

Section : Chemistry

Q.1 The molality of solution obtained by dissolving 1.5 g of ethanoic acid CH_3COOH in 25 g of benzene is:

1. 0.1 mol kg^{-1}
2. $0.001 \text{ mol kg}^{-1}$
3. 1.0 mol kg^{-1}
4. 0.2 mol kg^{-1}

Options 1. 1
2. 2
3. 3
4. 4

Q.2 What is the formula for the Tetraammineaquachloridocobalt (III) chloride coordination compound?

1. $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}_2$
2. $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})_2]\text{Cl}_3$
3. $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}_2]\text{Cl}$
4. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}\cdot\text{H}_2\text{O}$

Options 1. 1
2. 2
3. 3
4. 4

Q.3 Which of the following is a heteroleptic complex?

1. $[\text{Cr}(\text{NH}_3)_6]^{3+}$
2. $[\text{Fe}(\text{NH}_3)_6]^{3+}$
3. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]$
4. $[\text{Mn}(\text{CN})_6]^{4-}$

Options 1. 1
2. 2
3. 3
4. 4

Q.4 Arrange the following alkyl halides in increasing order of reactivity towards $\text{S}_\text{N}2$ reaction:

- (A) 1-Bromobutane
- (B) 1-Bromo-2,2-dimethylpropane
- (C) 1-Bromo-2-methylbutane
- (D) 1-Bromo-3-methylbutane

Choose the correct answer from the options given below:

1. (A), (B), (C), (D)
2. (A), (C), (B), (D)
3. (B), (C), (D), (A)
4. (C), (B), (D), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.5 Which of the following vitamins are water soluble ?

- (A) Thiamine
- (B) Riboflavin
- (C) Pyridoxine
- (D) Ascorbic acid

Choose the correct answer from the options given below:

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

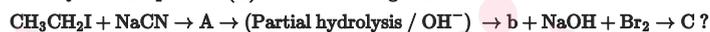
Options 1. 1
2. 2
3. 3
4. 4

Q.6 Molar conductivity increases with.....

1. Increase in concentration
2. Increase in pressure
3. Decrease in concentration
4. Decrease in pressure

Options 1. 1
2. 2
3. 3
4. 4

Q.7 Identify the final product (C) in the reaction given below:



1. $\text{CH}_3\text{CH}_2\text{OH}$



Options 1. 1

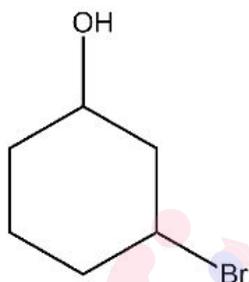
2. 2

3. 3

4. 4

Q.8

The IUPAC name of the following compound is



1. 3-Bromocyclohexanol

2. 2-Bromocyclohexanol

3. 3-Bromocyclohexanal

4. 3-Bromohexanol

Options 1. 1

2. 2

3. 3

4. 4

Q.9 The compound which will undergo Hoffmann Bromamide degradation

1. Aniline

2. Benzamide

3. Nitrobenzene

4. Benzylamine

Options 1. 1

2. 2

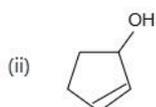
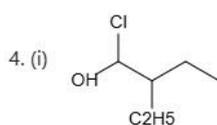
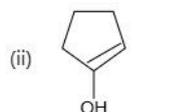
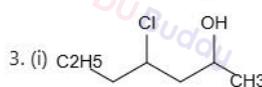
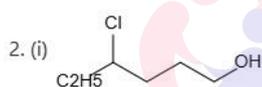
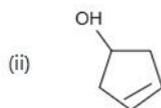
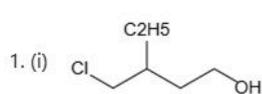
3. 3

4. 4

Q.10

Identify the correct structure of the compounds whose IUPAC names are respectively as follows:

