# NEET 2021 Chemistry P6

49. Three resistors having resistances r_1, r_2 and r_3 are connected as shown in the given circuit. The ratio i of currents in terms of resistances used in the circuit is:
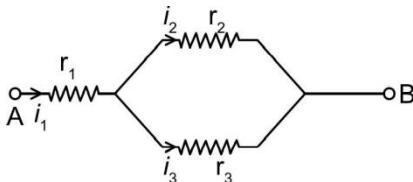
(1) $\dfrac{r_2}{r_1}$

(2) $\dfrac{r_3}{\dfrac{r_1}{r_2\ r_3}}$

(3) $\dfrac{r_2}{r_2\ r_3}$

(4) $\dfrac{r_1}{r_1}$

Ans: (3) r_2

Sol: $\dfrac{i_2}{r_3 i_3\ \overline{r_2}}$ and $\dfrac{i_2\ i_3}{i_1}$

$\dfrac{i_2}{r_2} \quad 1 \quad \dfrac{r_3}{r_2}$
$\overline{i_3}$

$\dfrac{i_2\ i_3}{r_3} \quad \dfrac{r_2}{r_2}$
$\overline{i_3} \qquad r_2$

$\dfrac{i_1}{i_3} \quad \dfrac{r_2\ r_3}{r_2}$

$\dfrac{i_3}{i_1} \quad \dfrac{r_2}{r_2}$
$\qquad r_3$

50. A uniform rod of length 200 cm and mass 500 g is balanced on a wedge placed at 40 cm mark. A mass of 2 kg is suspended from the rod at 20 cm and another unknown mass 'm' is suspended from the rod at 160 cm mark as shown in the figure. Find the value of 'm' such that the rod is in equilibrium. ($g = 10\,m/s^2$)
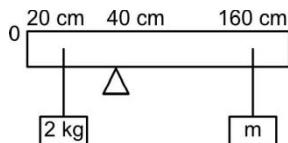
(1) $\dfrac{1}{12}$ kg

(2) $\dfrac{1}{2}$ kg

(3) $\dfrac{1}{3}$ kg

Ans: (1)

Sol:
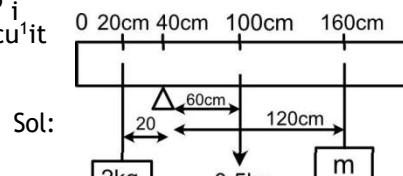
From principle of moments

2	20	0.5	60	m	120

2   1.5   6m

0.5   6m

m $\dfrac{1}{12}$ kg

Chemistry (SECTION- A)

51. Dihedral angle of least stable conformer of ethane is :

(1) 0

(2) 120

(3) 180

(4) 60

Ans: (1)

Sol: Eclipsed conformer is highly unstable

Dihedral angle is zero

(4) $\dfrac{1}{}$ kg 6
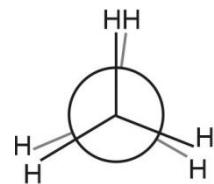
52. The structures of beryllium chloride in solid state and vapour phase, are :

    (1) Chain in both

    (2) Chain and dimer, respectively

   (3) Linear in both

    (4) Dimer and Linear, respectively

Ans: (2)

Sol: Beryllium chloride has chain structure in solid state. Vapour phase forms chlorobridged dimer

(Solid)

(Vapour)
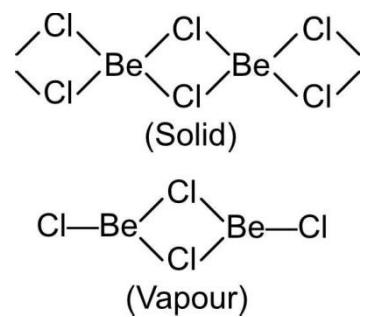
53. Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali

(1) $CH_3\text{—}CH_2\text{—}\overset{\cdot\cdot}{N}\text{—}CH_2\text{—}CH_3$ (with CH_3 below N)

(2) $CH_3\text{—}CH_2\text{—}\overset{\cdot\cdot}{N}O_2$

(3) $CH_3\text{—}CH_2\text{—}\overset{\cdot\cdot}{N}H\text{—}CH_3$

(4) $CH_3\text{—}CH_2\text{—}\overset{\cdot\cdot}{N}H_2$

Ans: (4)

Sol: $\underset{1^\circ \text{ amine}}{R\ NH\ H}\ \underset{\text{Hinsberg reagent}}{Cl\ SO_2 C_6 H_5} \longrightarrow \underset{\substack{N\ \text{alkyl benzeneSulphonamide} \\ \text{alkali soluble}}}{R\ NHSO_2 C_6 H_5}\ HCl$
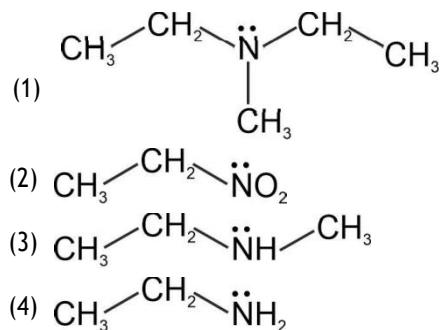
H - atom attached to nitrogen is highly acidic because it is attached to strong electron withdrawing $SO_2C_6H_5$ group

