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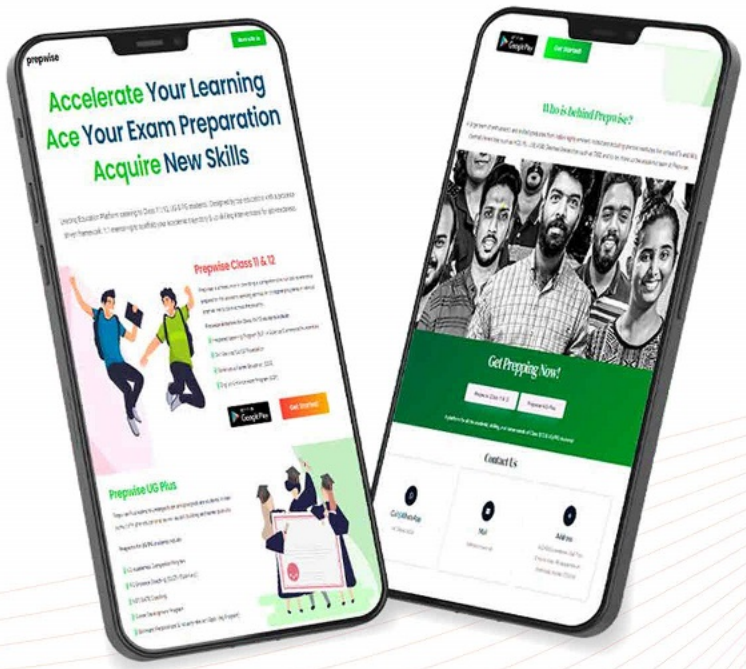

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Previous Year Question Paper

2022

Section II
Chemistry

Section Name:CHEMISTRY
Question:

Total number of atoms present in face centred cubic unit cell is :

(1) 2
(2) 3
(3) 4
(4) 5

Section Name:CHEMISTRY
Question:

Mole fraction of ethylene glycol ($C_2H_6O_2$) in an aqueous solution containing 25% of $C_2H_6O_2$ would be :

(1) 0.888

(2) 0.88

(3) 0.18

(4) 0.018

Section Name:CHEMISTRY
Question:

The products of the following reaction are :

$XeF_6 + 2\,H_2O \rightarrow$ ———— + ————

(1) XeO_2F_2, HF

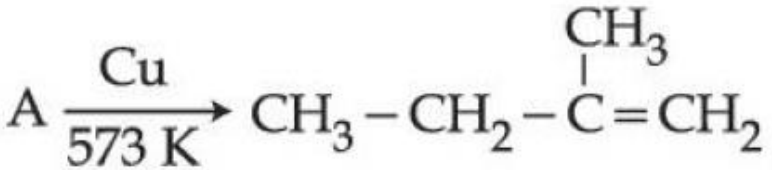
(2) $XeOF_4$, HF

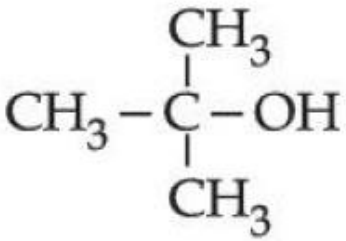
(3) XeO_3, HF

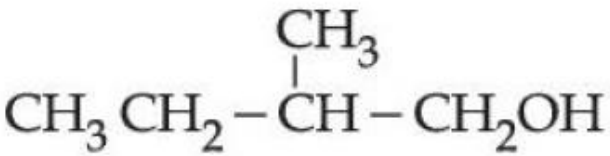
(4) $XeOF_2$, HF

Section Name:CHEMISTRY
Question:

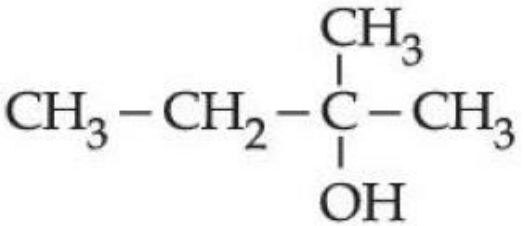
Identify A in the following reaction :



(1) 

(2) 

(3) $CH_3CH_2CH_2CH_2CH_2OH$

(4) 

Section Name:CHEMISTRY
Question:

The linkage present between α-D-glucose and β-D- fructose to form sucrose is :

(1) 1, 4 - glycosidic linkage.
(2) 1, 6 - glycosidic linkage.
(3) 1, 2 - glycosidic linkage.
(4) 1, 2-glycosidic and 1, 4-glycosidic linkages.

