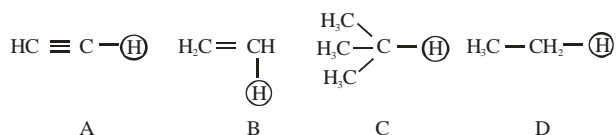


**CHEMISTRY**

**TEST PAPER WITH SOLUTION**

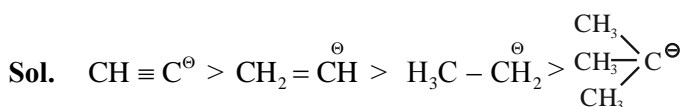
**SECTION-A**

61. The ascending acidity order of the following H atoms is

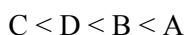


- (1)  $C < D < B < A$   
 (2)  $A < B < C < D$   
 (3)  $A < B < D < C$   
 (4)  $D < C < B < A$

Ans. (1)



Stability of conjugate base  $\propto$  acidic strength



62. Match List I with List II

List I (Bio Polymer)		List II (Monomer)	
A.	Starch	I.	nucleotide
B.	Cellulose	II.	$\alpha$ -glucose
C.	Nucleic acid	III.	$\beta$ -glucose
D.	Protein	IV.	$\alpha$ -amino acid

Choose the correct answer from the options given below :-

- (1) A-II, B-I, C-III, D-IV  
 (2) A-IV, B-II, C-I, D-III  
 (3) A-I, B-III, C-IV, D-II  
 (4) A-II, B-III, C-I, D-IV

Ans. (4)

Sol. A-II, B-III, C-I, D-IV

Fact based.

63. Match List I with List II

List I (Compound)		List II ( $\text{pK}_a$ value)	
A.	Ethanol	I.	10.0
B.	Phenol	II.	15.9
C.	m-Nitrophenol	III.	7.1
D.	p-Nitrophenol	IV.	8.3

Choose the correct answer from the options given below :-

- (1) A-I, B-II, C-III, D-IV  
 (2) A-IV, B-I, C-II, D-III  
 (3) A-III, B-IV, C-I, D-II  
 (4) A-II, B-I, C-IV, D-III

Ans. (4)

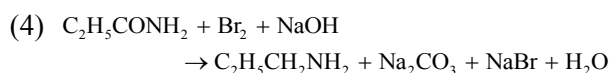
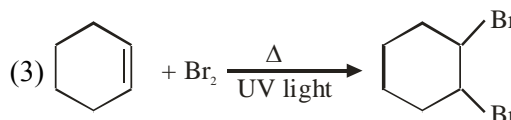
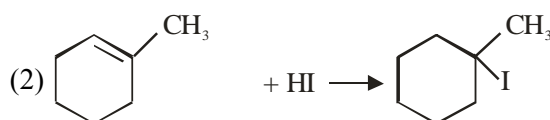
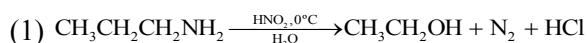
Sol. Ethanol  $\rightarrow$  15.9

Phenol  $\rightarrow$  10

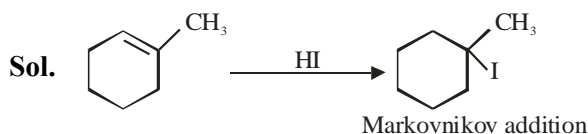
m-Nitrophenol  $\rightarrow$  8.3

p-Nitrophenol  $\rightarrow$  7.1

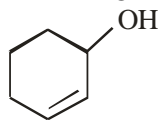
64. Which of the following reaction is correct ?



Ans. (2)



65. According to IUPAC system, the compound



is named as

- (1) Cyclohex-1-en-2-ol (2) 1-Hydroxyhex-2-ene  
(3) Cyclohex-1-en-3-ol (4) Cyclohex-2-en-1-ol

Ans. (4)

Cyclohex-2-en-1-ol

66. The correct IUPAC name of  $K_2MnO_4$  is

- (1) Potassium tetraoxopermanganate (VI)  
(2) Potassium tetraoxidomanganate (VI)  
(3) Dipotassium tetraoxidomanganate (VII)  
(4) Potassium tetraoxidomanganese (VI)

Ans. (2)

Sol.  $K_2MnO_4$

$$2 + x - 8 = 0$$

$$\Rightarrow x = +6$$

O.S. of Mn = +6

IUPAC Name =

Potassium tetraoxidomanganate(VI)

67. A reagent which gives brilliant red precipitate with Nickel ions in basic medium is

- (1) sodium nitroprusside  
(2) neutral  $FeCl_3$   
(3) meta-dinitrobenzene  
(4) dimethyl glyoxime

Ans. (4)