54. The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91.0 Scm²mol⁻¹ respectively. The molar conductance of CH_3COOH at infinite dilution is. Choose the right option for your answer

(1) 540.48 Scm²mol⁻¹

(2) 201.28 Scm²mol⁻¹

(3) 390.71 Scm²mol⁻¹

(4) 698.28 Scm²mol⁻¹

Ans: (3)

Sol: $\lambda_M^{CH_3COOH} = M_{CH_3COO} + M_{Na} - M_{Na} + M_H + M_{Cl}$

$= \lambda^M_{CH_3COONa} + \lambda^M_{HCl} - \lambda^M_{NaCl}$

$= 91 + 426.16 - 126.45$

$= 390.71$ Scm² mole⁻¹
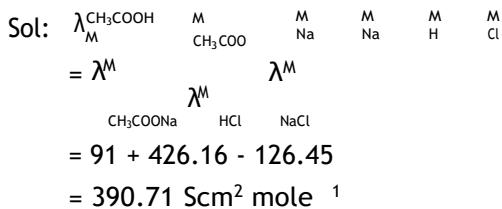
55. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are

(1) 12, 6

(2) 8, 4

(3) 6, 12

(4) 2, 1

Ans: (4)

Sol: Number of tetrahedral voids = 2N

Number of octahedral voids = N

N = effective atoms

for Hexagonal effective atoms = 6

Tetrahedral voids = 2 6 12

Octahedral voids = 6

56. Tritium, a radioactive isotope of hydrogen, emits which of the following particles?

(1) Neutron (n)

(2) Beta ( )

(3) Alpha ( )

(4) Gamma ( )

Ans: (2)

Sol: $_1H^3 \longrightarrow \ _2He^3 \ _{-1}e^0 \ \beta$ ray

57. An organic compound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is : [Atomic wt. of C is 12, H is 1]

(1) CH_4

(2) CH

(3) CH_2

(4) CH_3

Ans: (4)

Sol: % C = 78

% H = 22

$C : H = \dfrac{78}{12} : \dfrac{22}{1}$

$= 6.5 : 22$

$\dfrac{6.5}{6.5} : \dfrac{22}{6.5}$ 1 : 3.3

C : H CH_3
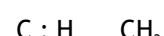
58. What is the IUPAC name of the organic compound formed in the following chemical reaction?

Acetone $\xrightarrow[\text{ii }\ H]{\text{i } C_2H_5MgBr, \text{dry Ether}}$ Product
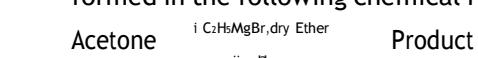
(1) 2-methyl butan-2-ol

(2) 2-methyl propan-2-ol

(3) pentan-2-ol

(4) pentan-3-ol

Ans: (1)

Sol: $CH_3\text{—}\overset{\overset{O}{\|}}{C}\text{—}CH_3 \xrightarrow[H_2O/H^+]{C_2H_5MgBr} CH_3\text{—}\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}}\text{—}C_2H_5$
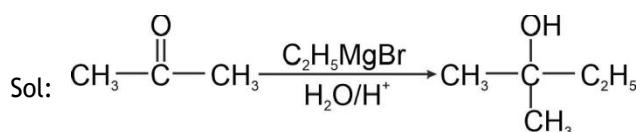
59. Choose the correct option for graphical representation of Boyle's law, which shows a graph of pressure vs. volume of a gas at different temperatures

(1)

(2)

(3)

(4)
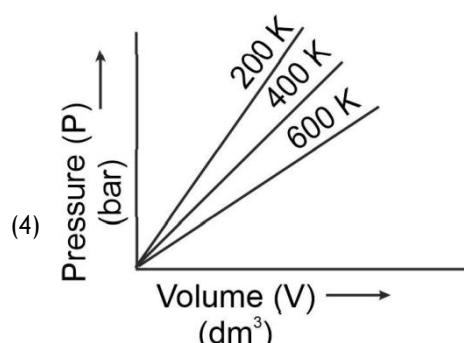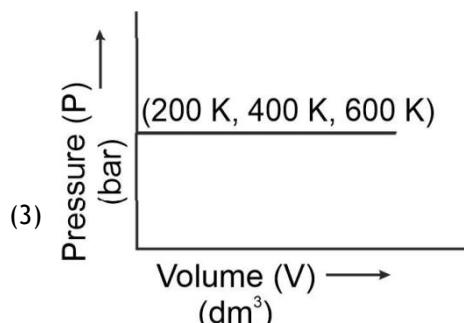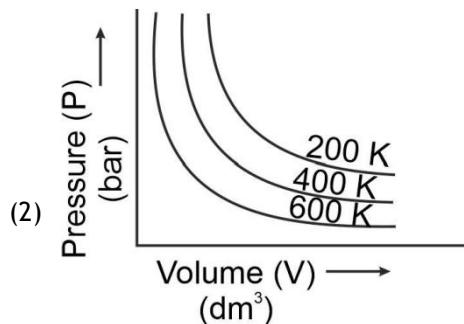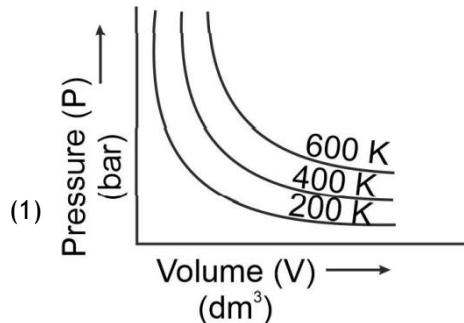
Ans: (1)

