CHEMISTRY

46. Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false?

(1) The H – C – H bond angle in CH_4, the H – N – H bond angle in NH_3, and the H – O – H bond angle in H_2O are all greater than 90°.

(2) The H – O – H bond angle in H_2O is larger than the H – C – H bond angle in CH_4.

(3) The H – O – H bond angle in H_2O is smaller than the H – N – H bond angle in NH_3.

(4) The H – C – H bond angle in CH_4 is larger than the H – N – H bond angle in NH_3.

Solution: (2)

Bond Angle	Molecule
104.5°	H_2O
107°	NH_3
109°28′	CH_4

All the molecules are sp^3 hybridized and Bond angle of H_2O is smaller than NH_3.

47. In the reaction

$$H-C\equiv CH \xrightarrow[(2)\ CH_3\ CH_2\ Br]{(1)\ NaNH_2\ /liq.\ NH_3} X \xrightarrow[(2)\ CH_3\ CH_2Br]{(1)\ NaNH_2\ /liq.\ NH_3} Y$$

X and Y are:

(1) X = 1 – Butyne ; Y = 3 – Hexyne

(2) X = 2 – Butyne ; Y = 3 – Hexyne

(3) X = 2 – Butyne ; Y = 2 – Hexyne

(4) X = 1 – Butyne ; Y = 2 – Hexyne

Solution: (1)

$$H-C\equiv C-H \xrightarrow{NaNH_2/liq.NH_3} H-C\equiv \overline{C}:Na^+$$

$$\downarrow CH_3CH_2Br$$

$$Na^+:C\equiv \overline{C}-CH_2CH_3 \xleftarrow{NaNH_2/liq.NH_3} H-C\equiv C-CH_2CH_3$$

1-Butyne (x)

$$\downarrow CH_3CH_2Br$$

$$CH_3CH_2-C\equiv C-CH_2-CH_3$$

3-Hexyne (y)

48. Among the following, the correct order of acidity is:
(1) $HClO_3 < HClO_4 < HClO_2 < HClO$
(2) $HClO < HClO_2 < HClO_3 < HClO_4$
(3) $HClO_2 < HClO < HClO_3 < HClO_4$
(4) $HClO_4 < HClO_2 < HClO < HClO_3$

Solution: (2) Oxidation state of chlorine $\propto$ Acidity of Oxo Acid.

$HClO < HClO_2 < HClO_3 < HClO_4$ is the correct increasing order.

49. The rate of a first-order reaction is $0.04\ mol\ l^{-1}s^{-1}$ at 10 second and $0.03\ mol\ l^{-1}s^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is:
(1) 24.1 s
(2) 34.1 s
(3) 44.1 s
(4) 54.1 s

Solution: (1)

	Rate	Time
	0.04	10
	0.03	20

For first order reaction r $\propto$ conc.

$$\frac{r_1}{r_2} = \frac{C_1}{C_2} = \frac{4}{3}$$

$$\therefore k = \frac{2.303}{t_2 - t_1} \log \frac{C_1}{C_2}$$

$$\Rightarrow \frac{0.693}{t_{1/2}} = \frac{2.303}{20-10} \log \frac{4}{3}$$

On solving $t_{1/2} = 24.1\ s$

50. Which one of the following characteristics is associated with adsorption?
(1) ΔG is negative but ΔH and ΔS are positive
(2) $\Delta G, \Delta H$ and ΔS all are negative
(3) ΔG and ΔH are negative but ΔS is positive
(4) ΔG and ΔS are negative but ΔH is positive

Solution: (2) $\Delta H < 0$ Adsorption process is exothermic

$\Delta G < 0$ Adsorption process is Feasible

$\Delta S < 0$ Adsorption process is accompanied of decrease in entropy.

51. In which of the following options the order of arrangement does not agree with the variation of property indicated against it?

(1) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increasing ionic size)
(2) $B < C < N < O$ (increasing first ionization enthalpy)
(3) $I < Br < Cl < F$ (increasing electron gain enthalpy)
(4) $Li < Na < K < Rb$ (increasing metallic radius)

Solution: (2,3) N is having $ns^2\ np^3$ (Half filled configuration). Hence has high IP than O which is having $ns^2\ np^4$ electronic configuration.

52. Which of the following statements is false?
(1) Mg^{2+} ions form a complex with ATP.
(2) Ca^{2+} ions are important in blood clotting.
(3) Ca^{2+} ions are not important in maintaining the regular beating of the heart.
(4) Mg^{2+} ions are important in the green parts of plants.