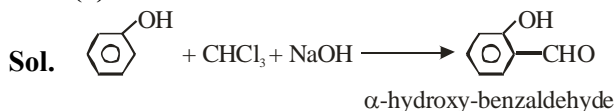
Sol.  $Ni^{2+} + 2dmg^- \rightarrow [Ni(dmg)_2]$

Rosy red/Bright Red precipitate

68. Phenol treated with chloroform in presence of sodium hydroxide, which further hydrolysed in presence of an acid results

- (1) Salicylic acid  
(2) Benzene-1,2-diol  
(3) Benzene-1,3-diol  
(4) 2-Hydroxybenzaldehyde

Ans. (4)



It is Reimer Tiemann Reaction

69. Match List I with List II

List I (Spectral Series for Hydrogen)		List II (Spectral Region/Higher Energy State)	
A.	Lyman	I.	Infrared region
B.	Balmer	II.	UV region
C.	Paschen	III.	Infrared region
D.	Pfund	IV.	Visible region

Choose the correct answer from the options given below :-

- (1) A-II, B-III, C-I, D-IV  
(2) A-I, B-III, C-II, D-IV  
(3) A-II, B-IV, C-III, D-I  
(4) A-I, B-II, C-III, D-IV

Ans. (3)

Sol. A – II, B – IV, C – III, D – I

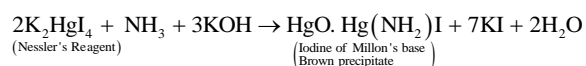
Fact based.

70. On passing a gas, 'X', through Nessler's reagent, a brown precipitate is obtained. The gas 'X' is

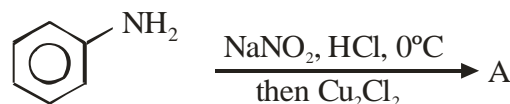
- (1)  $H_2S$  (2)  $CO_2$   
(3)  $NH_3$  (4)  $Cl_2$

Ans. (3)

Sol. Nessler's Reagent Reaction :

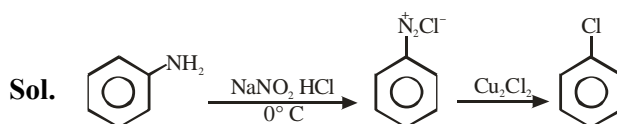


71. The product A formed in the following reaction is:

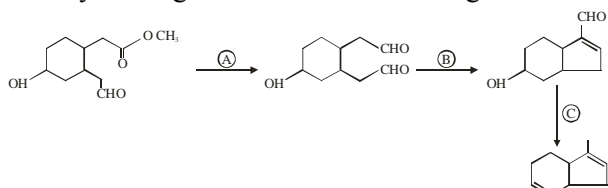


- (1) (2)   
(3) (4)

Ans. (3)



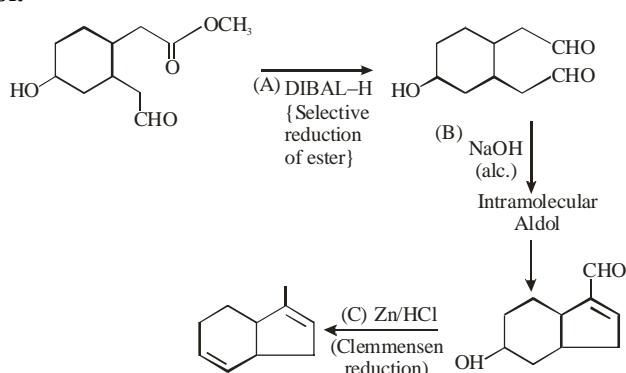
72. Identify the reagents used for the following conversion



- (1) A =  $\text{LiAlH}_4$ , B =  $\text{NaOH}_{(\text{aq})}$ , C =  $\text{NH}_2\text{-NH}_2/\text{KOH}$ , ethylene glycol  
 (2) A =  $\text{LiAlH}_4$ , B =  $\text{NaOH}_{(\text{alc})}$ , C =  $\text{Zn}/\text{HCl}$   
 (3) A = DIBAL-H, B =  $\text{NaOH}_{(\text{aq})}$ , C =  $\text{NH}_2\text{-NH}_2/\text{KOH}$ , ethylene glycol  
 (4) A = DIBAL-H, B =  $\text{NaOH}_{(\text{alc})}$ , C =  $\text{Zn}/\text{HCl}$

Ans. (4)

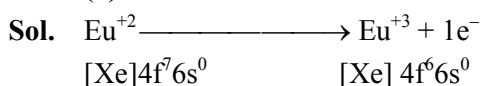
Sol.



