmeyer's reaction
- (d) Wurtz-Fittig reaction

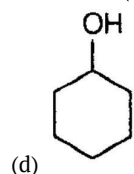
Correct: b

60. The crystal field splitting energy (CFSE) for $[\text{CoCl}_6]^{4-}$ is about 18000cm^{-1} . What would be the CFSE value of $[\text{CoCl}_4]^{2-}$?
- (a) 18000cm^{-1}
 (b) 8000cm^{-1}
 (c) 16000cm^{-1}
 (d) 2000cm^{-1}

Correct: b

61. The fastest dehydration reaction could be expected in

- (a) 
- (b) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$
 (c) $\text{CH}_3 - (\text{CH}_2)_4 - \text{OH}$



Correct: a

62. Amongst the following interhalogen compounds which one is used for the production of UF_6 during ^{235}U enrichment process?
- (a) ClF_3
 (b) ClF_5
 (c) IF_3
 (d) IF_5

Correct: a

63. Which one of the following is known as animal starch?
- (a) Amylose
 (b) Cellulose
 (c) Glycogen
 (d) Amylopectin

Correct: c

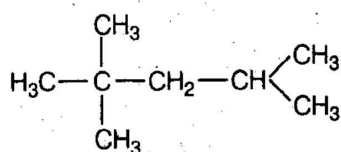
64. Nucleotides are joined together by between 5' and 3' carbon atoms of pentose sugar
- (a) glycosidic linkage
 (b) peptide linkage
 (c) ether linkage
 (d) phosphodiester linkage

Correct: d

65. The drug which was designed to prevent the interaction of histamine with the receptors present in the stomach wall
- (a) cimetidine
 (b) nardil
 (c) iproniazid
 (d) phenelzine

Correct: a

66. What is the IUPAC name for the following compound?



- (a) 1,3 - pentamethyl propane

- (b) 1, 1, 3, 3-tetramethylbutane
- (c) 2, 4, 4-trimethylpentane
- (d) 2, 2, 4-trimethylpentane

Correct: d

67. Which one of the following set of metals deposits an anode mud during the process of electrolytic refining of copper?

- (a) Sn and Ag
- (b) Pb and Zn
- (c) Ag and Au
- (d) Fe and Ni

Correct: c

68. Which of the following has highest hydration energy?

- (a) $MgCl_2$
- (b) $CaCl_2$
- (c) $BaCl_2$
- (d) $SrCl_2$

Correct: a

69. The structure of B_{rF_3} is

- (a) square planar
- (b) distorted tetrahedral
- (c) angular
- (d) T-shaped

Correct: d

70. For complexes $[NiCl_4]^{2-}$ and $Ni(CO)_4$ which one of the following statement is true

- (a) $[NiCl_4]^{2-}$ is diamagnetic while $[Ni(CO)_4]$ is paramagnetic and both the complexes have square planar geometry.
- (b) $[NiCl_4]^{2-}$ is paramagnetic while $[Ni(CO)_4]$ is diamagnetic and both the complexes have tetrahedral geometry.
- (c) $[NiCl_4]^{2-}$ is paramagnetic while $[Ni(CO)_4]$ is diamagnetic and both the complexes have square planar geometry.
- (d) $[NiCl_4]^{2-}$ is diamagnetic while $[Ni(CO)_4]$ is paramagnetic and both the complexes have tetrahedral geometry

Correct: b

71. Ziegler catalyst to manufacture polyethylene is made by the reaction

- (a) $TiCl_4$ with $Al(CH_3)_3$
- (b) $TiCl_4$ with CH_3Cl
- (c) $TiCl_4$ with $(C_6H_5)_3CCl$
- (d) $TiCl_4$ with $ZnCl_2$

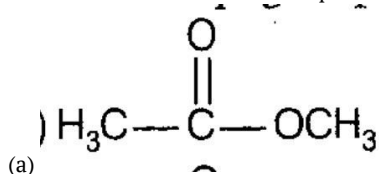
Correct: a

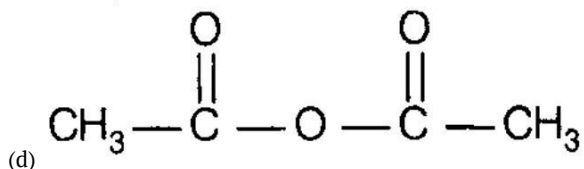
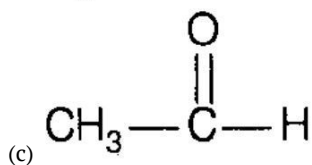
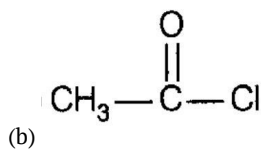
72. Primary valency of Co in $[Co(en)_2Cl_2]Cl$ is