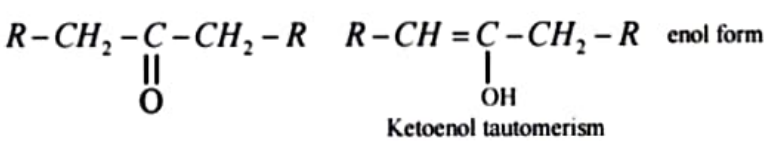
Solution: (3) Monovalent sodium and potassium ions and divalent magnesium and calcium ions are found in large properties in biological fluids. There ions perform important biological functions such as maintenance of heart and nerve impulse.

53. Which of the following statements about hydrogen is incorrect?
(1) Hydrogen has three isotopes of which tritium is the most common.
(2) Hydrogen never acts as cation in ionic salts.
(3) Hydronium ion, H_3O^{+} exists freely in solution.
(4) Dihydrogen does not act as a reducing agent.

Solution: (1,4) Hydrogen is having three isotopes protium, Dentenium and tritium in which tritium is Radioactive and very rare.

54. The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha carbon, is:
(1) A carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.
(2) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.
(3) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation.
(4) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism.

Solution: (4)



Ketoenol tautomerism

55. MY and NY_3, two nearly insoluble salts, have the same K_{sp} values of 6.2×10^{-13} at room temperature. Which statement would be true in regard to MY and NY_3?
(1) The molar solubilities of MY and NY_3 in water are identical.
(2) The molar solubility of MY in water is less than that of NY_3.
(3) The salts MY and NY_3 are more soluble in 0.5 M KY than in pure water.
(4) The addition of the salt of KY to solution of MY and NY_3 will have no effect on their solubilities.

Solution: (2) MY insoluble salt $K_{sp} = s^2$

$MY_{(s)} \rightleftharpoons M^{+}_{(aq)} + Y^{-}_{(aq)}$

NY_3 insoluble salt $K_{sp} = 4s^3$

$NY_{3(s)} \rightleftharpoons N^{+}_{(aq)} + 3Y^{-}_{(aq)}$

$\therefore S_{(MY)} = \sqrt{6.2 \times 10^{-13}} = 7.8 \times 10^{-7}$

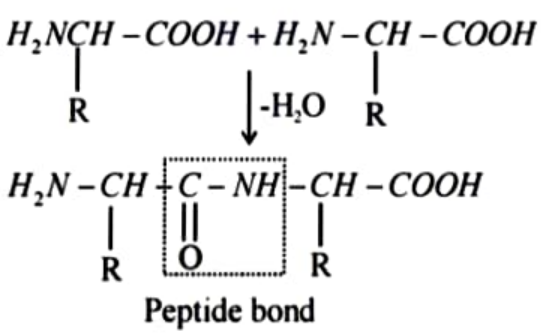
Solubility values

$\therefore S_{(NY_3)} = \left(\frac{6.2 \times 10^{-13}}{4}\right)^{1/3} = 5.2 \times 10^{-5}$

$\therefore S_{(MY)} < S_{(NY_3)}$

56. In a protein molecule various amino acids are linked together by:
(1) α-glycosidic bond
(2) β- glycosidic bond
(3) Peptide bond
(4) Dative bond

Solution: (3)

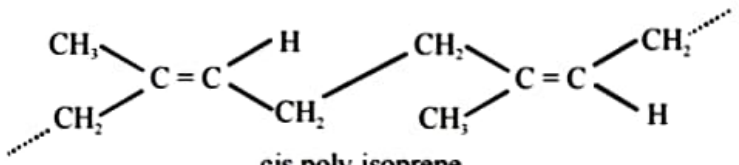


Peptide bond

57. Nutural rubber has:
(1) All cis – configuration
(2) All trans – configuration
(3) Alternate cis – and trans – configuration

(4) Random cis – and trans – configuration

Solution: (1)



cis poly isoprene

58. Match items of column I with the items of column II and assign the correct code:

	Column I		Column II
(a)	Cyanide process	(i)	Ultrapure Ge
(b)	Froth floatation process	(ii)	Dressing of ZnS
(c)	Electrolytic reduction	(iii)	Extraction of Al
(d)	Zone refining	(iv)	Extraction of Au
		(v)	Purification of Ni

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

Solution: (1) a] Cyanide process is used to extract and Au in hydrometallurgy.

b] Froth foundation process is used for dressing of sulfide ores.

c] Electrolytic reduction is used to extract Al.

d] Zone refinining process is used for obtaining ultrapure Ge.

59. Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$ solution?
(1) The solution turns blue.
(2) The solution is decolourized.
(3) SO_2 is reduced.
(4) Green $Cr_2(SO_4)_3$ is formed.

Solution: (4) $K_2Cr_2O_7 + SO_2 + H_2SO_4 \rightarrow K_2SO_4 + \underset{\text{Green}}{Cr_2(SO_4)_3} + H_2O$

60. The electronic configurations of Eu (Atomic no. 63), Gd (Atomic NO. 64) and Tb (Atomic No. 65) are:
(1) $[Xe]4f^7 6s^2$, $[Xe]4f^8 6s^2$ and $[Xe]4f^8 5d^1 6s^2$
(2) $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$
(3) $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^8 5d^1 6s^2$
(4) $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

Solution: (4) $Eu - [Xe]4f^7, 6s^2$

$Gd - [Xe]4f^7, 5d^1, 6s^2$

$T_6 - [Xe]4f^9, 6s^2$

61. Two electrons occupying the same orbital are distinguished by:
(1) Principal quantum number
(2) Magnetic quantum number
(3) Azimuthal quantum number
(4) Spin quantum number

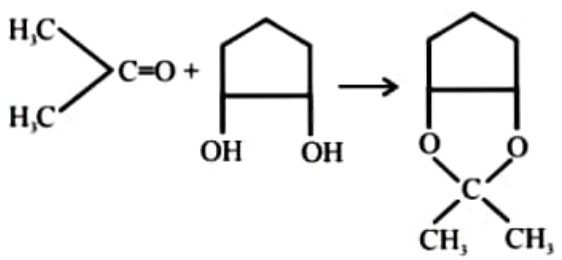
Solution: (4) Electron occupying same orbital have different spin quantum number.

62. When copper is heated with conc. HNO_3 it produces:
(1) $Cu(NO_3)_2$ and NO_2
(2) $Cu(NO_3)_2$ and NO
(3) $Cu(NO_3)_2$, NO and NO_2
(4) $Cu(NO_3)_2$ and N_2O

Solution: (1) $Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2NO_2 + O_2$

63. Which of the following reagents would distinguish cis-cyclopenta-1, 2-diol from the trans-isomer?
(1) Acetone
(2) Ozone
(3) MnO_2
(4) Aluminium isopropoxide

Solution: (1)



Ketal formation

64. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is:
(1) $\Delta H < 0$ and $\Delta S = 0$
(2) $\Delta H > 0$ and $\Delta S < 0$
(3) $\Delta H < 0$ and $\Delta S > 0$
(4) $\Delta H < 0$ and $\Delta S < 0$

Solution: (3) $\Delta G = \Delta H - T\Delta S$

Spontaneous at all temperature $\Delta H < 0, \Delta S > 0$

65. Lithium has a bcc structure. Its density is 530 kg m^{-3} and its atomic mass is 6.94 g mol^{-1}. Calculated the edge length of a unit cell of Lithium metal. ($N_A = 6.02 \times 10^{23}$ mol^{-1})
(1) 154 pm
(2) 352 pm
(3) 527 pm
(4) 264 pm

Solution: (2) $d = \frac{Z\,M}{N_A\,a^3}$

$a^3 = \frac{6.94\times2}{6.022\times10^{23}\times530\times10^{-3}} = \frac{6.94\times200\times10^{-24}}{5.30\times6.022}$

$= 3.52 \times 10^{-8}$ cm

$= 352$ pm

66. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?
(1) $I_2 > Br_2 > Cl_2 > F_2$
(2) $Cl_2 > Br_2 > F_2 > I_2$
(3) $Br_2 > I_2 > F_2 > Cl_2$
(4) $F_2 > Cl_2 > Br_2 > I_2$

Solution: (2) Decreasing order of Bond energy, $Cl_2 > Br_2 > F_2 > I_2$

The reason is anomalous behavior due to large electron – electron repulsion among the lone pairs in F_2 molecule other than Cl_2 and Br_2.