73. Which of the following acts as a strong reducing agent? (Atomic number : Ce = 58, Eu = 63, Gd = 64, Lu = 71)

- (1)  $\text{Lu}^{3+}$  (2)  $\text{Gd}^{3+}$   
 (3)  $\text{Eu}^{2+}$  (4)  $\text{Ce}^{4+}$

Ans. (3)



74. Chromatographic technique/s based on the principle of differential adsorption is/are

- A. Column chromatography  
 B. Thin layer chromatography  
 C. Paper chromatography

Choose the most appropriate answer from the options given below:

- (1) B only (2) A only  
 (3) A & B only (4) C only

Ans. (3)

Sol. Memory Based

75. Which of the following statements are correct about Zn, Cd and Hg?

- A. They exhibit high enthalpy of atomization as the d-subshell is full.  
 B. Zn and Cd do not show variable oxidation state while Hg shows +I and +II.  
 C. Compounds of Zn, Cd and Hg are paramagnetic in nature.  
 D. Zn, Cd and Hg are called soft metals.

Choose the **most appropriate** from the options given below:

- (1) B, D only (2) B, C only  
 (3) A, D only (4) C, D only

Sol. Ans. (1)

(A) Zn, Cd, Hg exhibit lowest enthalpy of atomization in respective transition series.

(C) Compounds of Zn, Cd and Hg are diamagnetic in nature.

76. The element having the highest first ionization enthalpy is

- (1) Si (2) Al  
 (3) N (4) C

Ans. (3)

Sol.  $\text{Al} < \text{Si} < \text{C} < \text{N}$ ;  $\text{IE}_1$  order.

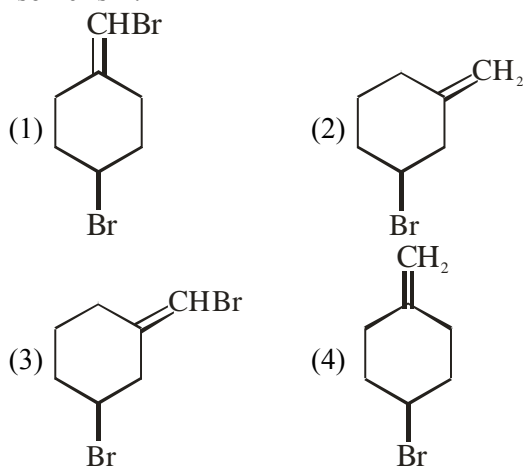
77. Alkyl halide is converted into alkyl isocyanide by reaction with

- (1) NaCN (2)  $\text{NH}_4\text{CN}$   
 (3) KCN (4) AgCN

Ans. (4)

Sol. Covalent character of AgCN.

78. Which one of the following will show geometrical isomerism?



Ans. (3)

Sol. Due to unsymmetrical.

79. Given below are two statements:  
**Statement I:** Fluorine has most negative electron gain enthalpy in its group.  
**Statement II:** Oxygen has least negative electron gain enthalpy in its group.  
 In the light of the above statements, choose the most appropriate from the options given below.  
 (1) Both Statement I and Statement II are true  
 (2) Statement I is true but Statement II is false  
 (3) Both Statement I and Statement II are false  
 (4) Statement I is false but Statement II is true

Ans. (4)

Sol. Statement-1 is false because chlorine has most negative electron gain enthalpy in its group.

80. Anomalous behaviour of oxygen is due to its  
 (1) Large size and high electronegativity  
 (2) Small size and low electronegativity  
 (3) Small size and high electronegativity  
 (4) Large size and low electronegativity

Ans. (3)

Sol. Fact Based.

### SECTION-B

81. The total number of anti bonding molecular orbitals, formed from 2s and 2p atomic orbitals in a diatomic molecule is \_\_\_\_\_.

Ans. (4)

Sol. Antibonding molecular orbital from 2s = 1  
 Antibonding molecular orbital from 2p = 3  
 Total = 4

82. The oxidation number of iron in the compound formed during brown ring test for  $\text{NO}_3^-$  ion is \_\_\_\_\_.

Ans. (1)

Sol.  $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$ ,  
 Oxidation no. of Fe = +1

83. The following concentrations were observed at 500 K for the formation of  $\text{NH}_3$  from  $\text{N}_2$  and  $\text{H}_2$ . At equilibrium  $[\text{N}_2] = 2 \times 10^{-2} \text{ M}$ ,  $[\text{H}_2] = 3 \times 10^{-2} \text{ M}$  and  $[\text{NH}_3] = 1.5 \times 10^{-2} \text{ M}$ . Equilibrium constant for the reaction is \_\_\_\_\_.

Ans. (417)

Sol. 
$$K_c = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$$
  

$$K_c = \frac{(1.5 \times 10^{-2})^2}{(2 \times 10^{-2}) \times (3 \times 10^{-2})^3}$$
  
 $K_c = 417$

84. Molality of 0.8 M  $\text{H}_2\text{SO}_4$  solution (density 1.06  $\text{g cm}^{-3}$ ) is \_\_\_\_\_  $\times 10^{-3} \text{ m}$ .

