PART C – CHEMISTRY

61. Which of the following compounds can be detected by Molisch's test ?
(1) Primary alcohols (2) Nitro compounds
(3) Sugars (4) Amines
Ans (3)

62. The increasing order of the ionic radii of the given isoelectronic species is :-
(1) K^+, S^{2-}, Ca^{2+}, Cl^-
(2) Cl^-, Ca^{2+}, K^+, S^{2-}
(3) S^{2-}, Cl^-, Ca^{2+}, K^+
(4) Ca^{2+}, K^+, Cl^-, S^{2-}
Ans (4)

63. Which one of the following statements is correct ?
(1) All amino acids except glutamic acid are optically active
(2) All amino acids except lysine are optically active
(3) All amino acids are optically active
(4) All amino acids except glycine are optically active
Ans (4)

64. 2–Hexyne gives trans –2–Hexene on treatment with :-
(1) Li AlH_4 (2) Pt/H_2
(3) Li/NH_3 (4) $Pd/BaSO_4$
Ans (3)

65. The species which can best serve as an initiator for the cationic polymerization is :-
(1) BuLi (2) $LiAlH_4$ (3) HNO_3 (4) $AlCl_3$
Ans (4)

66. The standard reduction potentials for Zn^{2+} / Zn, Ni^{2+} / Ni and Fe^{2+} / Fe are – 0.76, – 0.23 and – 0.44 V respectively. The reaction $X + Y^{+2} \rightarrow X^{2+} + Y$ will be spontaneous when
(1) X = Zn, Y = Ni
(2) X = Ni, Y = Fe
(3) X = Ni, Y = Zn
(4) X = Fe, Y = Zn
Ans (1)

67. Lithium forms body centred cubic structure. The length of the side of its unit cell is 351 pm. Atomic radius of the lithium will be :-
(1) 152 pm (2) 75 pm
(3) 300 pm (4) 240 pm
Ans (1)

68. The electrons identified by quantum numbers n and ℓ :-
(a) n = 4 , ℓ = 1 (b) n = 4, ℓ = 0
(c) n = 3, ℓ = 2 (d) n = 3, ℓ = 1
Can be placed in order of increasing energy as
(1) (a) < (c) < (b) < (d)
(2) (c) < (d) < (b) < (a)
(3) (d) < (b) < (c) < (a)
(4) (b) < (d) < (a) < (c)
Ans (3)

69. According to Freundlich adsorption isotherm, which of the following is correct ?
(1) $\frac{x}{m} \propto p^0$ (2) $\frac{x}{m} \propto p^1$
(3) $\frac{x}{m} \propto p^{1/n}$
(4) All the above are correct for different ranges of pressure
Ans (4)

70. The density of a solution prepared by dissolving 120 g of urea (mol. mass = 60 u) in 1000 g of water is 1.15 g/mL. The molarity of this solution is :-
(1) 2.05 M (2) 0.50 M
(3) 1.78 M (4) 1.02 M
Ans (1)

71. The pH of a 0.1 molar solution of the acid HQ is 3. The value of the ionization constant, Ka of this acid is :-
(1) 1×10^{-7} (2) 3×10^{-7}
(3) 1×10^{-3} (4) 1×10^{-5}
Ans (4)

72. The incorrect expression among the following is :-
(1) $K = e^{-\Delta G°/RT}$
(2) $\frac{\Delta G_{system}}{\Delta S_{total}} = -T$
(3) In isothermal process,
$W_{reversible} = -nRT \ln \frac{V_f}{V_i}$
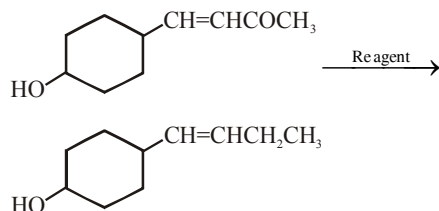(4) $\ln K = \frac{\Delta H° - T\Delta S°}{RT}$
Ans (4)

73. Iodoform can be prepared from all except :-
(1) Isobutyl alcohol
(2) Ethyl methyl ketone
(3) Isopropyl alcohol
(4) 3-Methyl–2–butanone

Ans (1)

74. In the given transformation, which of the following is the most appropriate reagent ?

(1) $NaBH_4$ (2) $NH_2\,NH_2, \overset{\ominus}{O}H$
(3) Zn – Hg / HCl   (4) Na, Liq.NH_3

Ans (2)

75. Very pure hydrogen (99.9%) can be made by which of the following processes ?
(1) Reaction of salt like hydrides with water
(2) Reaction of methane with steam
(3) Mixing natural hydrocarbons of high molecular weight
(4) Electrolysis of water