67. Which of the following is an analgesic?
(1) Novalgin
(2) Penicillin
(3) Streptomycin
(4) Chloromycetin

Solution: (1) Novalgin – It is analgesic. Used for treatment of pain.

Pencilin – Antibiotic

Streptomycin – Antibiotic

Chloromycetic – Used for treat infection.

68. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escape in the time required for one-half of the hydrogen to escape?

(1) $\frac{1}{8}$

(2) $\frac{1}{4}$

(3) $\frac{3}{8}$

(4) $\frac{1}{2}$

Solution: (1) $\frac{\frac{n_1}{t_1}}{\frac{n_2}{t_2}} = \sqrt{\frac{M_2}{M_1}} \Rightarrow n_2 = \frac{1}{2}, n_1 = n'$

$\Rightarrow \frac{2t_2 n'}{t_1 x_1} = \sqrt{\frac{M_2}{M_1}} = \sqrt{\frac{2}{32}} = \sqrt{\frac{1}{16}} = \frac{1}{4}$

Assuming $t_2 = t_1$

$\frac{2n't_2}{t_1} = \frac{1}{4}$

$\therefore n' = \frac{1}{8}$

69. Consider the nitration of benzene using mixed conc. H_2SO_4 and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be:

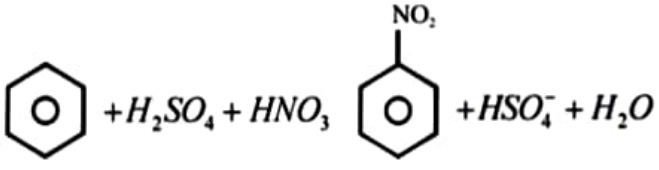
(1) Faster

(2) Slower

(3) Unchanged

(4) Doubled

Solution: (2)



If we add $KHSO_4^-$, conc. HSO_4^- increases, equilibrium shifts backward.

70. Predict the correct order among the following:
(1) Lone pair – lone pair > lone pair – bond pair > bond pair – bond pair
(2) Lone pair – lone pair > bond pair – bond pair > lone pair – bond pair
(3) Bond pair – bond pair > lone pair – bond pair > lone pair – lone pair
(4) Lone pair – bond pair > bond pair – bond pair > lone pair – lone pair

Solution: (1) As per VSEPR theory, overall order of Repulsion is

$$\underset{\text{(Repulsion)}}{\text{BP} - \text{BP}} < \underset{\text{(Repulsion)}}{\text{BP} - \text{LP}} < \underset{\text{(Repulsion)}}{\text{LP} - \text{LP}}$$

71. The product obtained as a result of a reaction of nitrogen with CaC_2 is:
(1) $Ca(CN)_2$
(2) CaCN
(3) $CaCN_3$
(4) Ca_2CN

Solution: (Bonus)

$$\underset{\text{Calcium Carbide}}{CaC_2} + \underset{\text{Nitrogen Gas}}{N_2} \rightarrow \underset{\text{Calcium Cyanamide}}{CaCN_2 + C}$$

$CaCN_2$ is not given in the option so it should be bonus.

72. Consider the following liquid – vapour equilibrium.

$$\text{Liquid} \rightleftharpoons \text{Vapour}$$

Which of the following relations is correct?

(1) $\frac{d \ln G}{dT^2} = \frac{\Delta H_v}{RT^2}$
(2) $\frac{d \ln P}{dT} = \frac{-\Delta H_v}{RT}$
(3) $\frac{d \ln P}{dT^2} = \frac{-\Delta H_v}{T^2}$
(4) $\frac{d \ln P}{dT} = \frac{\Delta H_v}{RT^2}$

Solution: (4) $P = Ke^{-\Delta H/RT}$

$$\ln P = \ln K - \frac{\Delta H}{RT}$$

$$\frac{d}{dT} \ln P = \frac{\Delta H_v}{RT^2}$$

$$\therefore \frac{d \ln P}{dT} = \frac{\Delta H_v}{RT^2}$$

73. Match the compounds given in column I with the hybridization and shape given in column II and mark the correct option.