Sol: $P \propto \dfrac{1}{V}$

at constant temperature PV = K

Greater the temperature greater the magnitude of PV

60. The correct structure of 2,6-Dimethyl-dec-4-ene is:

(1)

(2)

(3)

(4)

Ans: (2)

Sol:
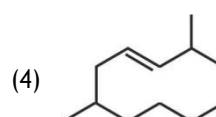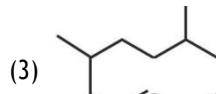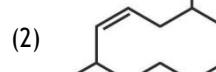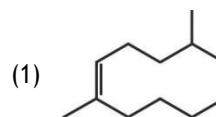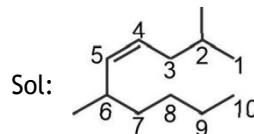
61. Match List - I with List -II.

	List - I		List – II
a)	PCl_5	i)	Square pyramidal
b)	SF_6	ii)	Trigonal planar
c)	BrF_5	iii)	Octahedral
d)	BF_3	iv)	Trigonal bipyramidal

Choose the correct answer from the options given below

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

Ans: (2)

Sol: PCl_5 · Trigonal bipyramidal (5 bond pairs)

SF$_6$ - Octahedral (6 bond pairs)

BrF$_5$ · Square pyramidal (5 bond pairs + 1 lone pair)

BF$_3$ - Trigonal planar (3 bond pairs)

62. The maximum temperature that can be achieved in blast furnace is:
   (1) upto 5000 K
   (2) upto 1200 K
   (3) upto 2200 K
   (4) upto 1900 K

Ans: (3)

Sol: Temperature about 2200 K. This temperature is attained at the bottom near tuyers

63. Which one among the following is the correct option for right relationship between C_p and C_V for one mole of ideal gas?

(1) $C_V = RC_p$

(2) $C_p + C_V = R$

(3) $C_p - C_V = R$

(4) $C_p = RC_V$

Ans: (3)

Sol: For an ideal gas, $C_p - C_V = R$

64. Statement I: Acid strength increases in the order given as HF << HCl << HBr << HI

Statement II: As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases.

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

(1) Statement I is incorrect but Statement II is true

(2) Both Statement I and Statement II are true.

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

(4) Statement I is correct but Statement II is false.

Ans: (2)

Sol: Down the group acidic strength increases as bond length increases and bond strength decreases due to which ease of release of H^+ increases. Acidic strength increases

65. The right option for the statement "Tyndall effect is exhibited by" is

(1) Urea solution

(2) NaCl solution

(3) Glucose solution

(4) Starch solution

Ans: (4)

Sol: Colloidal sol shows Tyndall effect. Starch is a colloid

66. The correct option for the number of body centred unit cells in all 14 types of Bravais lattice unit cells is:

(1) 3

(2) 7

(3) 5

(4) 2

Ans: (1)

Sol: Cubic, Tetragonal, Orthorhombic

67. Which of the following reactions is the metal displacement reaction? Choose the right option.

(1) $2Pb\ NO_3 \quad 2PbO \quad 4NO_2 \quad O_2$

(2) $2KClO_3 \quad 2KCl \quad 3O_2$

(3) $Cr_2O_3 \quad 2Al \quad Al_2O_3 \quad 2Cr$

(4) $Fe \quad 2HCl \quad FeCl_2 \quad H_2$

Ans: (3)

Sol: More electropositive element displaces less electropositive metal

68. For a reaction A ⟶ B, enthalpy of reaction is -4.2 kJ mol^{-1} and enthalpy of activation is 9.6 kJ mol^{-1}. The correct potential energy profile for the reaction is shown in option.

(1)

(2)

(3)

(4)
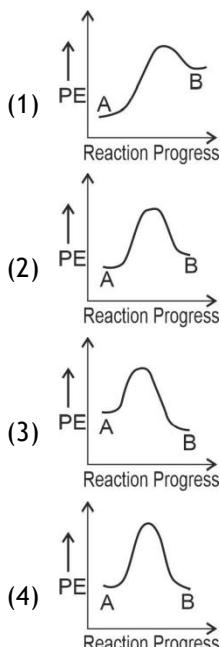
Ans: (3)

Sol: It is an exothermic reaction

For exothermic reaction, energy of reactants is greater than energy of products. By inspection option 3 is correct.

