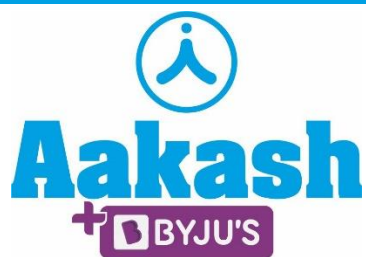


10/08/2022

Slot-1



Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005 | Ph.: 011-47623456

## Answers & Solutions

Time : 45 min.

M.M. : 200

## *for* CUET UG-2022

(CHEMISTRY)

### IMPORTANT INSTRUCTIONS:

1. The test is of 45 Minutes duration.
2. The test contains 50 Questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:
  - a. Correct answer or the most appropriate answer: Five marks (+5)
  - b. Any incorrect option marked will be given minus one mark (–1).
  - c. Unanswered/Marked for Review will be given no mark (0).

Choose the correct answer :

**Question ID: 692641**

Among the following statements, choose the correct statements.

- A. In ionic solid, ions are the constituent particles.
- B. Ionic solids are soft.
- C. Ionic solid are electrical insulators in the solid state.
- D. Ionic solid conduct electricity in molten state.
- E. Ionic solid have low melting and boiling points.

Choose the correct answer from the options given below :

- (A) A, C & D only                      (B) A, D & E only
- (C) A, B & C only                      (D) A, C & E only

**Answer (A)**

**Sol.** Ions are the constituent particles of ionic solids. Such solids are formed by the three dimensional arrangements of cations and anions bound by strong coulombic (electrostatic) forces. These solids are hard and brittle in nature. They have high melting and boiling points. Since the ions are not free to move about, they are electrical insulators in the solid state. However, in the molten state or when dissolved in water, the ions become free to move about and they conduct electricity.

**Question ID: 692642**

Atoms of element B form hcp lattice and those of the element A occupy  $\frac{2}{3}$ rd of tetrahedral voids. What is the formula of the compound formed by the elements A and B?

- (A)  $A_3B_4$                                   (B)  $A_4B_3$
- (C)  $A_2B_3$                                   (D)  $A_3B_2$

**Answer (B)**

**Sol.** Since B forms HCl number of B = 6

A at  $\frac{2}{3}$ rd of tetrahedral void.

$$\text{Number of A} = \frac{2}{3} \times 12 = 8$$

$$\text{Formula : } A_8B_6 \Rightarrow A_4B_3$$

**Question ID: 692643**

Consider the 1 M aqueous solution of the following compounds and arrange them in the increasing order of elevation in the boiling points.

- A.  $C_6H_{12}O_6$                                   B. NaCl
- C.  $MgCl_2$                                       D.  $AlCl_3$
- E.  $Al_2(SO_4)_3$

Choose the correct answer from the options given below :

- (A)  $B < C < D < E < A$
- (B)  $A < E < D < C < B$
- (C)  $A < B < C < D < E$
- (D)  $E < D < C < B < A$

**Answer (C)**

**Sol.** Elevation in boiling point  $\propto i \times M$

Solute	i
A. $C_6H_{12}O_6$	1
B. NaCl	2
C. $MgCl_2$	3
D. $AlCl_3$	4
E. $Al_2(SO_4)_3$	5

Order of elevation in boiling point

$$E > D > C > B > A$$

**Question ID: 692644**

Calculate the molarity of a solution containing 5 g of NaOH in 450 mL solution.

- (A)  $0.278 \times 10^{-3} M$
- (B) 0.278 M
- (C)  $2.78 \times 10^{-3} M$
- (D) 2.78 M

**Answer (D)**

$$\begin{aligned} \text{Sol. Molarity } M &= \frac{W \times 1000}{M \times V_{ml}} \\ &= \frac{5 \times 1000}{40 \times 450} \\ &= 2.78 M \end{aligned}$$

**Question ID: 692645**

Among the following statements related to ionic conductance, choose the correct statements.

- A. Ionic conductance depends on the nature of electrolyte
- B. Ionic conductance is due to the movements of electrons
- C. Ionic conductance is also called electronic conductance
- D. Ionic conductance depends on temperature
- E. Ionic conductance also depends on the nature of solvent

Choose the correct answer from the options given below :

- (A) A, B and C only      (B) B, C and D only
- (C) B, C and E only      (D) A, D and E only

**Answer (D)**

**Sol.** The conductance of electricity by ions present in the solutions is called electrolytic or ionic conductance. The conductivity of electrolytic (ionic) solutions depends on :

- (i) the nature of the electrolyte added
- (ii) size of the ions produced and their solvation
- (iii) the nature of the solvent and its viscosity
- (iv) concentration of the electrolyte
- (v) temperature (it increases with the increase of temperature)