Question:

Percentage of amylose in starch is :

(1) 10 - 15%

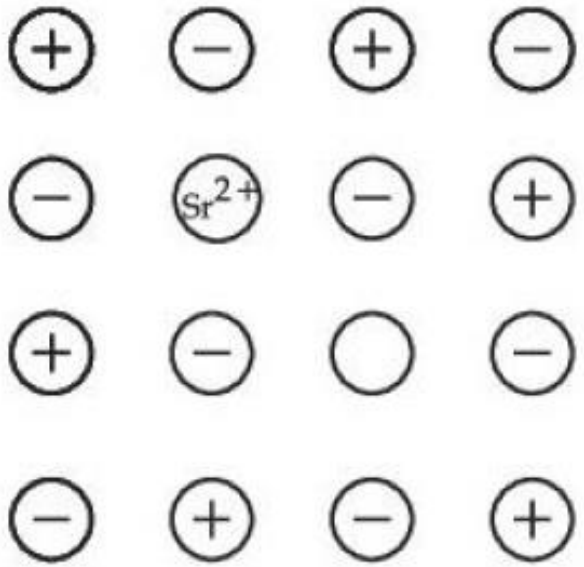
(2) 15 - 20%

(3) 80 - 85%

(4) 85 - 90%

Section Name:CHEMISTRY
Question:

Identify the type of defect present in the following solid.



(1) Schottky defect
(2) Frenkel defect
(3) Impurity defect
(4) Dislocation defect

Section Name:CHEMISTRY
Question:

Solubility of sugar in water will not depend upon :

(1) temperature

(2) nature of sugar

(3) pressure

(4) kinetic energy of sugar particles

Section Name:CHEMISTRY
Question:

Which of the following compounds is most reactive ?

(1) Cl_2
(2) Br_2
(3) I_2
(4) F_2

Section Name:CHEMISTRY
Question:

Match **List - I** with **List - II.**

List - I (Units of rate constant)	**List - II (Order of reaction)**
(A) $mol\ L^{-1}\ s^{-1}$	(I) Zero
(B) $mol^{-1}\ s^{-1}$	(II) 1^{st}
(C) s^{-1}	(III) 2^{nd}
(D) $mol^{-2}\ L^{2}\ s^{-1}$	(IV) 3^{rd}

Choose the **correct** answer from the options given below :

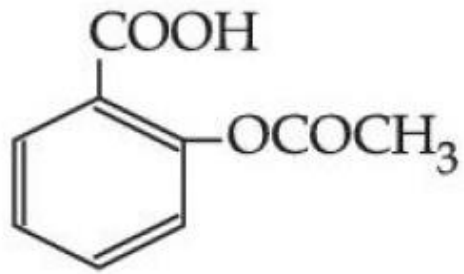
(1) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

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

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

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

Question:



is Aspirin, a popular pain killer. Its another name is :

(1) Acetyl salicylic acid
(2) Ethyl salicylic acid
(3) Benzyol acetate
(4) Acetyl benzoate

Section Name:CHEMISTRY
Question:

Which of the following nitrogenous bases is **not** present in DNA ?

(1) Adenine
(2) Guanine
(3) Cytosine
(4) Uracil

Section Name:CHEMISTRY
Question:

The correct order of reducing power of group 16 hydrides is :

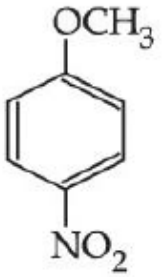
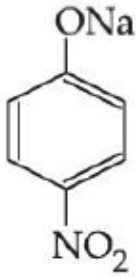
(1) $H_2S < H_2Se > H_2Te > H_2Po$

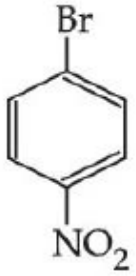
(2) $H_2S < H_2Se < H_2Te < H_2Po$

(3) $H_2S > H_2Se > H_2Te > H_2Po$

(4) $H_2S > H_2Se < H_2Te > H_2Po$

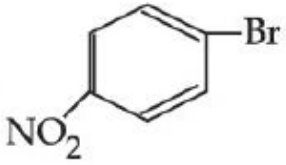
Question:

The suitable reactants required to prepare  are  and CH_3Br but not

 and CH_3ONa because :

(1) Aromatic halides do not give nucleophlic substitution reactions easily.

