Q1 - 2024 (01 Feb Shift 1)

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : Haloalkanes react with KCN to form alkyl cyanides as a main product while with AgCN form isocyanide as the main product.

Reason (R) : KCN and AgCN both are highly ionic compounds.

In the light of the above statement, choose the most appropriate answer from the options given below:

(1) (A) is correct but (R) is not correct

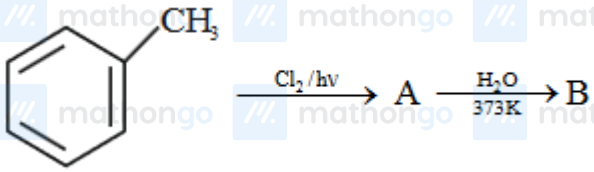
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(3) (A) is not correct but (R) is correct

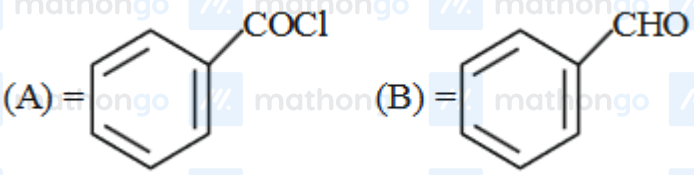
(4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

Q2 - 2024 (01 Feb Shift 1)

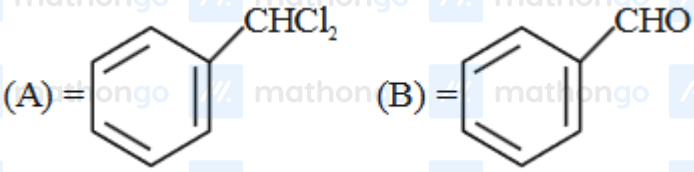
Identify A and B in the following sequence of reaction



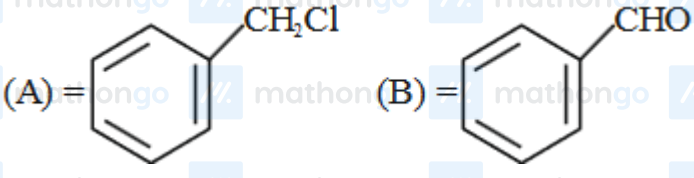
(1)



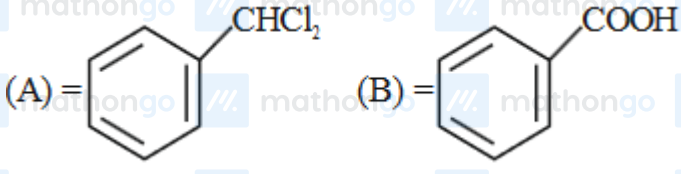
(2)



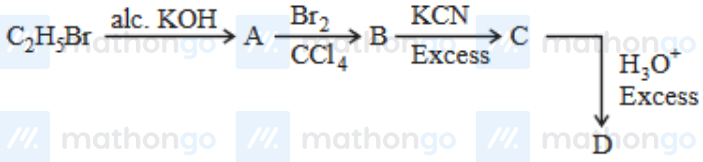
(3)



(4)



Q3 - 2024 (01 Feb Shift 2)



Acid D formed in above reaction is :

(1) Gluconic acid

(2) Succinic acid

(3) Oxalic acid

(4) Malonic acid

Q4 - 2024 (27 Jan Shift 1)

The correct statement regarding nucleophilic substitution reaction in a chiral alkyl halide is ;

(1) Retention occurs in S_N1 reaction and inversion occurs in S_N2 reaction.

(2) Racemisation occurs in S_Nl reaction and retention occurs in S_N2 reaction.

(3) Racemisation occurs in both S_N1 and S_N2 reactions.

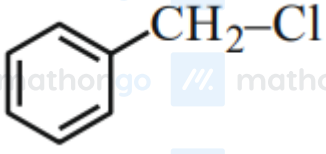
(4) Racemisation occurs in S_N1 reaction and inversion occurs in S_N2 reaction.