**Question ID: 692646**

$\Lambda_m^0$  for NaCl, HCl and NaOAc are 126.4, 425.9 and 91.0 S cm<sup>2</sup> mol<sup>-1</sup> respectively. Calculate  $\Lambda^0$  for HOAc

- (A) 390.5 S cm<sup>2</sup> mol<sup>-1</sup>      (B) 643.3 S cm<sup>2</sup> mol<sup>-1</sup>
- (C) 461.3 S cm<sup>2</sup> mol<sup>-1</sup>      (D) 208.5 S cm<sup>2</sup> mol<sup>-1</sup>

**Answer (A)**

**Sol.**  $\Lambda_{m(\text{HAc})}^0 = \lambda_{\text{H}^+}^0 + \lambda_{\text{Ac}^-}^0$

$$= \lambda_{\text{H}^+}^0 + \lambda_{\text{Cl}^-}^0 + \lambda_{\text{Ac}^-}^0 + \lambda_{\text{Na}^+}^0 - \lambda_{\text{Cl}^-}^0 - \lambda_{\text{Na}^+}^0$$

$$= \Lambda_{m(\text{HCl})}^0 + \Lambda_{m(\text{NaAc})}^0 - \Lambda_{m(\text{NaCl})}^0$$

$$= (425.9 + 91.0 - 126.4) \text{ S cm}^2 \text{ mol}^{-1} \\ = 390.5 \text{ S cm}^2 \text{ mol}^{-1}$$

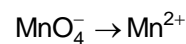
**Question ID: 692647**

How much charge is required for the reduction of 1 mole of  $\text{MnO}_4^-$  to  $\text{Mn}^{2+}$ ?

- (A) 1 F      (B) 5 F
- (C) 3 F      (D) 6 F

**Answer (B)**

**Sol.** For redox change



$$n\text{-factor} = 5$$

$$n_{\text{eq}} = n_{\text{mol}} \times n\text{-factor}$$

$$= 1 \times 5$$

$$= 5$$

$$\text{Charge required in Faraday} = \text{Number of } n_{\text{eq}} \\ = 5 \text{ F}$$

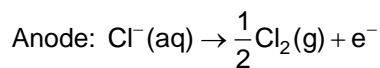
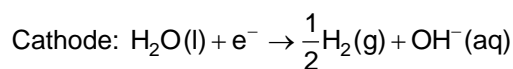
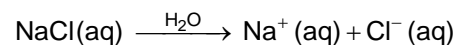
**Question ID: 692648**

The products formed at cathode and anode by electrolysis of aqueous NaCl solution respectively are

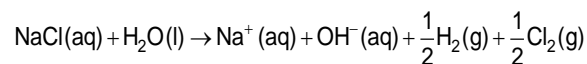
- (A) Na, Cl<sub>2</sub>      (B) Na, O<sub>2</sub>
- (C) H<sub>2</sub>, Cl<sub>2</sub>      (D) H<sub>2</sub>, O<sub>2</sub>

**Answer (C)**

**Sol.** On electrolysis of aq. NaCl



Net reaction :

**Question ID: 692649**

The artificial sweetner used only for cold food is

- (A) Alitame      (B) Sucralose
- (C) Aspartame      (D) Saccharin

**Answer (C)**

**Sol.** Aspartame is unstable at cooking temperature therefore limited to cold foods and soft drink only.

**Question ID:6926410**

Rate constant 'k' for a certain reaction is  $k = 2.3 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$ . Order of the reaction is

- (A) 0 (B) 1  
(C) 2 (D) 3

**Answer (C)**

**Sol.**  $K = 2.3 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$

For order of reaction,

$$\text{The unit of rate constant} = \frac{\text{mol L}^{-1}}{\text{s}} \times \frac{1}{(\text{mol L}^{-1})^n}$$

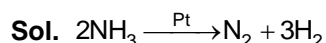
The unit ' $\text{L mol}^{-1} \text{ s}^{-1}$ ' corresponds to the 2<sup>nd</sup> order reaction.

**Question ID:6926411**

The decomposition of  $\text{NH}_3$  on platinum surface is zero order reaction. If  $k = 2.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$  the rate of production of  $\text{H}_2$  is

- (A)  $2.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$   
(B)  $7.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$   
(C)  $5.0 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$   
(D)  $10.0 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$

**Answer (B)**



As reaction is zero order

$$\text{Rate} = k[\text{NH}_3]^0$$

$$\text{Rate} = k$$

$$\text{Rate} = \frac{-1}{2} \frac{\Delta[\text{NH}_3]}{\Delta t} = \frac{1}{3} \frac{\Delta[\text{H}_2]}{\Delta t} = k$$

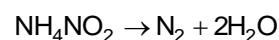
$$\frac{\Delta \text{H}}{\Delta t} = 3k$$

$$= 3 \times 2.5 \times 10^{-4}$$

$$= 7.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$$

**Question ID:6926412**

The molecularity of the following elementary reaction is



- (A) Zero (B) One  
(C) Two (D) Three

**Answer (B)**

**Sol.** Only one reacting species is involved, therefore it is a unimolecular reaction.

**Question ID 6926413**

Which of the following is not the Characteristic of Physisorption?