Ans. (815)

Sol. 
$$m = \frac{M \times 1000}{d_{\text{sol}} \times 1000 - M \times \text{Molar mass}_{\text{solute}}}$$
  
 $815 \times 10^{-3} \text{ m}$

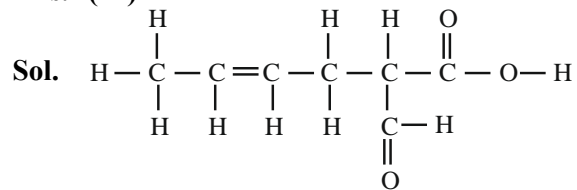
85. If 50 mL of 0.5 M oxalic acid is required to neutralise 25 mL of NaOH solution, the amount of NaOH in 50 mL of given NaOH solution is \_\_\_\_\_ g.

Ans. (4)

Sol. Equivalent of Oxalic acid = Equivalents of NaOH  
 $50 \times 0.5 \times 2 = 25 \times M \times 1$   
 $M_{\text{NaOH}} = 2M$   
 $W_{\text{NaOH}} \text{ in } 50\text{ml} = 2 \times 50 \times 40 \times 10^{-3} \text{ g} = 4\text{g}$

86. The total number of 'Sigma' and Pi bonds in 2-formylhex-4-enoic acid is \_\_\_\_\_.

Ans. (22)



22 bonds

87. The half-life of radioisotopic bromine - 82 is 36 hours. The fraction which remains after one day is \_\_\_\_\_  $\times 10^{-2}$ .

(Given  $\text{antilog } 0.2006 = 1.587$ )

Ans. (63)

Sol. Half life of bromine - 82 = 36 hours

$$t_{1/2} = \frac{0.693}{K}$$

$$K = \frac{0.693}{36} = 0.01925 \text{ hr}^{-1}$$

1<sup>st</sup> order rxn kinetic equation

$$t = \frac{2.303}{K} \log \frac{a}{a-x}$$

$$\log \frac{a}{a-x} = \frac{t \times K}{2.303} \quad (t = 1 \text{ day} = 24\text{hr})$$

$$\log \frac{a}{a-x} = \frac{24\text{hr} \times 0.01925 \text{ hr}^{-1}}{2.303}$$

$$\log \frac{a}{a-x} = 0.2006$$

$$\frac{a}{a-x} = \text{anti log}(0.2006)$$

$$\frac{a}{a-x} = 1.587$$

If a = 1

$$\frac{1}{1-x} = 1.587 \Rightarrow 1-x = 0.6301 = \text{Fraction remain after one day}$$

88. Standard enthalpy of vapourisation for  $\text{CCl}_4$  is  $30.5 \text{ kJ mol}^{-1}$ . Heat required for vapourisation of 284g of  $\text{CCl}_4$  at constant temperature is \_\_\_\_\_ kJ.  
(Given molar mass in  $\text{g mol}^{-1}$ ; C = 12, Cl = 35.5)

Ans. (56)

Sol.  $\Delta H_{\text{vap}}^\circ \text{ CCl}_4 = 30.5 \text{ kJ / mol}$

Mass of  $\text{CCl}_4 = 284 \text{ gm}$

Molar mass of  $\text{CCl}_4 = 154 \text{ g/mol}$

Moles of  $\text{CCl}_4 = \frac{284}{154} = 1.844 \text{ mol}$

$\Delta H_{\text{vap}}^\circ$  for 1 mole =  $30.5 \text{ kJ/mol}$

$\Delta H_{\text{vap}}^\circ$  for 1.844 mol =  $30.5 \times 1.844$   
=  $56.242 \text{ kJ}$

89. A constant current was passed through a solution of  $\text{AuCl}_4^-$  ion between gold electrodes. After a period of 10.0 minutes, the increase in mass of cathode was 1.314 g. The total charge passed through the solution is \_\_\_\_\_  $\times 10^{-2} \text{ F}$ .  
(Given atomic mass of Au = 197)

Ans. (2)

Sol.  $\frac{W}{E} = \frac{\text{charge}}{1F}$

$$\frac{1.314}{197} = \frac{Q}{1F}$$
$$3$$

$Q = 2 \times 10^{-2} \text{ F}$

90. The total number of molecules with zero dipole moment among  $\text{CH}_4$ ,  $\text{BF}_3$ ,  $\text{H}_2\text{O}$ ,  $\text{HF}$ ,  $\text{NH}_3$ ,  $\text{CO}_2$  and  $\text{SO}_2$  is \_\_\_\_\_.

Ans. (3)

- Sol. Molecules with zero dipole moment =  $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{BF}_3$