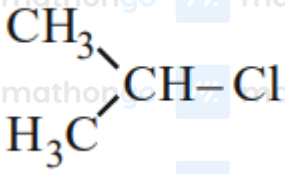
Q5 - 2024 (27 Jan Shift 2)

Which among the following halide/s will not show S_N1 reaction:

(A) $H_2C = CH - CH_2Cl$

(B) $CH_3 - CH = CH - Cl$

(C) 



(D)

Choose the most appropriate answer from the options given below:

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

(2) (A) and (B) only

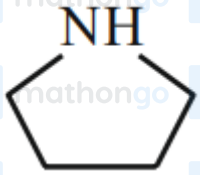
(3) (B) and (C) only

(4) (B) only

Q6 - 2024 (27 Jan Shift 2)

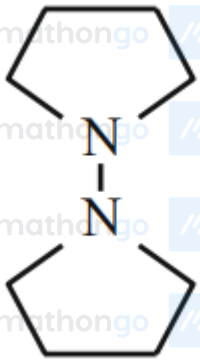
Identify B formed in the reaction.

$$Cl-(CH_2)_4-Cl \xrightarrow{\text{excess } NH_3} A \xrightarrow{NaOH} B + H_2O + NaCl$$

(1) 

(2) $H_2N-(CH_2)_4-NH_2$

(3) $\overset{+}{Cl}H_3-(CH_2)_4-\overset{+}{N}H_3Cl^-$

(4) 

Q7 - 2024 (29 Jan Shift 1)

Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : Aryl halides cannot be prepared by replacement of hydroxyl group of phenol by halogen atom.

Reason R : Phenols react with halogen acids violently. In the light of the above statements, choose the most appropriate from the options given below:

(1) Both A and R are true but R is NOT the correct explanation of A

(2) A is false but R is true

(3) A is true but R is false

(4) Both A and R are true and R is the correct explanation of A

Q8 - 2024 (29 Jan Shift 2)

Alkyl halide is converted into alkyl isocyanide by reaction with

(1) NaCN

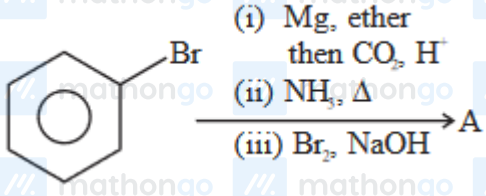
(2) NH_4CN

(3) KCN

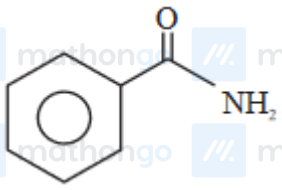
(4) AgCN

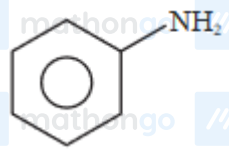
Q9 - 2024 (30 Jan Shift 1)

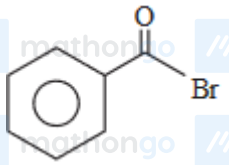
The final product A, formed in the following multistep reaction sequence is:

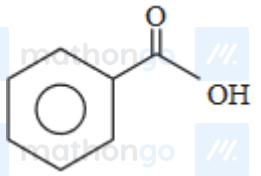


(1)



(2) 

(3) 

(4) 

Q10 - 2024 (30 Jan Shift 2)

Given below are two statements:

Statement - I: High concentration of strong nucleophilic reagent with secondary alkyl halides which do not have bulky substituents will follow S_N2 mechanism.

Statement - II: A secondary alkyl halide when treated with a large excess of ethanol follows S_N1 mechanism.

In the the light of the above statements, choose the most appropriate from the questions given below:

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

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

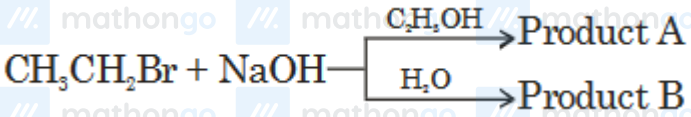
(4) Both statement I and Statement II are true.