(i) 4-Chloro-3-ethylbutan-1-ol and (ii) Cyclopent-3-en-1-ol



Options 1. 1

2. 2
3. 3
4. 4

Q.11 Match List-I with List-II

List-I	List-II
(A) S_N2	(I) Racemization
(B) Iodoform	(II) Ozone depletion
(A) S_N1	(III) Antiseptic
(D) Carbon tetrachloride	(IV) Inversion

Choose the correct answer from the options given below:

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

- Options 1. 1
2. 2
3. 3
4. 4

Q.12 The correct expression of the rate of the reaction according to the collision theory is:

1. $Z_{AB}e^{-\frac{E_a}{RT}}$

2. $PZ_{AB}e^{-\frac{E_a}{RT}}$

Extra close brace or missing open brace

4. $pe^{-\frac{E_a}{RT}}$

- Options 1. 1
2. 2
3. 3
4. 4

Q.13 Which of the following set of reagents will convert aniline to p-nitroaniline?

- $(CH_3CO)_2O$ / Pyridine, HNO_3/H_2SO_4 , and NaOH
- Sn/HCl, $NaNO_2/HCl$, H_3PO_2 , and H_2O
- HNO_3 , H_2SO_4 , and NaOH
- HNO_3 , H_2SO_4 , H_3PO_2 , and H_2O

- Options 1. 1
2. 2
3. 3
4. 4

Q.14 Match List-I with List-II

List-I	List-II
(Type of solution)	(Examples)
(A) Gas in liquid	(I) Brass
(B) liquid in liquid	(II) Benzene in Toluene
(C) liquid in solid	(III) Aerated drinks
(D) solid in solid	(IV) Mercury in gold

Choose the correct answer from the options given below:

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

- Options 1. 1
2. 2
3. 3
4. 4

Q.15 Among the given statements about electronic conductance, the correct statements are

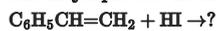
- The electronic conductance depends on the nature and structure of the metal
- The electronic conductance depends on temperature (it decreases with increase in temperature)
- The composition of the metallic conductor remains unchanged during electronic conductance.
- The electronic conduction depends on the number of valence electrons per atom.

Choose the correct answer from the options given below:

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

- Options 1. 1
2. 2
3. 3
4. 4

Q.16 The major product in the following reaction is:

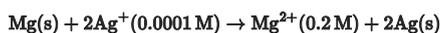


1. $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{I}$
2. $\text{C}_6\text{H}_5\text{CHICH}_3$
3. $\text{I}-\text{C}_6\text{H}_4\text{CH}=\text{CH}_2$
4. $\text{C}_6\text{H}_5\text{CH}_2\text{CHI}_2$

Options 1. 1

2. 2
3. 3
4. 4

Q.17 For the cell represented by the following reaction:



If $E_{\text{cell}}^\circ = 3.17\text{ V}$, its E_{cell} at 298 K will be:

(Given: $\log_{10} 2 = 0.301$)

1. 2.96 V
2. 2.42 V
3. 1.94 V
4. 4.5 V

Options 1. 1

2. 2
3. 3
4. 4

Q.18 Match List-I with List-II

List-I	List-II
Sources	Vitamin name
(A) Fish liver oil	(I) Vitamin C
(B) Citrus fruits	(II) Vitamin A
(C) Exposure to sunlight	(III) Vitamin B ₁₂
(D) Curd	(IV) Vitamin D

Choose the correct answer from the options given below:

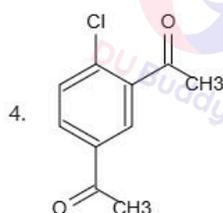
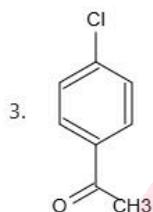
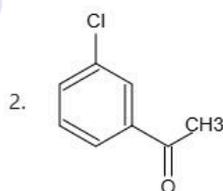
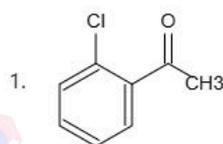
1. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
2. (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1

2. 2
3. 3
4. 4

Q.19

Chlorobenzene reacts with acetyl chloride in anhydrous AlCl_3 to give major product as



Options 1. 1

2. 2

3. 3

4. 4

Q.20 **Question:** Which of the following properties are related to the complex $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$?