- (A) It arises because of vander Waals forces.  
(B) It is not specific in nature  
(C) Enthalpy of adsorption is high  
(D) It results into multi molecular layers on adsorbent surface under high pressure

**Answer (C)**

**Sol.** In physisorption enthalpy of adsorption is low ( $20-40 \text{ kJ mol}^{-1}$ ) whereas in case of chemisorption enthalpy of adsorption is high ( $80 - 240 \text{ kJ mol}^{-1}$ )

**Question ID 6926414**

Which one of the following is an emulsion?

- (A) Smoke  
(B) Hair cream  
(C) Paint  
(D) Cheese

**Answer (B)**

**Sol.**

Example	Type of Emulsion
Smoke	Aerosol
Hair Cream	Emulsion
Paint	Sol
Cheese	Gel

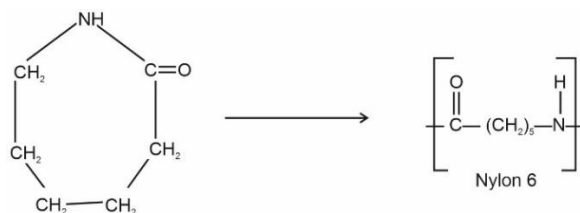
**Question ID 6926415**

Caprolactam is the starting material for

- (A) Nylon 6, 6  
(B) Nylon 6  
(C) Nylon 2, 6  
(D) Dacron

**Answer (B)**

Sol.



Caprolactam

**Question ID 6926416**

Which of the following is a positively charged sol?

- (A) Starch (B) Gum  
(C) Gold sol (D) Blood

**Answer (D)**

**Sol.** Blood is a positively charged colloid whereas sols of starch, gum & gold are negatively charged.

**Question ID 6926417**

Match list I with list II

List I		List II	
A.	Siderite	(I)	Aluminium
B.	Malachite	(II)	Iron
C.	Calamine	(III)	Copper
D.	Bauxite	(IV)	Zinc

Choose the correct answer from the options given below

- (A) A(I), B-(III), C(III), D(IV)  
(B) A(II), B(III), C(IV), D(I)  
(C) A(IV), B(III), C(II), D(I)  
(D) A(III), B(II), C(IV), D(I)

**Answer (B)**

**Sol.** Correct Match of ore & its composition is :

Ore	Compositions
Siderite	$\text{FeCO}_3$
Malachite	$\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
Calamine	$\text{ZnCO}_3$
Bauxite	$\text{AlO}_x(\text{OH})_{3-2x}$
	Where $0 < x < 1$

So, correct Answer is

A(II), B(III), C(IV), D(I)

**Question ID 6926418**

The metal refined by Van Arkel method is

- (A) Ni (B) Zr  
(C) Cu (D) Sn

**Answer (B)**

**Sol.** Zirconium (Zr) or Titanium (Ti) is refined using van Arkel method. This method is very useful for removing all the oxygen and nitrogen present in the form of impurity in metals like Zr and Ti.

**Question ID: 6926419**

Arrange the following hydrides in increasing order of thermal stability.

- A.  $\text{H}_2\text{O}$   
B.  $\text{H}_2\text{Se}$   
C.  $\text{H}_2\text{Po}$   
D.  $\text{H}_2\text{Te}$   
E.  $\text{H}_2\text{S}$

Choose the correct answer from the options given below:

- (A)  $\text{A} < \text{B} < \text{C} < \text{D} < \text{E}$  (B)  $\text{C} < \text{D} < \text{B} < \text{E} < \text{A}$   
(C)  $\text{C} < \text{D} < \text{E} < \text{B} < \text{A}$  (D)  $\text{A} < \text{E} < \text{B} < \text{D} < \text{C}$

**Answer (B)**

**Sol.** Thermal stability of group-16 hydrides decreases from  $\text{H}_2\text{O}$  to  $\text{H}_2\text{Po}$  due to decrease in bond dissociation energy.