Q11 - 2024 (30 Jan Shift 2)

2-chlorobutane $+Cl_2 \rightarrow C_4H_8Cl_2$ (isomers)

Total number of optically active isomers shown by $C_4H_8Cl_2$, obtained in the above reaction is _____.

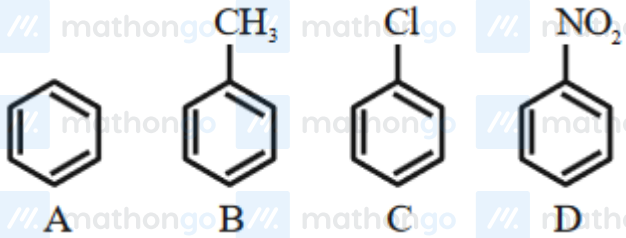
Q12 - 2024 (31 Jan Shift 1)



The total number of hydrogen atoms in product A and product *B* is _____.

Q13 - 2024 (31 Jan Shift 2)

The correct order of reactivity in electrophilic substitution reaction of the following compounds is :



(1) B > C > A > D

(2) D > C > B > A

(3) A > B > C > D

(4) B > A > C > D

Answer Key

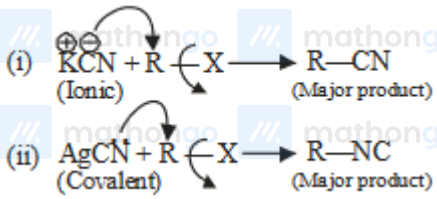
Q1 (1) **Q2** (2) **Q3** (2) **Q4** (4)

Q5 (4) **Q6** (2) **Q7** (3) **Q8** (4)

Q9 (2) **Q10** (4) **Q11** (6) **Q12** (10)

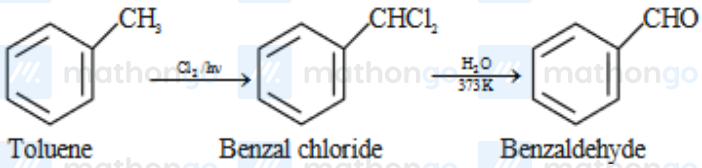
Q13 (4)

Q1

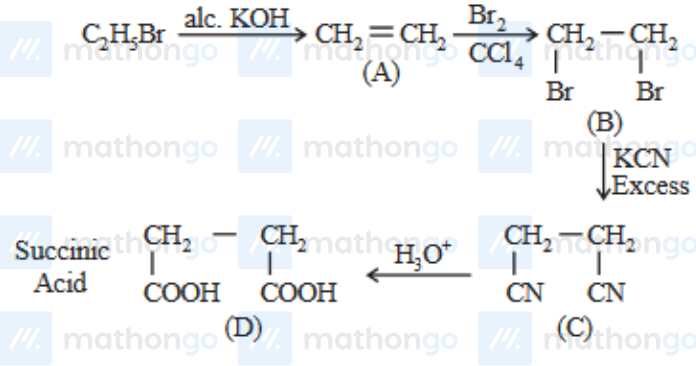


AgCN is mainly covalent in nature and nitrogen is available for attack, so alkyl isocyanide is formed as main product.

Q2



Q3



Q4

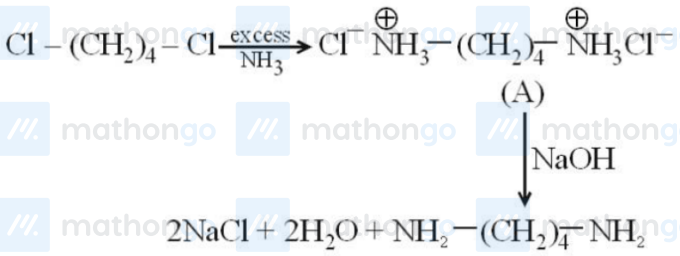
SN^1 – Racemisation

SN^2 - Inversion

Q5

Since $CH_3 - CH = \overset{+}{C}H$ is very unstable, $CH_3 - CH = CH - Cl$ cannot give S_{N^1} reaction.