	Column I		Column II
(a)	XeF_6	(i)	Distorted octahedral
(b)	XeO_3	(ii)	Square planar
(c)	$XeOF_4$	(iii)	Pyramidal
(d)	XeF_4	(iv)	Square pyramidal

(1) (a) (b) (c) (d)
(i) (iii) (iv) (ii)

(2) (a) (b) (c) (d)
(i) (ii) (iv) (iii)

(3) (a) (b) (c) (d)
(iv) (iii) (i) (ii)

(4) (a) (b) (c) (d)
(iv) (i) (ii) (iii)

Solution: (1)

	Molecule	Hybridization	Shape as per VSEPR Theory
1	XeF_6	sp^3d^3	Distored octahedron
2	XeO_3	sp^3	Pyramidal
3	$XeOF_4$	sp^3d^2	Square Pyramidal
4	XeF_4	sp^3d^2	Square planar

74. Which of the following has longest C – O bond length? (Free C – O bond length in CO is 1.128 Å).
(1) $Ni(CO)_4$
(2) $[Co(CO)_4]^{\ominus}$
(3) $[Fe(CO)_4]^{2-}$
(4) $[Mn(CO)_6]^{+}$

Solution: (3) Metal carbon bond in metal carbonyls possess both σ and π character. M – C π bond is formed by donation of a pair of electrons from filled orbital of metal into vacant antibonding π orbital of CO. CO bond length increases if M has more tendency to donate lone pair by metal more CO bond length.

75. The pressure of H_2 required to make the potential of H_2 – electrode zero in pure water at 298 k is:
(1) 10^{-14} atm
(2) 10^{-12} atm
(3) 10^{-10} atm
(4) 10^{-4} atm

Solution: (1) $Pt, \frac{H_{2(g)}}{H^+}$ Hydrogen electrode $E^o_{H_2/H^+} = 0.0$ Volt

$H_{2(g)} \rightarrow 2H^+_{(aq)} + 2e^-$

$[H^+] = 10^{-7}$ M at 25°C (for Pure water)

$$E = \frac{-0.0591}{2}\log\left(\frac{[H^+]^2}{P_{H_2}}\right)$$

$$E = 0 = \log\frac{[H^+]}{P_{H_2}} = 0$$

$$\therefore [H^+]^2 = P_{H_2}$$

$$\therefore P_{H_2} = 10^{-14}\ \text{atm}$$

76. The addition of a catalyst during a chemical reaction alters which of the following quantities?
(1) Entropy
(2) Internal energy
(3) Enthalpy
(4) Activation energy

Solution: (4) Catalyst is going to affect the activation energy of a chemical reaction. Activation energy is the minimum energy required to from activated complex or Transition state.

77. The ionic radii of A^+ and B^- ions are $0.98 \times 10^{-10}m$ and $1.81 \times 10^{-10}\ m$. The coordination number of each ion in AB is
(1) 6
(2) 4
(3) 8
(4) 2

Solution: (1) Radius ratio of $\left(\frac{A^+}{B^-}\right) = \frac{0.98\times10^{-10}\ m}{1.81\times10^{-10}\ m} = \frac{0.98}{1.81} = 0.541$

If the radius ratio is between 0.414 and 0.732 then Co-ordination number is 6.

78. Which is the correct statement for the given acids?
(1) Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.
(2) Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid.
(3) Both are triprotic acids
(4) Both are diprotic acids

Solution: (2) Phosphinic acid is Hypophosphorous acid H_3PO_2 which is Monobasic acid. Phosphonic acid is phosphorous acid H_3PO_3 which is Dibasic acid.

79. Fog is a colloidal solution of:
(1) Liquid in gas
(2) Gas in liquid
(3) Solid in gas

(4) Gas in gas

Solution: (1) Fog is a colloidal solution in which liquid droplets are dispersed in gas.

80. Which of the following statements about the composition of the vapour over an ideal 1 : 1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25^oC. (Given vapour pressure data at 25^oC, benzene = 12.8 kPa, toluene = 3.85 kPa)
(1) The vapour will contain a higher percentage of benzene.
(2) The vapour will contain a higher percentage of toluene.
(3) The vapour will contain equal amounts of benzene and toluene.
(4) Not enough information is given to make a prediction.