69. The p^{K_b} of dimethylamine and p^{K_a} of acetic acid are 3.27 and 4.77 respectively at T (K). The correct option for the p^H of dimethylammonium acetate solution is:

(1) 6.25

(2) 8.50

(3) 5.50

(4) 7.75

Ans: (4)

Sol: For a salt of weak acid and weak base p^H does not depend on concentration of salt.

$$p^H = 7 + \frac{1}{2}\left[p^{K_a} - p^{K_b}\right]$$

$$= 7 + \frac{1}{2}[4.77 - 3.27] = 7.75$$

70. The major product formed in dehydrohalogenation reaction of 2-Bromo pentane is Pent-2-ene. This product formation is based on?

    (1) Huckel's Rule
    (2) Saytzeff's Rule
    (3) Hund's Rule
    (4) Hofmann Rule

Ans: (2)

Sol:
CH_3 CH Br $\xrightarrow{alc.KOH}$ CH CH
CH_3

CH_2 CH CH_2 CH_2 CH_3 CH_3 CH CH CH_2
CH_3

1 pentene minor   2 pentene major
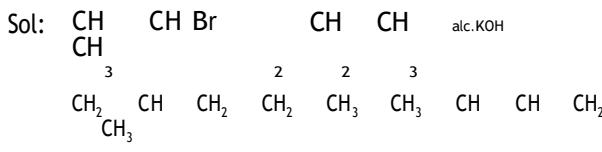
During dehydrohalogenation most stable alkene is formed by Saytzeff rule. According to Saytzeff's rule an alkene with more number of hyperconjugated hydrogens is the major product

71. Which one of the following polymers is prepared by addition polymerisation?

    (1) Dacron
    (2) Teflon
    (3) Nylon-66
    (4) Novolac

Ans: (2)

Sol: Teflon is formed by addition polymerisation of Tetrafluoro ethylene

$nCF_2 = CF_2 \xrightarrow[\text{Under pres}]{\text{Peroxide}} \left(CF_2 - CF_2 \right)_n$
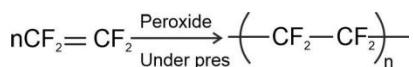
72. The RBC deficiency is deficiency disease of:

    (1) Vitamin B_2
    (2) Vitamin B_{12}
    (3) Vitamin B_6
    (4) Vitamin B_1

Ans: (2)

Sol: Deficiency of vitamin B_{12} causes Megaloblastic Anaemia/Pernicious anaemia

73. The following solutions were prepared by dissolving 10 g of glucose ($C_6H_{12}O_6$) in 250 ml of water (P_1), 10 g of urea (CH_4N_2O) in 250 ml of water (P_2) and 10 g of surcrose ($C_{12}H_{22}O_{11}$) in 250 ml of water (P_3). The right option for the decreasing order of osmotic pressure of these solutions is:

    (1) $P_3 > P_1 > P_2$ (2) $P_2 > P_1 > P_3$
    (3) $P_1 > P_2 > P_3$ (4) $P_2 > P_3 > P_1$

Ans: (2)

Sol: $\pi \dfrac{W}{ST\,M}$

$\pi \dfrac{1}{Mol.wt}$

Glucose (180), Urea (60), Sucrose (342)

π_{urea} $\pi_{glucose}$
$\pi_{sucrose}$

74. A particular station of All India Radio, New Delhi, broadcasts on a frequency of 1,368 kHz(kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is: [speed of light, $c = 3.0 \times 10^8$ ms^{-1}]

    (1) 21.92 cm
    (2) 219.3 m
    (3) 219.2 m
    (4) 2192 m

Ans: (2)

Sol: $\lambda \dfrac{C}{V} \dfrac{3 \times 10^8 ms^{-1}}{1368 \times 10^3 S^{-1}}$ 219.3m

75. Noble gases are named because of their inertness towards reactivity. Identify an incorrect statement about them.

    (1) Noble gases have large positive values of electorn gain enthalpy.
    (2) Noble gases are sparingly soluble in water.
    (3) Noble gases have very high melting and boiling points.
    (4) Noble gases have weak dispersion forces.

Ans: (3)

Sol: Noble gases have low melting point and boiling point due to weak London dispersion forces

76. Given below are two statements:

    Statement - I : Aspirin and Paracetamol belong to the class of narcotic analgesics.

    Statement - II : Morphine and Heroin are non-narcotic analgesics. In the light of the above statements, choose the correct answer from the options given below.

    (1) Statement I is incorrect but Statement II is true.
    (2) Both Statement I and Statement II are true.
    (3) Both Statement I and Statement II are false.
    (4) Statement I is correct but Statement II is false.