(A) Paramagnetic

(B) Number of unpaired electrons are five

(C) d^2sp^3 hybridisation

(D) H_2O is a strong field ligand

Choose the correct answer from the options given below:

1. (A), (B) and (C) only

2. (A) and (B) only

3. (A), (B) and (D) only

4. (C) and (D) only

Options 1. 1

2. 2

3. 3

4. 4

Q.21 **Question:** A solution containing 10 g/dm^3 of urea (NH_2CONH_2) is isotonic with a 10% solution of a non-volatile solute. The molecular mass of the solute is:

1. 300 g mol^{-1}

2. 600 g mol^{-1}

3. 150 g mol^{-1}

4. 100 g mol^{-1}

Options 1. 1

2. 2

3. 3

4. 4

Q.22 Which type of linkage is present between the two nucleotides?

1. Phosphodiester linkage

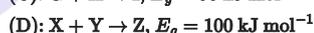
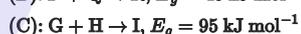
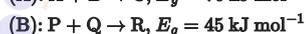
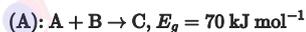
2. Phosphate linkage

3. α -linkage
4. β -linkage

Options 1. 1
2. 2
3. 3
4. 4

Q.23

Arrange the following reactions in increasing order of the value of the ratio of rate constants $\left(\frac{k_{310}}{k_{300}}\right)$



Choose the correct answer from the options given below:

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

Options 1. 1
2. 2
3. 3
4. 4

Q.24 The Chelating ligand used for the estimation of hardness of water is

- DMG
- DMSO
- EDTA
- Ethylenediamine

Options 1. 1
2. 2
3. 3
4. 4

Q.25 Identify the essential amino acids from the following.

- Threonine
- Serine
- Histidine
- Lysine

Choose the correct answer from the options given below:

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

Options 1. 1
2. 2
3. 3
4. 4

Q.26 Match List-I (amino acid) with List-II (Characteristic Side Chain)

List-I	List-II
Amino acid	Characteristic Side Chain

(A) Phenylalanine (I) $(\text{CH}_3)_2\text{CHCH}_2-$

(B) Leucine (II) $\text{C}_6\text{H}_5\text{CH}_2-$

(C) Lysine (III) $\text{CH}_3-\text{CH}_2-\text{CH}(\text{CH}_3)-$

(D) Isoleucine (IV) $\text{H}_2\text{N}-(\text{CH}_2)_4-$

Choose the correct answer from the options given below:

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

Options 1. 1
2. 2
3. 3
4. 4

Q.27 The vapour pressure of pure water at 25°C is 23.75 mmHg.

The vapour pressure of the solution obtained by dissolving 34.2 g of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) in 100 g of water will be:

- 23.33 mmHg
- 24.00 mmHg
- 22.50 mmHg
- 23.75 mmHg

Options 1. 1

2. 2
3. 3
4. 4

Q.28 A reaction is second order with respect to a reactant. If the concentration of the reactant is increased by 1.5 times, the rate of the reaction

1. Decreases by 1.5 times.
2. Increases by 2.25 times.
3. Decreases by 2.25 times.
4. Increases by 2.5 times.

- Options 1. 1
2. 2
3. 3
4. 4

Q.29 Match List-I with List-II

List-I

(A) Catalysts alter the rate of reaction

(B) Molecularity

(C) Second half life of a first order reaction

(D)

$$e^{-E_a/RT}$$

List-II

(I) cannot be fraction or zero

(II) by lowering the activation energy

(III) is the same as the first

(IV) refers to the fraction of molecules with energy equal to or greater than activation energy