(2) Phenyl carbocation is more stable.

(3) NO_2 in  will not allow CH_3O^- ion to replace Br.

(4) Explosion may occur if we take  and CH_3ONa together.

Section Name:CHEMISTRY
Question:

Arrange the given compounds in decreasing order of their boiling points :

(A) $CH_3CH_2CH_2CH_2OH$

(B) $CH_3CH_2CH_2CHO$

(C) $CH_3CH_2CH_2CH_3$

(D) $CH_3CH_2CH_2CH_2Cl$

(E) $CH_3CH_2CH_2CH_2COOH$

Choose the **correct** answer from the options given below :

(1) (E), (A), (B), (D), (C)

(2) (E), (A), (B), (C), (D)

(3) (E), (A), (C), (B), (D)

(4) (A), (E), (C), (B), (D)

Section Name:CHEMISTRY
Question:

A Galvanic cell has $E^\circ_{cell} = 1.1$ V. It will stop working if external potential applied on this cell will be :

(1) less than 1.1 V
(2) more than 1.1 V
(3) equal to 1.1 V
(4) equal to -1.1 V

Section Name:CHEMISTRY
Question:

A reaction is 2^{nd} order with respect to A and 3^{rd} order with respect to B. The new rate of reaction when concentrations of both A and B are doubled, will become :

(1) 16 times of the previous rate.

(2) 8 times of the previous rate.

(3) 1/16 times of the previous rate.

(4) 32 times of the previous rate.

Section Name:CHEMISTRY
Question:

Dispersed phase and dispersion medium in butter are, respectively :

(1) Solid, Solid

(2) Liquid, Solid

(3) Liquid, Liquid

(4) Solid, Liquid

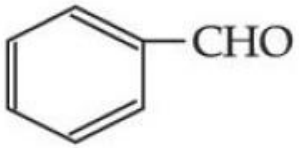
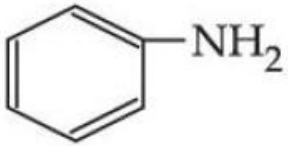
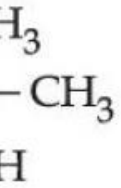
Section Name:CHEMISTRY
Question:

Mn^{7+} forms most stable compounds with :

(1) oxygen.
(2) fluorine.
(3) nitrogen.
(4) chlorine.

Section Name:CHEMISTRY
Question:

Match **List - I** with **List - II**.

	List - I (Name of the reaction)		**List - II (Given by the compound)**
(A)	Aldol condensation	(I)	
(B)	Lucas test	(II)	
(C)	Cannizzaro reaction	(III)	CH_3CHO
(D)	Carbylamine reaction	(IV)	

Choose the **correct** answer from the options given below :

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

Question:

Nucleic acids are made up of nucleosides and nucleotides. A nucleoside contains :

(1) Phosphoric acid + Sugar + Nitrogenous base

(2) Sugar + Nitrogenous base

(3) Sugar + Phosphoric acid

(4) Phosphoric acid + Nitrogenous base

Section Name:CHEMISTRY
Question:

The reagent used to distinguish chemically between benzoic acid and benzaldehyde is :