Ans: (3)

Sol: Aspirin and Paracetamol are non - narcotic where as Morphine and Heroin are narcotic analgesics

77. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature ?

    (1) Zone refining
    (2) Electrolysis
    (3) Chromatography
    (4) Distillation

Ans: (4)

P_2 P_1 P_3

Sol: Only metal stable in liquid state at room temperature is Hg. It has non volatile impurity. Therefore, it is purified by distillation

78. The correct sequence of bond enthalpy of 'C - X' bond is

(1) CH_3 Cl CH_3 F CH_3 Br CH_3
    |

(2) CH_3 F CH_3 Cl CH_3 Br CH_3
    |

(3) CH F CH Cl CH Br CH
    |
    ³   ³   ³   ³

(4) CH_3 F CH_3 Cl CH_3 Br CH_3

Ans: (3) |

Sol: Atomic size of F < Cl < Br < I

From R—F to R—I bond length increases where as bond enthalpy decreases

79. The compound which shows metamerism is

(1) $C_4H_{10}O$

(2) C_5H_{12}

(3) C_3H_8O

(4) C_3H_6O

Ans: (1)

Sol: With the formula $C_4H_{10}O$ the possible ethers are

(1) diethyl ether

(2) methyl n - propyl ether

(3) iso propyl methyl ether

(1) and (2), (1) and (3) are metamers

80. Ethylene diaminetetraacetate (EDTA) ion is

(1) Tridentate ligand with three "N" donor atoms

(2) Hexadentate ligand with four "O" and two "N" donor atoms

(3) Unidentate ligand

(4) Bidentate ligand with two "N" donor atoms

Ans: (2)

Sol:
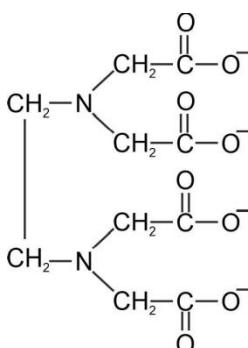
four O - atoms and two N - atoms

81. Zr (Z = 40) and Hf (Z = 72) have similar atomic and ionic radii because of

(1) having similar chemical properties

(2) belonging to same group

(3) diagonal relationship

(4) lanthanoid contraction

Ans: (4)

82. BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are

(1) sp^2 and 8

(2) sp^3 and 4

(3) sp^3 and 6

(4) sp^2 and 6

Ans: (4)

Sol:
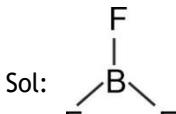
sp^2 and 6

83. The major product of the following chemical reaction is

(1)

(2)

(3)

(4)

Ans: (2)

Sol:
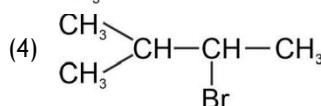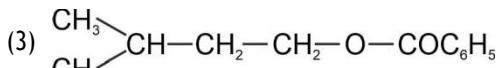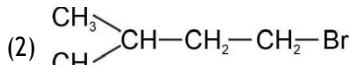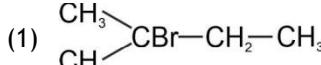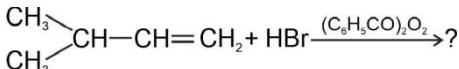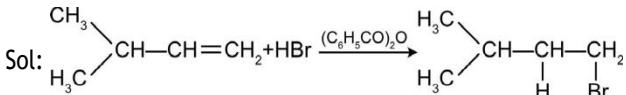
84. The incorrect statement among the following is :

(1) Actinoids are highly reactive metals, especially when finely divided

(2) Actinoid contraction is greater for element to element than Lanthanoid contraction

(3) Most of the trivalent Lanthanoid ions are colorless in the solid state

(4) Lanthanoids are good conductors of heat and electricity

Ans: (3)

Sol: Most of Lanthanoids in trivalent state are coloured due to unpaired electrons in f - subshell. La^{3+}, Lu^{3+} are colourless

85. Among the following alkaline earth metal halides, one which is covalent and soluble in organic solvents is

(1) Beryllium chloride

(2) Calcium chloride

(3) Strontium chloride

(4) Magnesium chloride

Ans: (1)

Sol: Due to high polarising power of Be^{2+} ion, all beryllium

Sol: Zr and Hf have same size due to Lanthanoid contraction halides are predominantly covalent. They are soluble in organic solvents

SECTION - B

86. The correct option for the value of vapour pressure of a solution at $45\,C$ with benzene to octane in molar ratio 3 : 2 is:

[At $45\,C$ vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

(1) 350 mm of Hg

(2) 160 mm of Hg

(3) 168 mm of Hg

(4) 336 mm of Hg

Ans: (4)

Sol: Applying Raoult's law, $P_{total} = P^o_A \cdot X_A + P^o_B \cdot X_B$

$$X_A = \frac{3}{5}, X_B = \frac{2}{5}$$

$$P_{total} = 280 \times \frac{3}{5} + 420 \times \frac{2}{5} = 336\,mm\ of\ Hg$$