Choose the correct answer from the options given below:

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

- Options 1. 1
2. 2
3. 3
4. 4

Q.30 The decreasing order of basicity of following amines in aqueous phase;

(A) N, N-Dimethylmethamine

(B) Methanamine

(C) N-Ethylethanamine

(D) Phenylmethanamine

Choose the correct answer from the options given below:

1. (C), (B), (A), (D)
2. (D), (C), (B), (A)
3. (D), (A), (C), (B)
4. (C), (A), (D), (B)

- Options 1. 1
2. 2
3. 3
4. 4

Q.31 Arrange the following compounds in increasing order of their solubility in water:

(A) n-butanol

(B) Butan-1-amine

(C) Methanamine

(D) Aniline

1. (A), (B), (C), (D)
2. (B), (A), (C), (D)
3. (D), (B), (A), (C)
4. (A), (B), (D), (C)

- Options 1. 1
2. 2
3. 3
4. 4

Q.32 What is the hybridisation of metal ion in $[\text{Ni}(\text{CO})_4]$ compound?

(1) sp^3

(2) dsp^2

(3) spd^2

(4) sp^2d

- Options 1. 1
2. 2
3. 3
4. 4

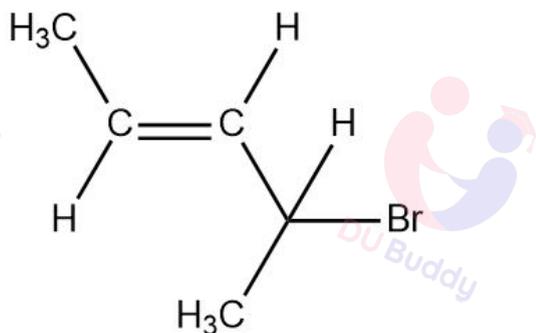
Q.33 For a chemical reaction with a rise in temperature by 10°C , the rate constant becomes nearly

1. 4 times
2. 2 times
3. 3 times
4. 6 times

- Options 1. 1
2. 2
3. 3
4. 4

Q.34

IUPAC name of the following compound is:



1. 4-Bromopent-2-ene
2. 2-Bromopent-2-ene
3. 3-Bromopent-2-ene
4. 4-Bromopent-3-ene

Options 1. 1
2. 2
3. 3
4. 4

Q.35 Arrange the following in increasing order of their conductivity

- (A) Silicon
- (B) Germanium
- (C) Sodium
- (D) Glass

Choose the correct answer from the options given below:

1. (D), (A), (B), (C)
2. (D), (B), (A), (C)
3. (B), (A), (D), (C)
4. (C), (B), (A), (D)

Options 1. 1
2. 2
3. 3
4. 4

Q.36 The reagent involved in Lucas test is

1. H₂SO₄
2. Conc. HCl and anhydrous ZnCl₂
3. Anhy. AlCl₃
4. CrO₃

Options 1. 1
2. 2
3. 3
4. 4

Q.37 Which of the following compounds comprise of a phenolic group?

- (A) Salicylic acid
- (B) Salicylaldehyde
- (C) Cresol
- (D) Catechol

Choose the correct answer from the options given below:

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

Options 1. 1
2. 2
3. 3
4. 4

Q.38 Which one of the following is the weakest oxidizing agent?