So, correct order of thermal stability is:

**Question ID: 6926420**

Match list I with list II

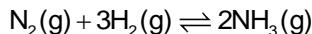
List I	List II
A. Ammonia	I. Ostwald's process
B. Chlorine	II. Contact process
C. Sulphuric Acid	III. Deacon process
D. Nitric Acid	IV. Haber's process

Choose the correct answer from the options given below:

- (A) A-IV, B-III, C-II, D-I (B) A-IV, B-I, C-II, D-III  
(C) A-IV, B-III, C-I, D-II (D) A-IV, B-I, C-III, D-II

**Answer (A)**

**Sol.** On a large scale, ammonia ( $\text{NH}_3$ ) is manufactured by Haber's process.



While,  $\text{HNO}_3$  is prepared using Ostwald's method. Sulphuric acid is manufactured by contact process and  $\text{Cl}_2$  is manufactured by Deacon's process

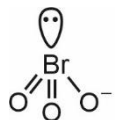
**Question ID: 6926421**

The formula of a noble gas species which is isostructural with  $\text{BrO}_3^-$  is:

- (A)  $\text{XeOF}_4$  (B)  $\text{XeF}_2$   
(C)  $\text{XeO}_3$  (D)  $\text{XeF}_4$

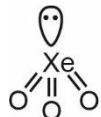
**Answer (C)**

**Sol.** In  $\text{BrO}_3^-$  ion, Br has  $sp^3$  hybridisation



Trigonal pyramidal

In  $\text{XeO}_3$ , Xe has  $sp^3$  hybridisation.



Trigonal pyramidal

**Question ID: 6926422**

Match list I with list II

List I (Transition Metals)	List II (Maximum Oxidation State)
A. Ti	I. 7
B. V	II. 4
C. Mn	III. 5
D. Cu	IV. 2

Choose the correct answer from the options given below:

- (A) A-II, B-III, C-I, D-IV (B) A-I, B-II, C-III, D-IV  
(C) A-III, B-I, C-II, D-IV (D) A-II, B-I, C-III, D-IV

**Answer (A)**

**Sol.** Outer electron configuration of Ti =  $3d^2 4s^2$

So, Maximum O.S. of Ti = +4

Outer E.C. of V =  $3d^3 4s^2$

So, Maximum O.S. of V = +5

Outer E.C. of Mn =  $3d^5 4s^2$

So, Maximum O.S. of Mn = +7

Outer E.C. of Cu =  $3d^{10} 4s^1$

So, Maximum O.S. of Cu = +2

So, correct option is : A-II, B-III, C-I, D-IV

**Question ID: 6926423**

The metal from first transition series having positive

$E_{M^{2+}/M}^0$  value :

- (A) Cr (B) V  
(C) Cu (D) Ni

**Answer (C)**

**Sol.** Cu has positive  $E_{Cu^{2+}/Cu}^0$  value in 3d series.

$$E_{Cu^{2+}/Cu}^0 = 0.34 \text{ V}$$

$$E_{Cr^{2+}/Cr}^0 = -0.90 \text{ V}$$

$$E_{V^{2+}/V}^0 = -1.18 \text{ V}$$

$$E_{Ni^{2+}/Ni}^0 = -0.25 \text{ V}$$

**Question ID: 6926424**

Magnetic moment of a divalent ion in aqueous solution of an element with atomic number 25 is:

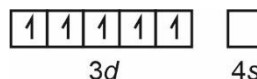
- (A) 2.84 BM (B) 3.87 BM  
(C) 4.90 BM (D) 5.92 BM

**Answer (D)**

**Sol.** Atomic number ( $z = 25$ ) belongs to Mn atom

$$\text{E.C. of Mn} = [\text{Ar}] 3d^5 4s^2$$

$$\text{E.C. of Mn}^{2+} \text{ ion} = [\text{Ar}] 3d^5 4s^0$$



$$\mu = \sqrt{n(n+2)} \text{ BM}$$

Number of unpaired electrons = 5

$$\mu = \sqrt{5(5+2)} = \sqrt{35} \text{ BM}$$

$$\mu = 5.92 \text{ BM}$$

**Question ID: 6926425**

Which one of the following transition metal ion is colourless?

- (A)  $\text{Sc}^{3+}$  (B)  $\text{V}^{2+}$   
(C)  $\text{Mn}^{2+}$  (D)  $\text{Co}^{3+}$

**Answer (A)**

**Sol.** In general species having no unpaired electron is colourless. So  $\text{Sc}^{3+}$  has electronic configuration  $[\text{Ar}] 3d^0 4s^0$

So, it is colourless ion.

**Question ID: 6926426**

Among the following statements, choose the correct statements.

- A.  $\text{S}_\text{N}2$  reaction proceeds with stereo chemical inversion.
- B. The process of conversion of Racemic mixture into enantiomer is known as Racemisation
- C. A mixture containing 2 enantiomers in equal proportions is known as Racemic mixture.
- D. The stereoisomers related to each other as superimposable mirror image are called enantiomers.
- E. The objects which are non-superimposable on their mirror image are said to be chiral and this properly is known as chirality.