87. For irreversible expansion of an ideal gas under isothermal condition, the correct option is:

(1) $\Delta U = 0,\ \Delta S_{total} = 0$

(2) $\Delta U = 0,\ \Delta S_{total} = 0$

(3) $\Delta U = 0,\ \Delta S_{total} = 0$

(4) $\Delta U = 0,\ \Delta S_{total} = 0$

Ans: (4)

Sol: For an isothermal process, $\Delta T = 0 \Rightarrow \Delta U = 0$

For an irreversible expansion, $\Delta S_{total} = 0$

88. The intermediate compound 'X' in the following chemical reaction is

(1)

(2) $CH(OCrOHCl_2)_2$

(3) $CH(OCOCH_3)_2$

Sol:

89. Choose the correct option for the total pressure (in atm) in a mixture of 4g O_2 and 2g H_2 confined in a total volume of one litre at $0\,C$ is :

Given R = 0.082 L atm mol^{-1}K^{-1}, T = 273 K

(1) 26.02

(2) 2.518

(3) 2.602

(4) 25.18

Ans: (4)

Sol: $n = n_H + n_O$

$$n = \frac{4}{32} + \frac{2}{2}$$

$$n = \frac{9}{8}$$

$$P = \frac{nRT}{V}$$

$$P = \frac{9}{8} \times \frac{0.0821 \times 273}{1} = 25.18\ atm$$

90. From the following pairs of ions which one is not an iso - electronic pair ?

(1) Fe^{2+}, Mn^{2+}

(2) O^{2-}, F^-

(3) Na^+, Mg^{2+}

(4) Mn^{2+}, Fe^{3+}

Ans: (1)

Sol: Fe^{2+} .... $Ar\ 3d^6$ .... 24 electrons

Mn^{2+} .... $Ar\ 3d^5$ .... 23 electrons

91. $CH_3CH_2COO\ Na \xrightarrow[Heat]{NaOH, ?} CH_3CH_3 + Na_2CO_3$

Consider the above reaction and identify the missing reagent/chemical

(1) DIBAL - H

(2) B_2H_6

(4)

Ans: (2)

(3) Red Phosphorus

(4) CaO

Ans: (4)

Sol: CH_3CH_2COONa NaOH $\xrightarrow{CaO}$ CH_3 CH_3 Na_2CO_3

This is a decarboxylation reaction

92. Which of the following molecules is non - polar in nature?

(1) NO_2

(2) $POCl_3$
(3) CH_2O
(4) $SbCl_5$

Ans: (4)

Sol:
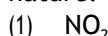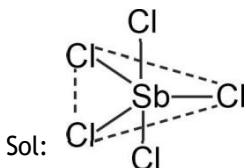
Trigonal bipyramidal

dipole moment $\mu = 0$

93. The slope of Arrhenius Plot $\ln k$ v s $\frac{1}{T}$ of first oder reaction is $-5 \times 10^3 K$. The value of E_a of the reaction is. Choose the correct option for your answer

Given $R = 8.314 JK^{-1}mol^{-1}$

(1) $83 kJ\, mol^{-1}$
(2) $41.5 kJmol^{-1}$
(3) $83.0 kJmol^{-1}$
(4) $166 kJ\, mol^{-1}$

Ans: (2)

Sol: $K = Ae^{-\frac{E_a}{RT}}$

$\ln K = \ln A - \frac{E_a}{R} \cdot \frac{1}{T}$
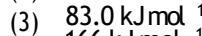
y - axis $C = m \times$
$\quad\quad\quad\quad R\quad T$

Slope $= -\frac{E_a}{R}$

$-\frac{E_a}{10^3K\,R} = -5$

$E_a = 5 \times 8.314\, J\,K^{-1}\,mole^{-1} \times 10^3\,K$

94. Match List - I with List - II
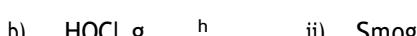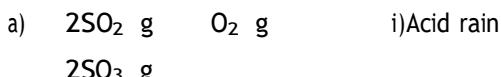
List - I	List – II
a) $2SO_2\,g + O_2\,g \rightarrow 2SO_3\,g$	i) Acid rain
b) $HOCl\,g \xrightarrow{h} OH + Cl$	ii) Smog
c) $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	iii) Ozone depletion
d) $NO_2\,g \xrightarrow{h} NO\,g + O\,g$	iv) Tropospheric pollution

Choose the correct answer from the options given below.