1. F
2. H₂
3. Li⁺
4. K⁺

- Options 1. 1
2. 2
3. 3
4. 4

Q.39 In the conversion of ethanol to ethene, the first step of the reaction involves the formation of

1. Oxonium ion
2. Carbonium ion
3. Carbene
4. Carbanion ion

- Options 1. 1
2. 2
3. 3
4. 4

Q.40 The degree of dissociation (α) of a weak electrolyte A_xB_y is related to the van't Hoff factor (i) by the expression:

1. $\alpha = \frac{(i-1)}{(x+y-1)}$

2. $\alpha = \frac{(i-1)}{(x+y+1)}$

3. $\alpha = \frac{(x+y-1)}{(i-1)}$

4. $\alpha = \frac{(x+y+1)}{(i-1)}$

- Options 1. 1
2. 2
3. 3
4. 4

Q.41 Read the passage carefully and answer the questions

Carboxylic acids are the organic compounds which comprise of carboxyl functional group, -COOH. These are generally found in nature, some higher members are known as fatty acids as they occur in natural fats as esters of glycerol. They can be prepared from oxidation of alcohols and aldehydes, hydrolysis of nitriles and amides and Grignard reagents. They are stronger acids than simple phenols and alcohols. but weaker than mineral acids. Substituents affect the acidity of aliphatic and aromatic carboxylic acids. They undergo reactions involving cleavage of -OH and C-OH bond. Carboxylic acids having an alpha hydrogen get halogenated in the presence of red phosphorus to form alpha halo carboxylic acids. The reaction is known as Hell Volhard Zelinsky reaction. Besides these aromatic carboxylic acids undergo electrophilic substitution reactions. They are versatile and are employed in the manufacture of various useful compounds. For example, methanoic acid is used in rubber, textile, dyeing, leather and electroplating industries. Higher fatty acids are used in the manufacture of soaps and detergents. Esters of Benzoic acid are used in perfumery.

The reagents needed for the preparation of Benzoic acid from ethyl benzene is:

1. $\text{AgNO}_3/\text{H}_2\text{SO}_4$
2. $\text{KMnO}_4\text{-KOH, H}_3\text{O}^+$
3. H_2/PtO_2
4. $\text{LiAlH}_4/\text{Ether}$

- Options 1. 1
2. 2
3. 3
4. 4

Q.42 Read the passage carefully and answer the questions

Carboxylic acids are the organic compounds which comprise of carboxyl functional group, -COOH. These are generally found in nature, some higher members are known as fatty acids as they occur in natural fats as esters of glycerol. They can be prepared from oxidation of alcohols and aldehydes, hydrolysis of nitriles and amides and Grignard reagents. They are stronger acids than simple phenols and alcohols. but weaker than mineral acids. Substituents affect the acidity of aliphatic and aromatic carboxylic acids. They undergo reactions involving cleavage of -OH and C-OH bond. Carboxylic acids having an alpha hydrogen get halogenated in the presence of red phosphorus to form alpha halo carboxylic acids. The reaction is known as Hell Volhard Zelinsky reaction. Besides these aromatic carboxylic acids undergo electrophilic substitution reactions. They are versatile and are employed in the manufacture of various useful compounds. For example, methanoic acid is used in rubber, textile, dyeing, leather and electroplating industries. Higher fatty acids are used in the manufacture of soaps and detergents. Esters of Benzoic acid are used in perfumery.

Which carboxylic acid will not undergo HVZ reaction?

1. Ethanoic acid
2. Benzoic acid
3. Propanoic acid
4. Phenyl acetic acid

- Options 1. 1
2. 2
3. 3
4. 4

Q.43 Read the passage carefully and answer the questions

Carboxylic acids are the organic compounds which comprise of carboxyl functional group, -COOH. These are

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Esterification of carboxylic acid with alcohols or phenols is which type of reaction?