Ans (4)

76. Which among the following will be named as dibromidobis (ethylene diamine) chromium (III) bromide ?
(1) $[Cr(en)Br_2]Br$
(2) $[Cr(en)_3]Br_3$
(3) $[Cr(en)_2Br_2]Br$
(4) $[Cr(en)Br_4]^-$

Ans (3)

77. Ortho-Nitrophenol is less soluble in water than p– and m– Nitrophenols because :-
(1) Melting point of o–Nitrophenol is lower than those of m– and p– isomers
(2) o–Nitrophenol is more volatile in steam than those of m– and p– isomers
(3) o–Nitrophenol shows Intramolecular H–bonding
(4) o–Nitrophenol shows Intermolecular H–bonding

Ans (3)

78. How many chiral compounds are possible on monochlorination of 2–methyl butane ?
(1) 6   (2) 8
(3) 2   (4) 4

Ans (4)

79. Iron exhibits +2 and +3 oxidation states. Which of the following statements about iron is **incorrect** ?
(1) Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds.
(2) Ferrous oxide is more basic in nature than the ferric oxide.
(3) Ferrous compounds are relatively more ionic than the corresponding ferric compounds.
(4) Ferrous compounds are less volatile than the corresponding ferric compounds.

Ans (1)

80. What is DDT among the following :
(1) Non-biodegradable pollutant
(2) Greenhouse gas
(3) A fertilizer
(4) Biodegradable pollutant

Ans (1)

81. K_f for water is 1.86 K kg mol^{-1}. If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol ($C_2H_6O_2$) must you add to get the freezing point of the solution lowered to $-2.8°C$?
(1) 27 g   (2) 72 g
(3) 93 g   (4) 39 g

Ans (3)

82. Which method of purification is represented by the following equation :

$Ti(s) + 2I_2(g) \xrightarrow{523K} TiI_4(g) \xrightarrow{1700K} Ti(s) + 2I_2(g)$
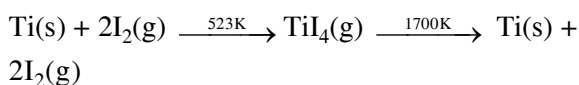
(1) Van Arkel
(2) Zone refining
(3) Cupellation
(4) Poling

Ans (1)

83. Which branched chain isomer of the hydrocarbon with molecular mass 72 u gives only one isomer of mono substituted alkyl halide ?
(1) Neohexane
(2) Tertiary butyl chloride
(3) Neopentane
(4) Isohexane

Ans (3)

84. The equilibrium constant (K_C) for the reaction $N_2(g) + O_2(g) \longrightarrow 2NO(g)$ at temperature T is 4×10^{-4}. The value of K_C for the reaction. $NO(g) \longrightarrow \frac{1}{2}N_2(g) + \frac{1}{2}O_2(g)$ at the same temperature is :-

(1) 50.0   (2) 0.02

(3) 2.5×10^2 (4) 4×10^{-4}

Ans **(1)**

85. For a first order reaction, (A) $\rightarrow$ products, the concentration of A changes from 0.1 M to 0.025 M in 40 minutes. The rate of reaction when the concentration of A is 0.01 M is :-

(1) 1.73×10^{-4} M/min

(2) 1.73×10^{-5} M/min

(3) 3.47×10^{-4} M/min

(4) 3.47×10^{-5} M/min

Ans **(3)**

86. Aspirin is known as :-

(1) Methyl salicylic acid

(2) Acetyl salicylic acid

(3) Phenyl salicylate

(4) Acetyl salicylate

Ans **(2)**

87. The molecule having smallest bond angle is :-

(1) PCl_3 (2) NCl_3

(3) $AsCl_3$ (4) $SbCl_3$

Ans **(4)**

88. The compressibility factor for a real gas at high pressure is :-

(1) $1 - \dfrac{pb}{RT}$ (2) $1 + \dfrac{RT}{pb}$

(3) 1 (4) $1 + \dfrac{pb}{RT}$

Ans **(4)**

89. Which of the following on thermal-decomposition yields a basic as well as an acidic oxide ?

(1) NH_4NO_3 (2) $NaNO_3$

(3) $KClO_3$ (4) $CaCO_3$

Ans **(4)**

90. In which of the following pairs the two species are not isostructural ?

(1) AlF_6^{3-} and SF_6

(2) CO_3^{2-} and NO_3^-

(3) PCl_4^+ and $SiCl_4$

(4) PF_5 and BrF_5

Ans **(4)**