Ans: (4)

Sol: (a) $2SO_2\,g + O_2\,g \rightarrow 2SO_3\,g$ .... Tropospheric pollution

(b) $HOCl\,g \xrightarrow{h} HO + Cl$ .Ozone depletion

(c) $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$ .... Acid rain

(d) $NO\,g \xrightarrow{h} NO\,g + O\,g$ .... Photo chemical smog

95. Match List - I with List - II
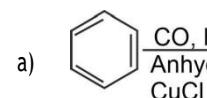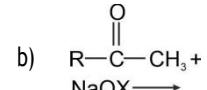
| List - I		List – II
a) $\text{(benzene)} \xrightarrow[\text{Anhyd.AlCl}_3/\text{CuCl}]{CO, HCl}$	i)	Hell -Volhard Zelinsky reaction
b) $R-\overset{O}{\overset{\|}{C}}-CH_3 + NaOX \longrightarrow$	ii)	Gattermann - Koch reaction
c) $R-CH_2-OH + R'COOH \xrightarrow{Conc.\ H_2SO_4} R-CH_2COOH$	iii)	Haloform reaction
d) $\xrightarrow[\text{(ii) H}_2O]{\text{(i) X}_2/\text{Red P}}$	iv)	Esterification
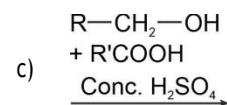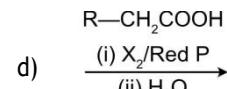
Choose the correct answer from the options given below.

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

Ans: (1)

Sol: (a)

- Koch reaction

$R-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow{NaOX} R-COO^-Na^+ + CHX_3$
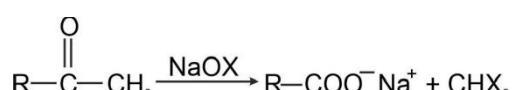
a\quad b\quad c\quad d

(1)   iii   ii   iv   i

(2)   i   ii   iii   iv

(3)   ii   iii   iv   i

(4)   iv   iii   i   ii

(b)   ....

Haloform test
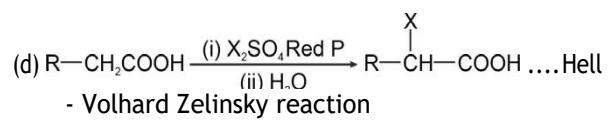
(c) $R-CH_2OH - HO-\overset{\overset{O}{\|}}{C}-R' \xrightarrow{Conc.\ H_2SO_4} R-CH_2-O-\overset{\overset{O}{\|}}{C}-R'+H_2O$

.... Esterification

(d) $R-CH_2COOH \xrightarrow[\text{(ii) }H_2O]{\text{(i) }X_2SO_4\text{Red P}} R-\overset{\overset{X}{|}}{CH}-COOH$ .... Hell - Volhard Zelinsky reaction

96. Match List - I with List - II

	List - I		List – II
a)	$Fe\ CN_3\ _6$	i)	5.92 BM
b)	$Fe\ H_2O_6\ ^3$	ii)	0 BM
c)	$Fe\ CN_4\ _6$	iii)	4.90 BM
d)	$Fe\ H_2O_6\ ^2$	iv)	1.73 BM

Choose the correct answer from the options given below.

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

Ans: (1)

Sol:

Fe^{+3} 3d 4p 4s

$[Fe(H_2O)]^{+3}$ 3d

n = 5 μ_s = 5.92 B.M

Fe^{+3} (rearrangement) 3d

$[Fe(CN)_6)]^{-3}$ 3d

n = 1 μ_s = 1.732 B.M

Fe^{+2}... 3d 4s 4p

$[Fe(H_2O)_6]^{+2}$ 3d 4s 4p

n = 4 μ_s = 4.9 B.M

Fe^{+2} (rearrangement) 3d 4s 4p

$[Fe(CN)_6]^{-4}$ 3d 4s 4p
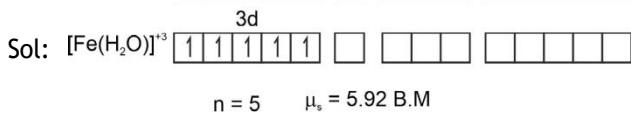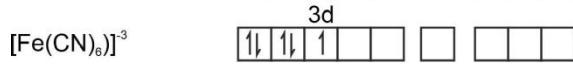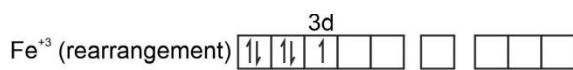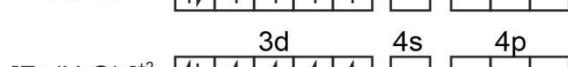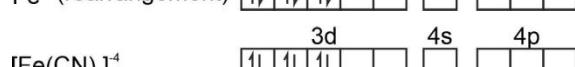
n = 4 μ_s = 0

97. The product formed in the following chemical reaction is :

(1)

(2)

(3)

(4)
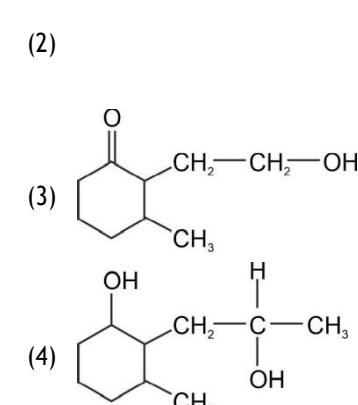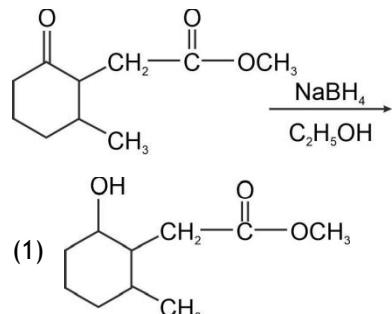
Ans: (1)