1. Nucleophilic Substitution
2. Nucleophilic acyl substitution
3. Nucleophilic addition
4. Electrophilic addition

- Options 1. 1
2. 2
3. 3
4. 4

Q.44 Read the passage carefully and answer the questions

Carboxylic acids are the organic compounds which comprise of carboxyl functional group, -COOH. These are generally found in nature, some higher members are known as fatty acids as they occur in natural fats as esters of glycerol. They can be prepared from oxidation of alcohols and aldehydes, hydrolysis of nitriles and amides and Grignard reagents. They are stronger acids than simple phenols and alcohols, but weaker than mineral acids. Substituents affect the acidity of aliphatic and aromatic carboxylic acids. They undergo reactions involving cleavage of -OH and C-OH bond. Carboxylic acids having an alpha hydrogen get halogenated in the presence of red phosphorus to form alpha halo carboxylic acids. The reaction is known as Hell Volhard Zelinsky reaction. Besides these aromatic carboxylic acids undergo electrophilic substitution reactions. They are versatile and are employed in the manufacture of various useful compounds. For example, methanoic acid is used in rubber, textile, dyeing, leather and electroplating industries. Higher fatty acids are used in the manufacture of soaps and detergents. Esters of Benzoic acid are used in perfumery.

Benzoic acid in the presence of conc. HNO₃ and conc. H₂SO₄ gives major product as:

1. Ortho-Nitrobenzoic acid
2. Para-Nitrobenzoic acid
3. Mixture of Ortho and Para-Nitrobenzoic acid
4. Meta-Nitrobenzoic acid

- Options 1. 1
2. 2
3. 3
4. 4

Q.45 Read the passage carefully and answer the questions

Carboxylic acids are the organic compounds which comprise of carboxyl functional group, -COOH. These are generally found in nature, some higher members are known as fatty acids as they occur in natural fats as esters of glycerol. They can be prepared from oxidation of alcohols and aldehydes, hydrolysis of nitriles and amides and Grignard reagents. They are stronger acids than simple phenols and alcohols, but weaker than mineral acids. Substituents affect the acidity of aliphatic and aromatic carboxylic acids. They undergo reactions involving cleavage of -OH and C-OH bond. Carboxylic acids having an alpha hydrogen get halogenated in the presence of red phosphorus to form alpha halo carboxylic acids. The reaction is known as Hell Volhard Zelinsky reaction. Besides these aromatic carboxylic acids undergo electrophilic substitution reactions. They are versatile and are employed in the manufacture of various useful compounds. For example, methanoic acid is used in rubber, textile, dyeing, leather and electroplating industries. Higher fatty acids are used in the manufacture of soaps and detergents. Esters of Benzoic acid are used in perfumery.

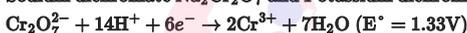
Identify the strongest acid

1. Benzoic acid
2. Phenyl acetic acid
3. Acetic acid
4. Propanoic acid

- Options 1. 1
2. 2
3. 3
4. 4

Q.46 Read the passage carefully and answer the questions

Sodium dichromate Na₂Cr₂O₇ and Potassium dichromate K₂Cr₂O₇ are strong oxidizing agents; in acidic solution, its oxidising action can be represented as follows:



The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.

The chromate ion is tetrahedral whereas the dichromate ion consists of two tetrahedra sharing one corner with Cr-O-Cr bond angle of 126°

Potassium permanganate is prepared by fusion of MnO₂ with an alkali metal hydroxide and an oxidising agent like KNO₃.

This produces the dark green K₂MnO₄ which disproportionates in a neutral or acidic solution to give permanganate.

It is a strong oxidizing agent. Hydrogen ion concentration of the solution plays

an important part in the reduction of permanganate to manganate, manganese dioxide and manganese(II) salt.

Potassium permanganate forms dark purple (almost black) crystals which are isostructural with those of KClO₄.

The salt is not very soluble in water (6.4 g/100 g of water at 293 K), but when heated it decomposes at 513 K.

The number of moles of KMnO₄ required to react with one mole of sulphide ion in acidic solution is

1. 2
2. 3/5
3. 2/5
4. 1/5

- Options 1. 1
2. 2

3. 3
4. 4

Q.47 Read the passage carefully and answer the questions

Sodium dichromate $\text{Na}_2\text{Cr}_2\text{O}_7$ and Potassium dichromate $\text{K}_2\text{Cr}_2\text{O}_7$ are strong oxidizing agents; in acidic solution, its oxidising action can be represented as follows:



The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.