Choose the correct answer from the options given below :

- (A) A, B and C only
- (B) A, C and E only
- (C) B, C and E only
- (D) C, D and E only

**Answer (B)**

**Sol.**  $\text{S}_\text{N}2$  reaction proceeds with stereo chemical inversion.

The process of conversion of enantiomer into Racemic mixture is known as Racemisation. A mixture containing 2 enantiomers in equal proportions is known as Racemic mixture.

The stereoisomers related to each other as superimposable mirror image are identical with each other.

The object which are non-superimposable on their mirror image are said to be chiral and this property to known as chirality.

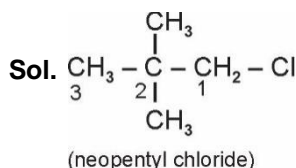
So, only A, C & E are correct statement.

**Question ID: 6926427**

IUPAC name of neopentyl chloride is

- (A) 1-Chloro – 2, 2-dimethylpropane
- (B) 2-Chloro – 1, 2-dimethylpropane
- (C) 2-Chloro – 2 – Methylbutane
- (D) 2-Chloro – 2 – Methylpentane

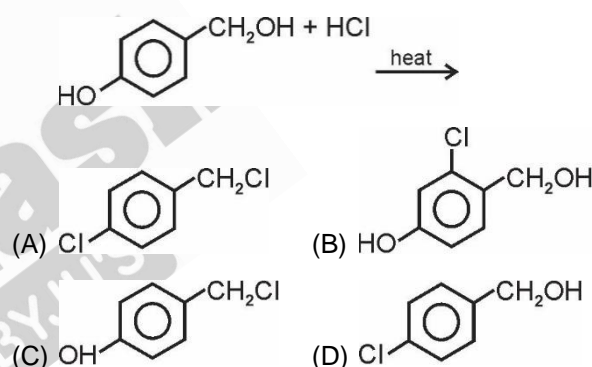
**Answer (A)**



1-chloro-2, 2-dimethylpropane

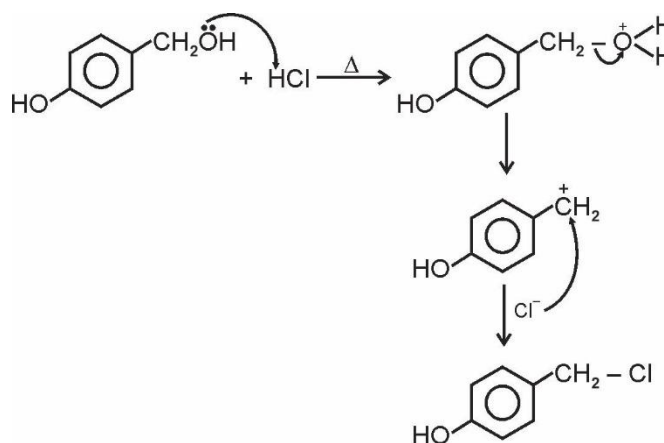
**Question ID: 6926428**

The structure of major monohalo product in the following reaction is \_\_\_\_\_



**Answer (C)**

**Sol.**



- $sp^3$  hybridized carbon atom show fast nucleophilic substitution reaction than  $sp^2$  hybridized carbon atom.



**Question ID: 6926429**

Among the following statements, choose the correct statements.

- A. Boiling point of alcohols increases with increase in the number of carbon atoms.
- B. In alcohols, boiling points increases with increase of branching in carbon chain.
- C. Boiling points of alcohols are lesser in comparison to haloalkanes of comparable molecular mass.
- D. Boiling points of alcohols are higher in comparison to hydrocarbons of comparable molecular mass.
- E. The high boiling points of alcohols are mainly due to the presence of intramolecular hydrogen bonding.

Choose the correct answer from the options given below

- (A) A, D and E only
- (B) A, B and C only
- (C) B, C and D only
- (D) C, D and E only

**Answer (A)**

**Sol.** • The boiling points of alcohols increase with increase in the number of carbon atoms (increase in van der Waals forces). In alcohols, the boiling points decrease with increase of branching in carbon chain (because of decrease in van der Waals forces with decrease in surface area)

- Boiling point of alcohols is more in comparison to hydrocarbons of comparable molecular mass due to intermolecular hydrogen bonding.
- Boiling point of alcohols are higher in comparison to other classes of compounds, namely hydrocarbons, ether, haloalkanes and haloarenes of comparable molecular masses.

**Note :** In statement E, we have to consider inter molecular hydrogen bonding instead of intramolecular hydrogen bonding.