Sol: $NaBH_4$ C_2H_5OH is a weak reducing agent. It cannot reduce - COOR group

It reduces $-\overset{O}{\underset{\|}{C}}-$ to - CHOH - group
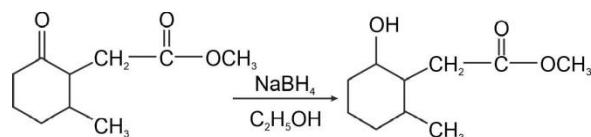


98. In which of the following arrangements the given sequence is not strictly according to the properties indicated against it ?

(1) CO_2 SiO_2 :   Increasing oxidizing
        SnO_2 power
        PbO_2

(2) HF < HCl < HBr < HI :   Increasing acidic strength

(3) H_2O H_2S :   Increasing pK_a values
    H_2Se H_2

(4) Te   :   Increasing acidic character
    NH_3 PH_3

Ans: (3) AsH_3
        SbH_3

Sol: From H_2O to H_2Te as X - H bond enthalpy decreases, acidic strength increases (K_a increases)

$H_2O \quad H_2S \quad H_2Se \quad H_2Te \qquad K_a$

$H_2O \quad H_2S \quad H_2Se \quad H_2Te \qquad pK_a$
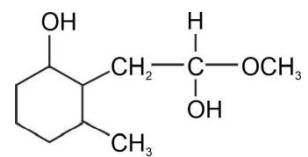
99. The molar conductivity of 0.007 M acetic acid is 20 S $cm^2 mol^{-1}$. What is the dissociation constant of acetic acid? Choose the correct option.

$\Lambda^0_H = 350\ S\ cm^2\ mol^{-1}$

$\Lambda^0_{CH_3COO} = 50\ S\ cm^2\ mol^{-1}$
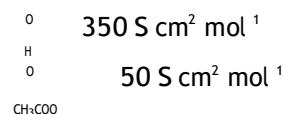
(1) $2.50 \times 10^{-5}\ mol\ L^{-1}$

(2) $1.75 \times 10^{-4}\ mol\ L^{-1}$
     $2.50 \times 10^{-4}\ mol\ L^{-1}$

(3) $1.75 \times 10^{-5}\ mol\ L^{-1}$

(4)

Ans: (4)

Sol: Degree of dissociation α of CH_3COOH

$$\alpha = \frac{\Lambda_c}{\Lambda_0} = \frac{20}{350+50} = \frac{1}{20}$$

$$K_a = \frac{C\alpha^2}{1-\alpha}$$

$1-\alpha \approx 1$

$K_a = C\alpha^2$

$K_a = 0.007 \times \frac{1}{20} \times \frac{1}{20}$

$K_a = 1.75 \times 10^{-5}$

100. The reagent 'R' in the given sequence of chemical reaction is :
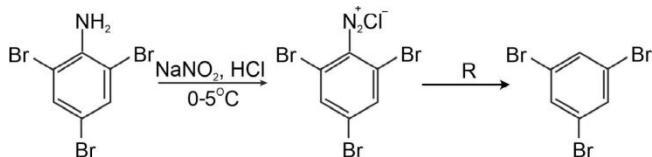
(1) CuCN/KCN

(2) H_2O

(3) CH_3CH_2OH

(4) HI

Ans: (3)
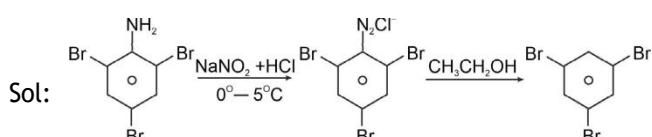
Sol:

Botany
SECTION - A

101. Match List-I with List-II.

	List - I		List – II
a)	Cells with active cell division capacity	(i)	Vascular tissues
b)	Tissue having all cells similar in structure and function	(ii)	Meristematic tissue
c)	Tissue having different types of cells	(iii)	Sclereids
d)	Dead cells with highly thickened walls and narrow lumen	(iv)	Simple tissue

Select the correct answer from the options given below.

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

Ans: (2)

Sol: Cells with active cell division – Meristematic tissue

Tissue having all cells similar in structure and function – Simple tissue

Tissue having different types of cells – Vascular tissues

Dead cells with highly thickened walls and narrow lumen - Sclereids

102. Which of the following is an incorrect statement?

(1) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.

(2) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.

(3) Microbodies are present both in plant and animal cells.

(4) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm.

Ans: (2)

Sol: Mature sieve tube elements do not have nucleus but have cytoplasm. (Anucleated living cells)