The chromate ion is tetrahedral whereas the dichromate ion consists of two tetrahedra sharing one corner with Cr–O–Cr bond angle of 126°

Potassium permanganate is prepared by fusion of MnO_2 with an alkali metal hydroxide and an oxidising agent like KNO_3 .

This produces the dark green K_2MnO_4 which disproportionates in a neutral or acidic solution to give permanganate.

It is a strong oxidizing agent. Hydrogen ion concentration of the solution plays

an important part in the reduction of permanganate to manganate, manganese dioxide and manganese(II) salt.

Potassium permanganate forms dark purple (almost black) crystals which are isostructural with those of KClO_4 .

The salt is not very soluble in water (6.4 g/100 g of water at 293 K), but when heated it decomposes at 513 K.

Potassium dichromate is used in the leather industry because of its nature as

1. Oxidant
2. Reductant
3. Alkali media
4. disproportionating media

Options 1. 1
2. 2
3. 3
4. 4

Q.48 Read the passage carefully and answer the questions

Sodium dichromate $\text{Na}_2\text{Cr}_2\text{O}_7$ and Potassium dichromate $\text{K}_2\text{Cr}_2\text{O}_7$ are strong oxidizing agents; in acidic solution, its oxidising action can be represented as follows:



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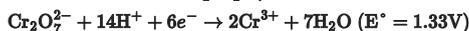
Choose the correct statement from the options given below:

1. K_2MnO_4 is isostructural with KClO_4
2. Chromate ion gets converted to a dichromate ion in basic medium.
3. In $\text{K}_2\text{Cr}_2\text{O}_7$ all Cr–O bonds have equal bond length.
4. $\text{K}_2\text{Cr}_2\text{O}_7$ is used as primary standard in volumetric analysis.

Options 1. 1
2. 2
3. 3
4. 4

Q.49 Read the passage carefully and answer the questions

Sodium dichromate $\text{Na}_2\text{Cr}_2\text{O}_7$ and Potassium dichromate $\text{K}_2\text{Cr}_2\text{O}_7$ are strong oxidizing agents; in acidic solution, its oxidising action can be represented as follows:



The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.

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It is a strong oxidizing agent. Hydrogen ion concentration of the solution plays

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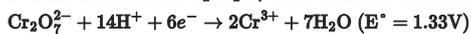
Alkaline/neutral KMnO_4 oxidizes iodide (I^-) ion to

1. IO_3^-
2. IO_2
3. I_2
4. I_2O_4

Options 1. 1
2. 2
3. 3
4. 4

Q.50 Read the passage carefully and answer the questions

Sodium dichromate $\text{Na}_2\text{Cr}_2\text{O}_7$ and Potassium dichromate $\text{K}_2\text{Cr}_2\text{O}_7$ are strong oxidizing agents; in acidic solution, its oxidising action can be represented as follows:



The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.

The chromate ion is tetrahedral whereas the dichromate ion consists of two tetrahedra sharing one corner with Cr–O–Cr bond angle of 126°

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This produces the dark green K_2MnO_4 which disproportionates in a neutral or acidic solution to give permanganate.

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Potassium permanganate forms dark purple (almost black) crystals which are isostructural with those of KClO_4 .

The salt is not very soluble in water (6.4 g/100 g of water at 293 K), but when heated it decomposes at 513 K.

When KMnO_4 is added to oxalic acid solution, the decolourisation is slow in the beginning but becomes faster after some time because

1. reaction is exothermic
2. MnO_4^- catalyses the reaction
3. Mn^{2+} acts as autocatalyst
4. CO_2 is formed as the product

Options 1. 1

2. 2

3. 3

4. 4