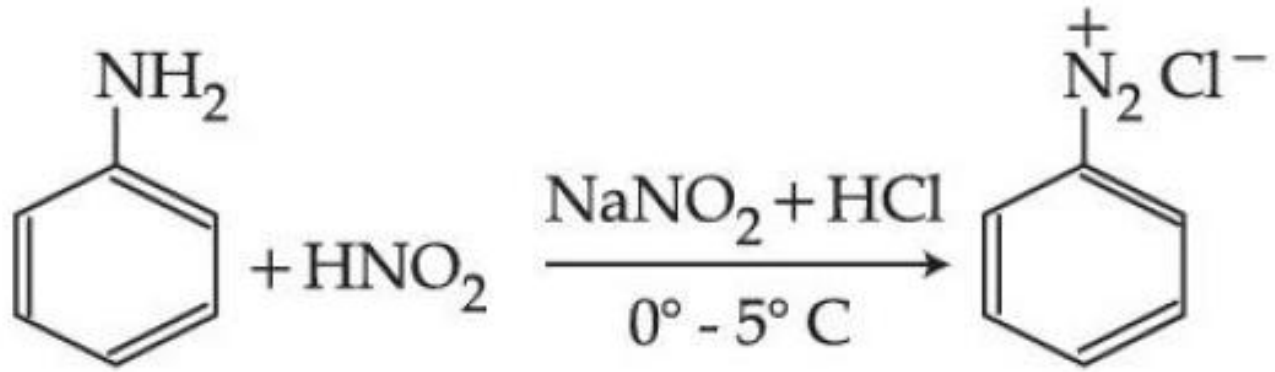
(1) Sodium bicarbonate

(2) Fehling's reagent

(3) Mixture of NaOH and I_2

(4) NaCl

Section Name:CHEMISTRY
Question:



is an example of :

(1) carbylamine reaction.
(2) Gabrial phthalimide reaction.
(3) diazotization reaction.
(4) coupling reaction.

Question:

There are four wires A, B, C, D having areas 2 m^2, 4 m^2, 1 m^2 and 0.5 m^2 respectively. The wire with highest resistance is :

(1) A

(2) B

(3) C

(4) D

Section Name:CHEMISTRY
Question:

Choose the correct statements.

(A) Amines are acidic in nature.

(B) Amines form cyanides on reacting with $CHCl_3$.

(C) Amines have higher boiling points than corresponding alcohols.

(D) Aniline is less basic than methamine.

(E) Aniline forms diazonium salt with $NaNO_2$ and HCl at 0°C.

Choose the **correct statement(s)** from the options given below :

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

(2) (A), (B) and (C) only

(3) (D) and (E) only

(4) (A), (C) and (E) only

Section Name:CHEMISTRY
Question:

In a reaction between A and B, following data was obtained :

[A] M	0.2	0.2	0.45
[B] M	0.3	0.1	0.055
Rate of reaction mol $L^{-1} S^{-1}$	5.07×10^{-5}	5.07×10^{-5}	1.43×10^{-5}

Order of reaction with respect to B will be :

(1) 0
(2) 1
(3) 2
(4) 3

Section Name:CHEMISTRY
Question:

The process **not** related to colloidal solutions is :

(1) Peptization
(2) Coagulation
(3) Diffusion
(4) Electrophoresis

Section Name:CHEMISTRY
Question:

Match **List - I** with **List - II**.

	List - I		**List - II**
(A)	Polystyrene	(I)	Glyptal
(B)	Manufacturing handles of utensils and computer disc	(II)	Manufacture of television cabinets
(C)	Urea-formaldehyde resin	(III)	For making laminated sheets
(D)	Manufacture of paints and lacquers	(IV)	Bakelite

Choose the **correct** answer from the options given below :

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

Question:

Match **List - I** with **List - II**.

	List - I		**List - II**
(A)	Distillation	(I)	Zr
(B)	Liquation	(II)	Zn
(C)	Zone refining	(III)	Sn
(D)	Vapour phase refining	(IV)	In

Choose the **correct answer** from the options given below :

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

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

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

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

Section Name:CHEMISTRY
Question:

The main consequence of lanthanoid contraction is that :

(1) d block elements have partially filled d orbitals.

(2) Hf and Zr have almost same size.

(3) Zinc is a soft metal.

(4) Transition elements show variable oxidation states.

Question:

For a strong electrolyte, molar conductivity Λ_m slowly increases with dilution and can be represented by the equation :

$$\Lambda_m = \Lambda_m^\circ - Ac^x$$

The exponent x in the above equation is :

(1) $\frac{1}{3}$

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

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

(4) $\frac{1}{5}$

Section Name:CHEMISTRY
Question:

Rate constant for a first order reaction is 100 s^{-1}. The time taken by the reaction to reduce the initial concentration of the reactant to its $\frac{1}{10}$th value will be :

(1) 0.203×10^{-2} s
(2) 2.303×10^{-2} s
(3) 2.303×10^{-1} s
(4) 2.303×10^{-3} s

Section Name:CHEMISTRY
Question:

On adding KI solution in excess to $AgNO_3$ solution, the ions forming mobile layer in the mixture are :

(1) NO_3^- ions

(2) I^- ions

(3) K^+

(4) Ag^+ ions

Section Name:CHEMISTRY
Question:

The electronic configuration of Ce^{3+} ion will be :

(Atomic Number of Ce is 58)