**Question ID: 6926430**

Arrange the following compounds in increasing order of their acid strength :

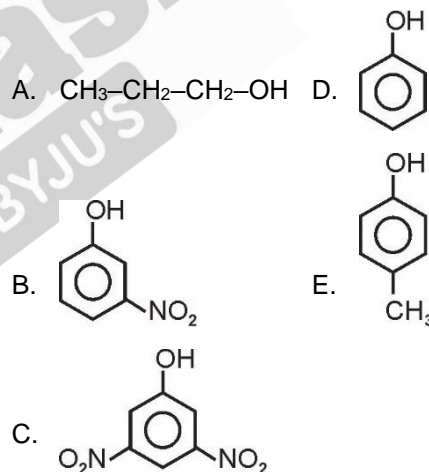
- A. Propan-1-ol
- B. 3-nitrophenol
- C. 3, 5-dinitrophenol
- D. Phenol
- E. 4-Methylphenol

Choose the correct answer from the options given below :

- (A)  $A < D < C < B < E$
- (B)  $C < B < D < E < A$
- (C)  $A < B < C < D < E$
- (D)  $A < E < D < B < C$

**Answer (D)**

**Sol.** • More electron withdrawing group attached with alcohols or phenols, more will be the acidity



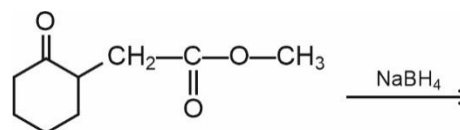
- Alkyl groups show +I effect and  $\text{—NO}_2$  group show  $\text{—M}$  effect

Order of acids strength



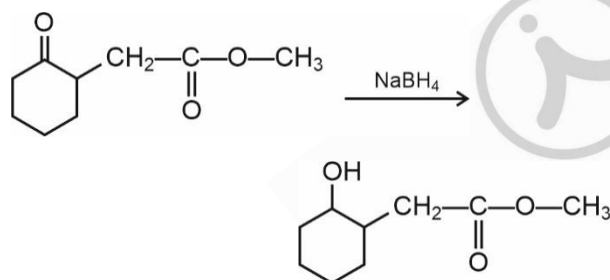
**Question ID: 6926431**

The structure of the product of the following reaction is:





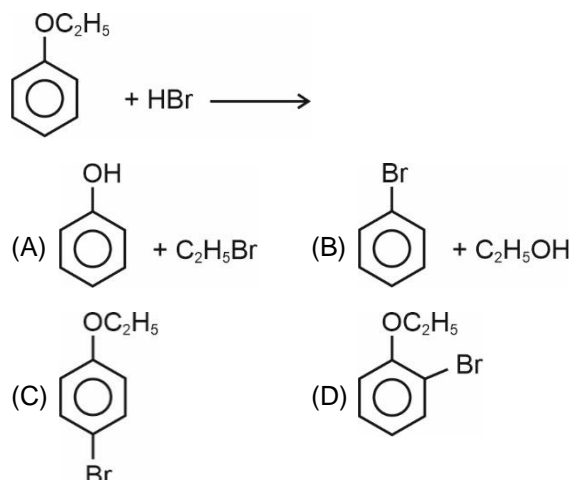
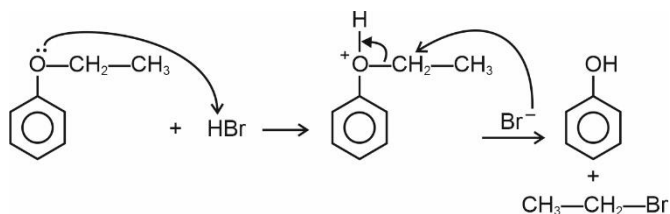
- (A)
- (B)
- (C)
- (D)

**Answer (B)****Sol.**

$\text{NaBH}_4$  can reduce aldehyde and ketone functional groups into primary and secondary alcohol respectively.

**Question ID:6926432**

The Product of the following reaction is:

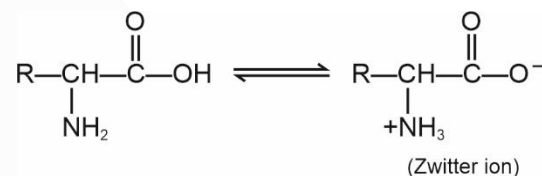
**Answer (A)****Sol.****Question ID:6926433**

Amino acid in Zwitter ionic form show

- (A) Acid Behaviour  
(B) Basic Behaviour  
(C) Amphoteric Behaviour  
(D) Neutral Behaviour

**Answer (C)**

**Sol.** In Zwitter ionic form, amino acids show amphoteric behaviour as they react both with acids and bases.

**Question ID:6926434**

Match List-I with List-II

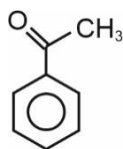
List-I (Nomenclature)	List-II (Structure)
1. Acetophenone	I.
2. Benzaldehyde	II.
3. Benzoic acid	III.
4. Benzophenone	IV.