Solution: (1) A – benzene, B – Toluene

$P_T = P_A^o X_A + P_B^o X_B$

$= 12.8 \times 0.5 + 3.85 \times 0.5$

$= 6.2 + 1.925$

$= 8.125$

Also, mole fraction of benzene in vapour form

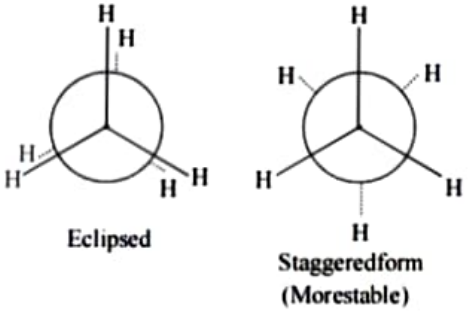
$Y_A = \frac{P_A^o X_A}{P_T} = \frac{6.2}{8.121} = 0.75$

And mole fraction of Toluene in vapour form

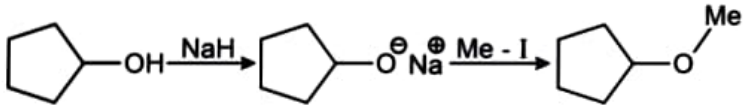
$Y_B = 1 - 0.75 = 0.25$

81. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane, is: 40/74
(1) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain.
(2) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain.
(3) The eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain.
(4) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain.

Solution: (4) $CH_3 - CH_3$



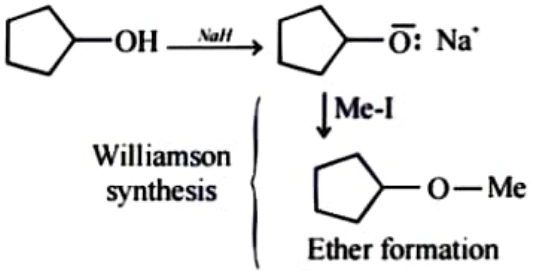
82. The reaction



Can be classified as:

(1) Williamson ether synthesis reaction
(2) Alcohol formation reaction
(3) Dehydration reaction
(4) Williamson alcohol synthesis reaction

Solution: (1)



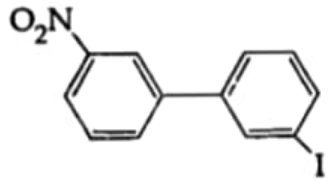
83. The product formed by the reaction of an aldehyde with a primary amine is:

(1) Schiff base
(2) Ketone
(3) Carboxylic acid
(4) Aromatic acid

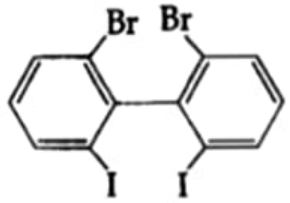
Solution: (1) $> C = O + R - NH_2 \rightarrow \underset{Schiff\ base}{> C = N - R}$

84. Which of the following biphenyls is optically active?

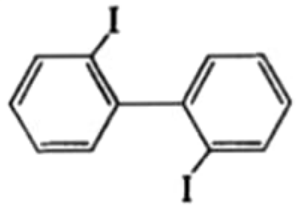
(1)



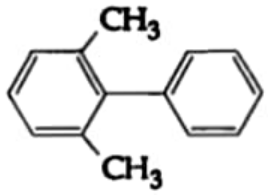
(2)



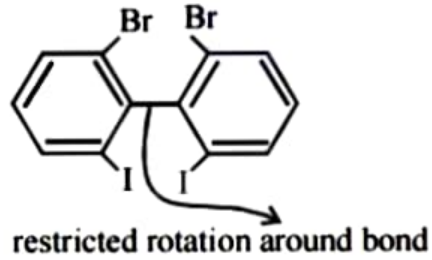
(3)



(4)



Solution: (2)

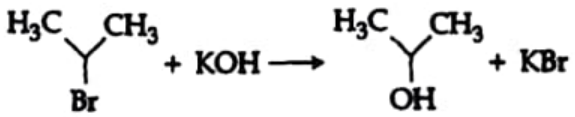


Is optically active (Non super imposable on its mirror image)

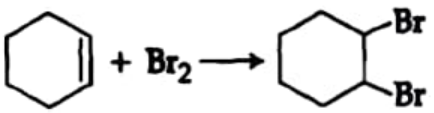
85. For the following reactions:

a. $CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH = CH_2 + KBr + H_2O$

b.



c.

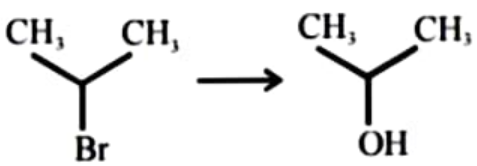


Which of the following statements is correct?

(1) a and b are elimination reactions and c is addition reaction.
(2) a is elimination, b is substitution and c is addition reaction.
(3) a is elimination, b and c are substitution reactions.
(4) a is substitution, b and c are addition reactions.