(1) $4f^0\ 5d^1\ 6s^2$

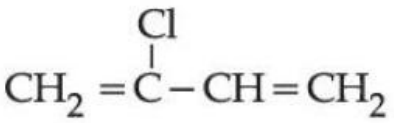
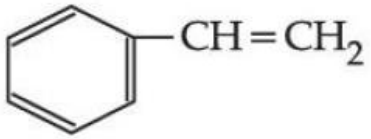
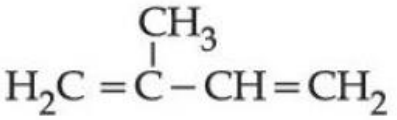
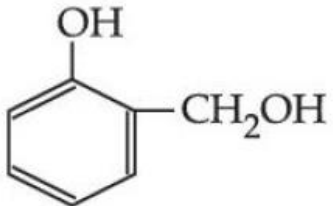
(2) $4f^0\ 5d^0\ 6s^2$

(3) $4f^1\ 5d^1\ 6s^1$

(4) $4f^1\ 5d^0\ 6s^0$

Section Name:CHEMISTRY
Question:

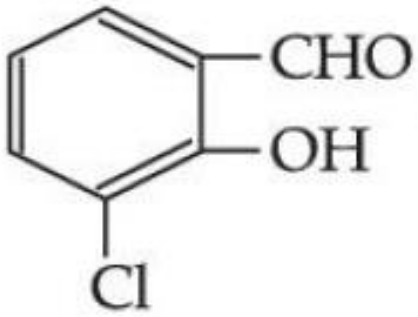
Match **List - I** with **List - II**.

	List - I		**List - II**
(A)		(I)	Natural rubber
(B)		(II)	Novolac
(C)		(III)	Neoprene
(D)		(IV)	Polystyrene

Choose the **correct answer** from the options given below :

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

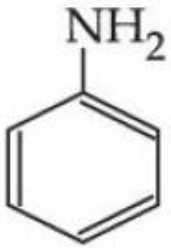
Section Name:CHEMISTRY
Question:

The correct IUPAC name for 

will be :

(1) 6-chloro-5-hydroxybenzaldehyde.
(2) 3-chloro-2-hydroxybenzaldehyde.
(3) 2-Hydroxy-3-chlorobenzaldehyde.
(4) 3-Hydroxy-2-chlorobenzaldehyde.

Section Name:CHEMISTRY
Question:

During the reaction of  with HNO_3 and H_2SO_4, i.e. nitration, 47% meta product is obtained along with ortho and other products. This is because :

(1) NH_2 is a meta directing group.

(2) NH_2 is a basic group which reacts with H_2SO_4 to form $\overset{+}{N}H_3$ which is meta directing.

(3) NO_2^+ prefers to attack over meta position of ring.

(4) Aniline is an acidic amine which prefers attack of NO_2^+ on meta position.

Question:

Value of EMF of a cell at 298 K having $E^\circ_{cell} = 0.70$ V and giving following reaction, will be nearly

$$2\,Al^{3+}\,(0.01\,M) + 3\,Mg(s) \rightarrow 3\,Mg^{2+}\,(0.1M) + 2\,Al(s)$$

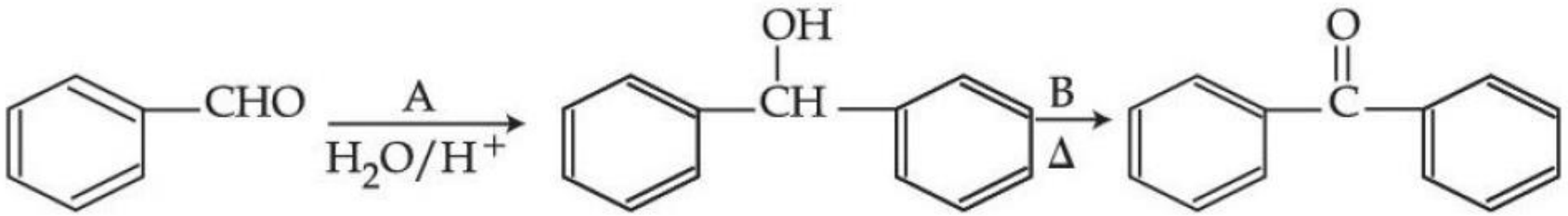
(1) 0.67 V

(2) 0.68 V

(3) 0.69 V

(4) 0.71 V

Section Name:CHEMISTRY
Question:



Identify A, B in the above conversion.