Choose the correct answer from the options given below:

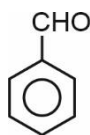
- (A) 1 – III, 2 – I, 3 – II, 4 – IV  
(B) 1 – II, 2 – I, 3 – IV, 4 – III  
(C) 1 – I, 2 – II, 3 – III, 4 – IV  
(D) 1 – IV, 2 – III, 3 – II, 4 – I

**Answer (B)**

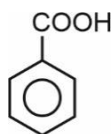
**Sol.** 1. Acetophenone



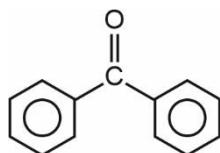
2. Benzaldehyde



3. Benzoic acid



4. Benzophenone

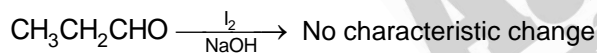
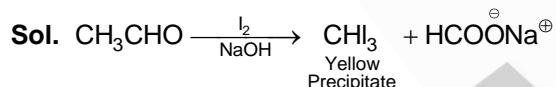


**Question ID:6926435**

Which simple chemical test is used to distinguish between ethanal and propanal?

- (A) Iodoform test (B) Tollen's test  
(C) Fehling's test (D) Lucas test

**Answer (A)**



Ethanal gives positive iodoform test.

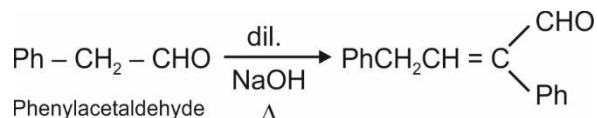
**Question ID: 6926436**

Which of the following compound would undergo Aldol condensation?

- (A) Methanal (B) Benzaldehyde  
(C) 2, 2-Dimethylbutanal (D) Phenylacetaldehyde

**Answer (D)**

**Sol.** Aldehydes which contain at least  $2\alpha$  hydrogen atoms, undergo Aldol condensation reaction. Phenylacetaldehyde contains  $2\alpha$  hydrogen atoms and undergoes Aldol condensation reaction in presence of dilute alkali.



**Question ID: 6926437**

Among the following statements choose the correct statements.

- A. Analgesics reduce or abolish pain without causing impairment of consciousness, mental confusion.  
B. Tranquilizers are neurologically inactive drugs.  
C. Morphine is the example of non-narcotic analgesics.  
D. Disinfectants are applied to inanimate objects whereas antiseptics are applied to the living tissues.  
E. Same substance can act as an antiseptic as well as disinfectant by varying the concentration

Choose the correct answer from the options given below:

- (A) A, D and E only  
(B) B, C and D only  
(C) A, C and E only  
(D) B, C and E only

**Answer (A)**

**Sol.** Tranquilizers are neurologically active drugs.

Morphine is an example of narcotic analgesic.

**Question ID: 6926438**

Out of the following artificial sweetening agents, which one has highest sweetness value in comparison to cane sugar?

- (A) Saccharin (B) Alitame  
(C) Sucralose (D) Aspartame

**Answer (B)**

**Sol.**

Artificial Sweetener	Sweetness value in comparison to cane sugar
Saccharin	550
Alitame	2000
Sucralose	600
Aspartame	100

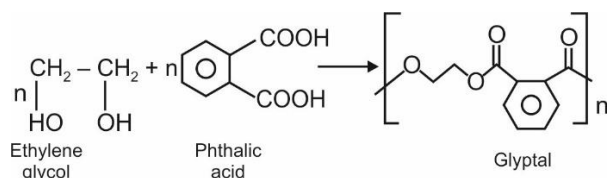
**Question ID: 6926439**

Among the following polymers, which one is the copolymer?

- (A) Polypropene  
(B) Polystyrene  
(C) Polyvinyl chloride  
(D) Glyptal

**Answer (D)**

**Sol.** A copolymer is formed by the polymerisation reaction in which a mixture of more than one monomeric species is allowed to polymerise.

**Question ID: 6926440**

Among the following, which one is a disaccharide?

- (A) Glucose  
(B) Glycogen  
(C) Maltose  
(D) Starch

**Answer (C)**

**Sol.** Disaccharides are formed by the glycosidic linkage of two monosaccharide units.

Maltose is a disaccharide which is composed of two α-D-glucose units.

**Question ID: 6926441**

Structure of ammonium salt when ethylamine reacts with one mole of HCl:

- (A)  $C_2H_5 - NH_3^+ Cl^-$                       (B)  $(C_2H_5)_2 - NH_2^+ Cl^-$   
(C)  $(C_2H_5)_3 - NH^+ Cl^-$                       (D)  $(C_2H_5)_4 - N^+ Cl^-$

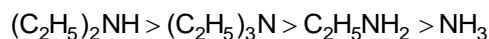
**Answer (A)****Question ID: 6926442**

Among the following amines, which one is most basic (in aqueous solution)?