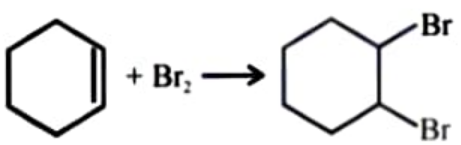
Solution: (2) a] $\underset{(Elimination)}{CH_3CH_2CH_2Br} + KOH \rightarrow CH_3CH = CH_2 + KBr + H_2O$

b]



(substitution)

c]



(addition)

86. At 100^oC the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If $K_b = 0.52$, the boiling point of this solution will be:

(1) 101^oC
(2) 100^oC
(3) 102^oC
(4) 103^oC

Solution: (1) At 100^oC (boiling point)

Vapour pressure of water $P^o = P_{atm} = 760\ ml$

$\therefore \frac{P^o - P_s}{po} = X_{solute}$

$\Rightarrow \frac{760-732}{760} = \frac{n_{solute}}{n_{solvent}}$

$\Rightarrow \frac{28}{760} = \frac{6.5/m}{100/18}$

$\Rightarrow m = \frac{6.5 \times 18 \times 760}{28 \times 100} \approx 32$

Now,

$\Delta T_b = K_b$ molality

$= 0.52 \times \frac{6.5/32}{0.1}$

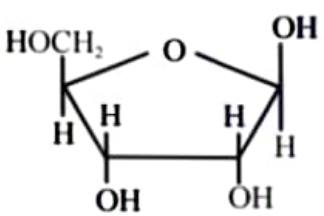
$= \frac{0.52 \times 6.5}{32 \times 0.1}$

$= 1.05 \approx 1s$

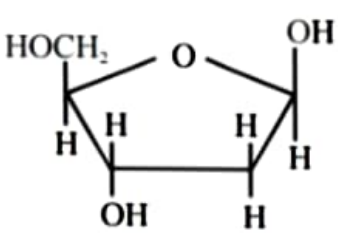
$\therefore$ Boiling point of solution $= 100 + 1 = 101°C$

87. The correct statement regarding RNA and DNA, respectively is:
(1) The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose.
(2) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.
(3) The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
(4) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose.

Solution: (2)



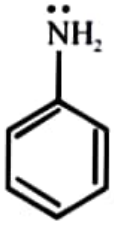
β -D-ribose
Sugar component of RNA



β -D-2deoxyribose
Sugar component of DNA

88. The correct statement regarding the basicity of aryl amines is:
(1) Aryl amines are generally less basic than alkyl amines because the nitrogen lone-pair electrons are delocalized by interaction with the aromatic ring π electron system.
(2) Aryl amines are generally more basic than alkyl amines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π electron system.
(3) Aryl amines are generally more basic than alkyl amines because of aryl group.
(4) Aryl amines are generally more basic than alkyl amines, because the nitrogen atom in aryl amines is sp-hybridized.

Solution: (1)

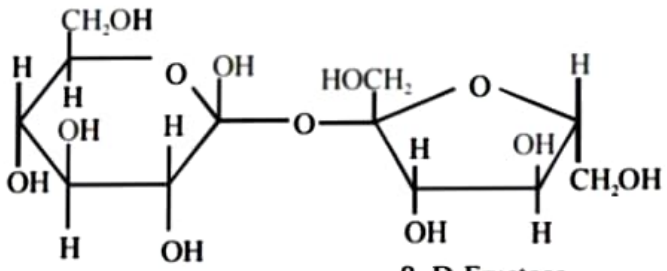


Here lone pair is in conjugation with double bond so basic strength decreased

$R - \ddot{N}H_2$ (No conjugation)

89. Which one given below is a non-reducing sugar?
(1) Maltose
(2) Lactose
(3) Glucose
(4) Sucrose

Solution: (4)



α -D-glucose

β -D-Fructose

Glycosidic bond involves reducing groups.

Sucrose (No reducing sugar)

90. The pair of electron in the given carbanion, $CH_3C \equiv C^{\ominus}$ is present in which of the following orbitals?

(1) 2p
(2) sp^3
(3) sp^2
(4) sp

Solution: (4) $CH_3 - C \equiv C^{\ominus}$: In the carbanian the carbon is having 1 sigma bond, 2π bonds and 1 lone pair therefore C is sp hybridized.