- (a) + 1
- (b) + 2
- (c) + 3
- (d) + 6

Correct: c

73. The most reactive to nucleophilic attack at the carbonyl group is





Correct: b

74. By the action of conc. H_2SO_4 , phosphorus changes to

- (a) phosphorus acid
- (b) orthophosphoric acid
- (c) metaphosphoric acid
- (d) pyrophosphoric acid

Correct: b

75. Tear gas is

- (a) CCl_3NO_2
- (b) COCl_2
- (c) $\text{ClC}_2\text{H}_4-\text{S}-\text{C}_2\text{H}_4\text{Cl}$
- (d) $\text{C}_6\text{H}_5-\text{S}-\text{Br}$

Correct: a

76. Which of the following statements is wrong about the oxides of nitrogen? (a) N_2O_5 is an anhydride of HNO_3

- (b) NO is in acidic oxide
- (c) N_2O_3 is an anhydride of HNO_2
- (d) NO is not an anhydride of an acid

Correct: c

77. Inert pair effect is concerned with

- (a) pair of s-electrons
- (b) pair of p-electrons
- (c) pair of d-electrons
- (d) pair of f-electrons

Correct: a

78. Copper is extracted from sulphide ore using the method

- (a) auto-reduction
- (b) carbon reduction
- (c) CO reduction
- (d) biochemical reduction

Correct: a

79. The photochemical smog is

- (a) formed due to oxidation of hydrocarbons trapped in flowing air in the presence of sunlight
- (b) formed due to oxidation of smoke trapped in stagnant air mass in the presence of sunlight
- (c) formed due to heterogeneous combination of smoke and fog in air in the presence of sunlight
- (d) formed due to oxidation of hydrocarbons trapped in stagnant air mass in the presence of sunlight.

Correct: d

80. A compound $C_5H_{10}O$ (A) forms a phenyl hydrazone and gives negative Tollen's test and a positive Iodoform reaction. It also gives n-pentane on reduction. The compound (A) is

- (a) pentanal
- (b) 2-pentanone
- (c) 3-pentanone
- (d) allyl alcohol

Correct: b

81. Which of the following chelating ligands can be used to remove the excess of copper in the biosystems?

- (a) D-penicillamine
- (b) Desferrioxamine B
- (c) EDTA
- (d) Dimercaprol

Correct: a

82. Which of the following is an example of thermosetting polymers?

- (a) Bakelite
- (b) PVC
- (c) Nylon 6, 6
- (d) Buna-S

Correct: a

83. Arrange H_2O , H_2S and H_2Se in order of increasing acidity.

- (a) H_2O
- (a) $T_1 < T_2 < T_3$
- (b) $T_3 < T_2 < T_1$
- (c) $T_2 < T_3 < T_1$
- (d) $T_1 < T_3 < T_2$

Correct: a

86. The root means square velocity of hydrogen at STP is $1.83 \times 10^5 \text{ cm sec}^{-1}$ and its mean free path is $1.78 \times 10^{-5} \text{ cm}$. What will be the collision number at STP?

- (a) $9.476 \times 10^9 \text{ sec}^{-1}$
- (b) $9.746 \times 10^{-9} \text{ sec}^{-1}$
- (c) $9.746 \times 10^9 \text{ sec}^{-1}$
- (d) $9.647 \times 10^9 \text{ sec}^{-1}$

Correct: a

87. Which of the following gases has high Boyle's temperature?

- (a) Ar
- (b) CO_2
- (c) O_2
- (d) He

Correct: b

88. The difference between \bar{C}_p and \bar{C}_v is [\bar{C}_p and \bar{C}_v signify molar quantities]

- (a) larger in case of gases in comparison to solids and liquids
- (b) larger in case of liquids in comparison to gases and solids
- (c) larger in case of solids in comparison to gases liquids
- (d) equal in solids, liquids and gases

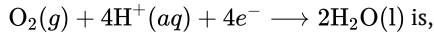
Correct: a

89. The rate of chemisorption of a gas

- (a) decreases with increasing pressure
- (b) increases with increasing pressure
- (c) is independent of pressure
- (d) is independent of temperature

Correct: b

90. The reaction quotient (Q) for the reduction of O_2 to H_2O in acid solution,



[where, α_{H^+} = activity of H^+ , p_{O_2} = pressure of O_2 , when it is present in the reaction, p^0 = pressure of O_2 at standard state)].