(1)  $MgBr, LiAlH_4$

(2)  $MgBr, Cu$

(3)  $CH_2MgBr, LiAlH_4$

(4)  CH_2MgBr, Cu

Question:

The correct order for extraction of a metal is :

(A) Conversion of ore into its oxide form

(B) Refining of metal

(C) Reduction of oxide to metal

(D) Concentration

(E) Crushing, grinding and pulverisation

Choose the **correct** answer from the options given below :

(1) (E), (D), (B), (A), (C)

(2) (E), (D), (A), (C), (B)

(3) (A), (B), (C), (D), (E)

(4) (C), (D), (A), (B), (E)

Section Name:CHEMISTRY
Question:

Following rules are applied while writing the formula or names of complexes. Read the following passage to answer :

- Cation is named first in both positive and negative entities.
- Ligands are written in alphabetical order.
- Oxidation state of central metal ion is written in Roman numerals in brackets.
- No di, tri etc. is used for counter ions.
- If the complex is cationic, then the name of its central metal ion is as it is but if it is anionic, then put 'ate' after its name.

Correct name of $[Cr(NH_3)_3(H_2O_3)]Cl_3$ is :

(1) triammine triaquachromium (III) chloride

(2) triammino triaquachromium (III) chloride

(3) triammine triaquachromium (III) tri chloride

(4) triammine triaquachromate (III) chloride

Question:

Following rules are applied while writing the formula or names of complexes. Read the following passage to answer :

- Cation is named first in both positive and negative entities.
- Ligands are written in alphabetical order.
- Oxidation state of central metal ion is written in Roman numerals in brackets.
- No di, tri etc. is used for counter ions.
- If the complex is cationic, then the name of its central metal ion is as it is but if it is anionic, then put 'ate' after its name.

Correct formula of Potassium trioxalatoaluminate (III) is :

(1) $K[Al\ (C_2O_4)_3]$

(2) $K_2[Al\ (C_2O_4)_3]$

(3) $K_3[Al\ (C_2O_4)_3]$

(4) $K_4[Al\ (C_2O_4)_3]$

Section Name:CHEMISTRY
Question:

Following rules are applied while writing the formula or names of complexes. Read the following passage to answer :

- Cation is named first in both positive and negative entities.
- Ligands are written in alphabetical order.
- Oxidation state of central metal ion is written in Roman numerals in brackets.
- No di, tri etc. is used for counter ions.
- If the complex is cationic, then the name of its central metal ion is as it is but if it is anionic, then put 'ate' after its name.

Match **List - I** with **List - II**.

	List - I **Compounds**		**List - II** **IUPAC Names**
(A)	$[Pt(NH_3)_2Cl(NO_2)]$	(I)	Dichloridobis(ethane-1,2-diamine)cobalt (III) ion
(B)	$[CoCl_2(en)_2]^+$	(II)	Tetrammineaquachloridocobalt (III) chloride
(C)	$[Co(en)_3]_2(SO_4)_3$	(III)	Diamminechloridonitrito-N-platimum (II)
(D)	$[Co(NH_3)_4\ (H_2O)Cl]Cl_2$	(IV)	tris (ethane-1,2-diamine) cobalt (III) sulphate

Choose the **correct answer** from the options given below :

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

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

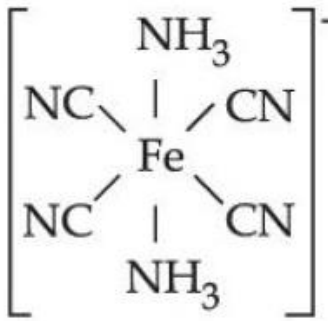
(3) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

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

Section Name:CHEMISTRY
Question:

Following rules are applied while writing the formula or names of complexes. Read the following passage to answer :

- Cation is named first in both positive and negative entities.
- Ligands are written in alphabetical order.
- Oxidation state of central metal ion is written in Roman numerals in brackets.
- No di, tri etc. is used for counter ions.
- If the complex is cationic, then the name of its central metal ion is as it is but if it is anionic, then put 'ate' after its name.