- (A)  $NH_3$                       (B)  $C_2H_5NH_2$   
(C)  $(C_2H_5)_2NH$                       (D)  $(C_2H_5)_3N$

**Answer (C)**

**Sol.** Based on inductive effect, solvation effect, and steric hindrance of the alkyl group in aqueous medium the basic strength order of the amines is:

**Question ID: 6926443**

The correct order of basicity of amines in gas phase

- (A)  $1^\circ < 3^\circ < 2^\circ$                       (B)  $3^\circ < 1^\circ < 2^\circ$   
(C)  $2^\circ < 3^\circ < 1^\circ$                       (D)  $1^\circ < 2^\circ < 3^\circ$

**Answer (D)**

**Sol.** More is the substitution in amine, more is +I effect hence more will be the basic strength. The correct order of basic strength:  $3^\circ > 2^\circ > 1^\circ$

**Question ID: 6926444**

Among the following, which one has the highest  $pK_b$  value?

- (A)  $C_2H_5NH_2$   
(B)  $C_6H_5NHCH_3$   
(C)  $(C_2H_5)_2NH$   
(D)  $C_6H_5NH_2$

**Answer (D)**

**Sol.** Higher is the value of  $pK_b$ , weaker is the basic strength. Lone pair of electron of nitrogen in amine (aniline) is involved in delocalization and hence its availability for protonation is minimum. It is least basic among the given options hence its  $pK_b$  is highest.

**Question ID: 6926445**

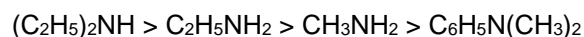
Among the following, which one has the highest  $K_b$  value?

- (A)  $C_2H_5NH_2$                       (B)  $C_6H_5N(CH_3)_2$   
(C)  $(C_2H_5)_2NH$                       (D)  $CH_3NH_2$

**Answer (C)**

**Sol.**

- More the basic nature of amine, more will be the  $K_b$  value.
- Basic nature



$$K_b : 10^{-3} \quad 10^{-3.29} \quad 10^{-3.38} \quad 10^{-8.92}$$

**Passage:**

According to the valence bond theory, the metal atom or ion under the influence of ligands can use its (n-1)d, ns, np, nd orbitals for hybridisation to yield a set of equivalent orbitals of definite geometry. These hybridised orbitals are allowed to overlap with ligand orbitals that can donate electron pairs for bonding. It is usually possible to predict the geometry of a complex from the knowledge of its magnetic behaviour on the basis of the valence bond theory. Consider the formation of  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$  and answer the following question:

**Questions ID : 6926446**

The IUPAC name of the above coordination entity is

- (A) Chloridopentaamminecobaltate(II) chloride
- (B) Chloridopentaamminecobaltate(II) dichloride
- (C) Pentaamminechloridocobalt (III) chloride
- (D) Pentaamminechloridocobalt (III) dichloride

**Answer (C)**

**Sol.**  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$  : Pentaamminechloridocobalt (III) chloride

**Questions ID : 6926447**

The spin only magnetic moment of the complex  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$  in BM is

- (A) 1.7
- (B) 0.0
- (C) 3.8
- (D) 4.9

**Answer (B)**

**Sol.** Due to high charge density on  $\text{Co}^{3+}$  and presence of strong field ligand ( $\text{NH}_3$ ), electrons in d-orbitals will pair up so unpaired electron (n) will be zero.

$$\therefore \text{Spin only magnetic moment} = \sqrt{n(n+2)} \text{ BM} \\ = 0$$

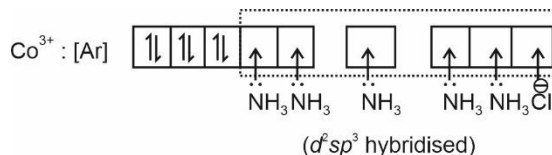
**Questions ID : 6926448**

The hybridization of cobalt in the above coordination entity is

- (A)  $sp^3d^2$
- (B)  $d^2sp^3$
- (C)  $sp^3d$
- (D)  $dsp^3$

**Answer (B)**

**Sol.**  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2 \Rightarrow \text{Co}^{3+} : [\text{Ar}]3d^64s^04p^0$



**Questions ID : 6926449**

The coordination number of cobalt in the above coordination entity is

- (A) 2
- (B) 4
- (C) 5
- (D) 6

**Answer (D)**

**Sol.**  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$

Coordination number = total number of donating sites = 5 + 1 = 6

**Questions ID : 6926450**

The primary valence of Co in above coordination entity is

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

**Answer (C)**

**Sol.**  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2 : x + 5(0) + 3(-1) = 0$

$$\Rightarrow x = +3 \Rightarrow \text{Co}^{3+}$$

Primary valence = oxidation state of central metal = +3