- (a) $Q = \frac{p^0}{\alpha_{H^+}^4 + p_{O_2}}$
(b) $Q = \frac{p_{O_2}}{\alpha_{H^+}^4 + p^0}$
(c) $Q = \frac{\alpha_{H^+}^4 + p_{O_2}}{p^0}$
(d) $Q = \frac{\alpha_{H^+}^4 + p^0}{p_{O_2}}$

Correct: a

91. Water + CH_3OH mixture shows positive deviation from ideal solution behaviour. 100mL of water is mixed with 100mL of CH_3OH . Then, total volume of the mixture will be

- (a) 200 mL
(b) less than 200 ml because of additional H-bonding between H_2O and CH_3OH
(c) more than 200 ml because H-bonding within H_2O molecules vanishes.
(d) more than 200 mL because H-bond between H_2O and CH_3OH is weaker than that between H_2O and H_2O

Correct: d

92. 0.02 molar solution of NaCl having degree of dissociation of 90% at $27^\circ C$ has osmotic pressure equal to

- (a) 0.94 bar
(b) 9.4 bar
(c) 0.094 bar
(d) 9.4×10^{-4} bar

Correct: a

93. The first order gaseous decomposition of N_2O_4 into NO_2 has a k value of $4.5 \times 10^3 s^{-1}$ at $1^\circ C$ and an energy of activation of 58 kJ $mole^{-1}$. At what temperature would be $1.00 \times 10^4 s^{-1}$??

- (a) 274 K
(b) 283 K
(c) 273 K
(d) 293 K

Correct: c

94. For the reaction, $S_{(rhombic)} + O_2 \rightarrow SO_2$, $\Delta H = -298 kJmol^{-1}$ at $25^\circ C$ and 1atm. Therefore, E for the reaction should be

- (a) $-298 kJmol^{-1}$
(b) $-298 + 8.314 \times 298 kJmol^{-1}$
(c) $-298 - 8.314 \times 298 kJmol^{-1}$
(d) $-298 - 2 \times 8.314 \times 298 kJmol^{-1}$

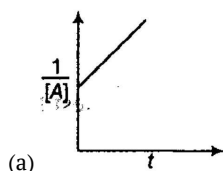
Correct: a

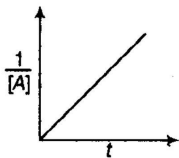
95. The ratio of the half-life time ($t_{1/2}$) to the three quarter life-time, ($t_{3/4}$), for a reaction that is second order

- (a) depends directly on concentration of reactants
(b) is independent of concentration of reactant
(c) depends inversely on the concentration of reactants
(d) depends directly to the square of concentration of reactants

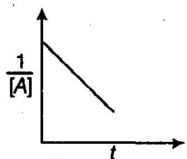
Correct: b

96. For a second order reaction, (2A Product), $\frac{1}{[A]}$ vs t is represented as

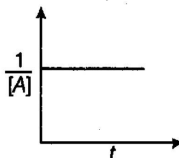




(b)



(c)



(d)

Correct: a

97. The solubility of pure oxygen in water at 20°C and 1.0 atmosphere pressure is 138×10^{-3} mol/litre. What will be the concentration of oxygen at 20°C and partial pressure of 0.21 atmosphere?

- (a) 2.9×10^{-4} mol/litre
- (b) 5.8×10^{-4} mol/litre
- (c) 7.6×10^{-4} mol/litre
- (d) 11.6×10^{-4} mol/litre

Correct: a

98. Calculation the maximum work done in expanding 16 g of oxygen at 300K and occupying a volume of 5dm^3 isothermally until volume becomes 25dm^3

- (a) $-2.01 \times 10^3\text{J}$
- (b) $+2.01 \times 10^3\text{J}$
- (c) 1.20×10^{22}
- (d) 2×10^{-3}

Correct: a

99. The K_{sp} of PbCO_3 and PbCO_3 , are 1.5×10^{-15} and 1×10^{-15} respectively at 298 K. The concentration of Pb^{2+} ions in a saturated reactants solution containing MgCO_3 and PbCO_3 is

- (a) $1.5 \times 10^{-8}\text{M}$
- (b) $3 \times 10^{-8}\text{M}$
- (c) $2 \times 10^{-8}\text{M}$
- (d) $2.5 \times 10^{-8}\text{M}$

Correct: b

100. In a suspension the diameter of the dispersed particles is of the order

- (a) 10 \AA
- (b) 100 \AA
- (c) 1000 \AA
- (d) 2000 \AA

Correct: d