The correct IUPAC name for  is :

(1) diamminetetracyanato ferrate (II)
(2) diamine tetracyanato ferrate (III)
(3) trans-diamminetetracyanato ferrate (III)
(4) trans-diamminetetracyanato ferrum (III)

Question:

Following rules are applied while writing the formula or names of complexes. Read the following passage to answer :

- Cation is named first in both positive and negative entities.
- Ligands are written in alphabetical order.
- Oxidation state of central metal ion is written in Roman numerals in brackets.
- No di, tri etc. is used for counter ions.
- If the complex is cationic, then the name of its central metal ion is as it is but if it is anionic, then put 'ate' after its name.

The formula for ,

Potassium dichloridodihydroxy zincate (II) is :

(1) $K_2[ZnCl_2(OH)_2]$

(2) $K_2[Zn(OH)_2Cl_2]$

(3) $K[Zn(OH)_2Cl_2]$

(4) $K_4[Zn(OH)_2Cl_2]$

Section Name:CHEMISTRY
Question:

Read the paragraph and answer the question :

S_N1 reactions are those reactions in which order is 1 whereas in S_N2 reactions, order is 2. S_N1 reactions proceed with formation of carbocation as intermediate whereas S_N2 reactions occur with formation of pentavalent carbon. Reactivity order of halides towards S_N1 reactions is $1° < 2° < 3°$. While for S_N2 reactions order is $1° > 2° > 3°$. A good leaving group gives S_N2 reactions faster.

Which of the following compounds would undergo S_N1 reactions fastest ?

(1) $CH_3CH_2CH_2CH_2Cl$

(2) $CH_3\underset{\underset{Cl}{|}}{CH}-CH_2CH_3$

(3) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-Cl$

(4) $\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{CH_3CH}}-CH_2Cl$

Section Name:CHEMISTRY
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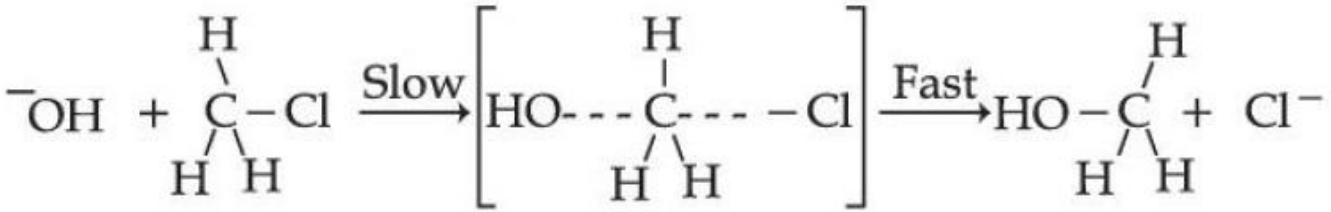

is an example of a/an :

(1) S_N1 reaction
(2) S_N2 reaction
(3) Addition reaction
(4) Elimination reaction

Section Name:CHEMISTRY
Question:

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The compound which is least reactive towards S_N2 reactions is :

(1) 

(2) 

(3) 

(4) 

Section Name:CHEMISTRY
Question:

Read the paragraph and answer the question :

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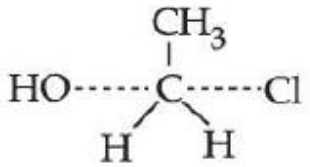
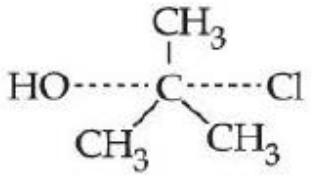
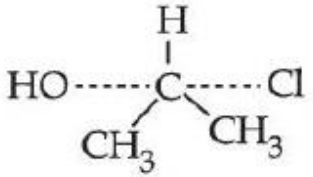
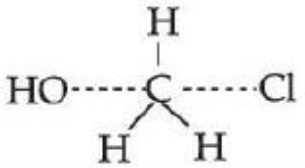
Identify the most stable species.

(1) 

(2) 

(3) 

(4) 

Question:

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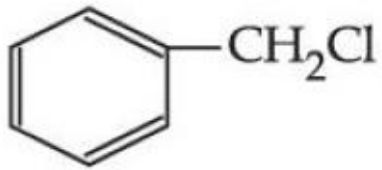

is more reactive than $CH_2 = CH - Cl$ towards S_N1 reactions due to :

(1) resonance effect.

(2) hyperconjugation.

(3) electromeric effect.

(4) more number of carbons in benzyl chloride.