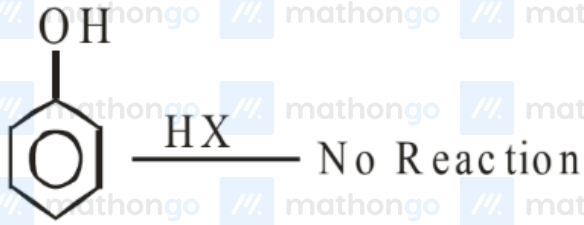
Q6



Q7

Assertion (A): Given statement is correct because in phenol hydroxyl group cannot be replaced by halogen atom.

Reason (R) :



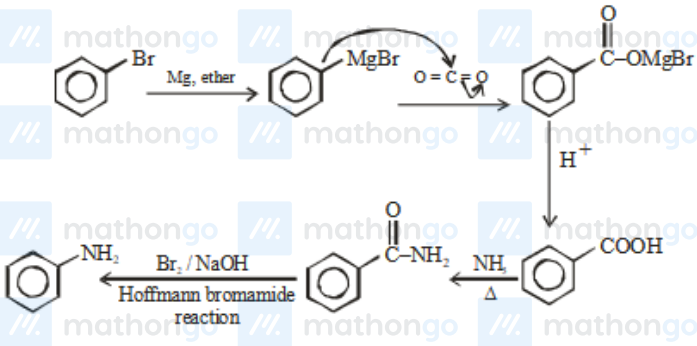
Given reason is false

Hence Assertion (A) is correct but Reason (R) is false

Q8

Covalent character of AgCN.

Q9



Q10

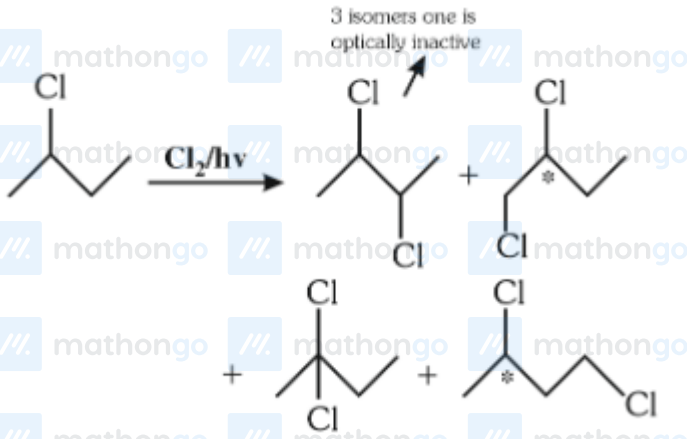
Statement-I: Rate of $S_N \propto [R-X][Nu]$

S_N2 reaction is favoured by high concentration of nucleophile (Nu) & less crowding in the substrate molecule.

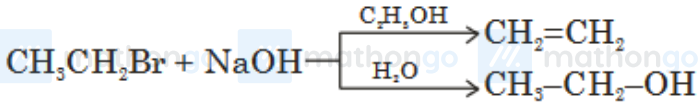
Statement - II: Solvolysis follows S_N1 path.

Both are correct Statements.

Q11



Q12



Total number of hydrogen atom in A and B is 10

Q13

$-CH_3$ shows $+M$ and $+I$.

$-Cl$ shows $+M$ and $-I$ but inductive effect dominates.

$-NO_2$ shows $-M$ and $-I$.

Electrophilic substitution $\alpha \frac{1}{-M \text{ and } -I}$

$\alpha + M$ and $+I$

Hence, order is $B > A > C > D$.