JEE Mains 2019 Chapter wise Question Bank

Aldehydes and Ketones - Questions

Q1

The major product of following reaction is:

$$R-C\equiv N \xrightarrow[(ii)\ H_2O]{(i)\ AlH(i-Bu)_2}$$

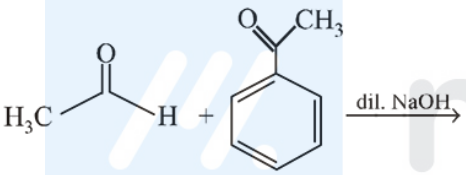
(1) RCOOH (2) $RCONH_2$

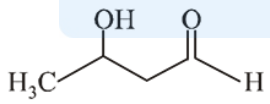
(3) RCHO (4) RCH_2NH_2

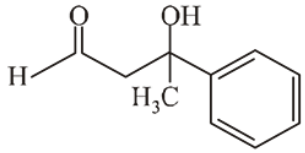
9 Jan Morning

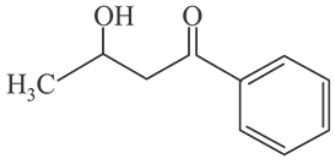
Q2

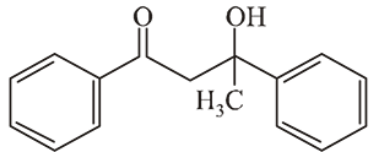
The major product formed in the following reaction is:



(1) 

(2) 

(3) 

(4) 

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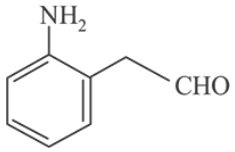
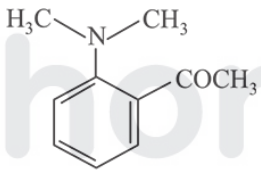
Q3

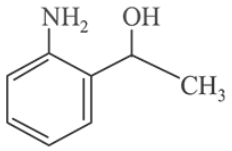
The tests performed on compound X and their inferences are:

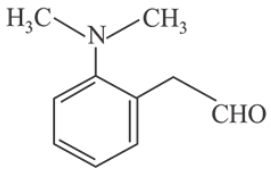
Test	Inference
(a) 2, 4 - DNP test	Coloured precipitate
(b) Iodoform test	Yellow precipitate
(c) Azo-dye test	No dye formation

Compound 'X' is:

(1) 

(2) 

(3) 

(4) 

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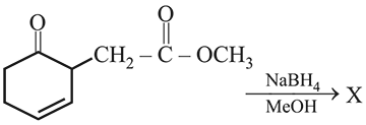
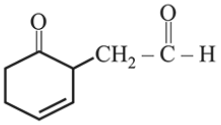
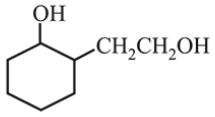
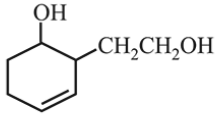
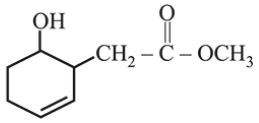
Q4



(1) 

(2) 

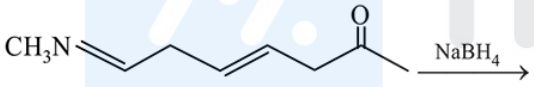
(3) 

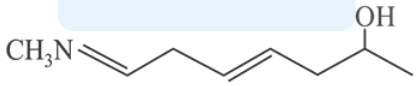
(4) 

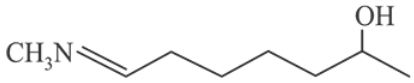
10 Jan Morning

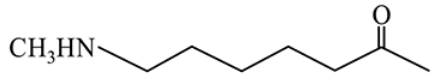
Q5

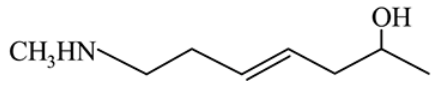
The major product of the following reaction is:



(1) 

(2) 

(3) 

(4) 

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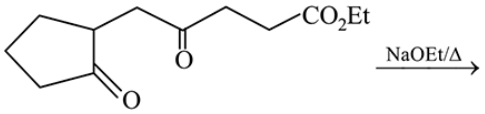
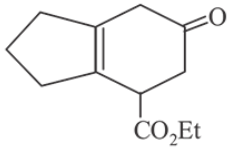
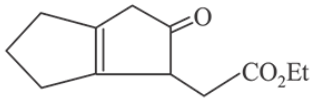
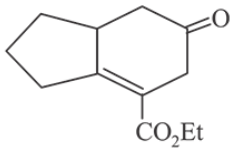
Q6

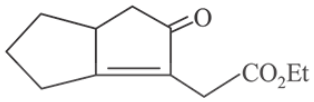
The major product obtained in the following reaction is:



(1) 

(2) 

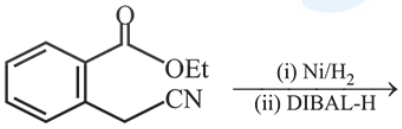
(3) 

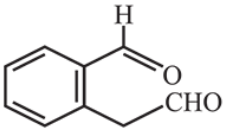
(4) 

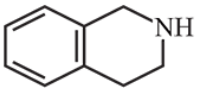
10 Jan Evening

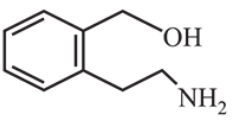
Q7

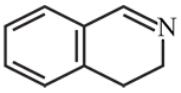
The major product of the following reaction is :



(1) 

(2) 

(3) 

(4) 

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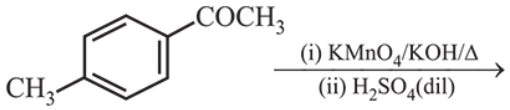
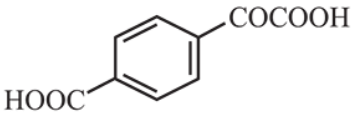
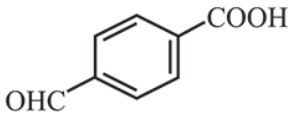
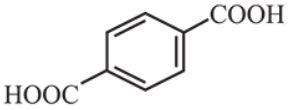
Q8

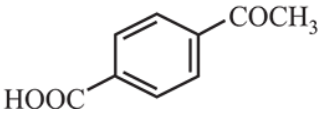
The major product of the following reaction is :



(1) 

(2) 

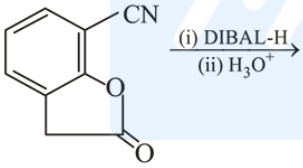
(3) 

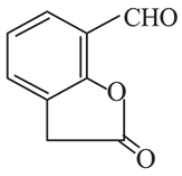
(4) 

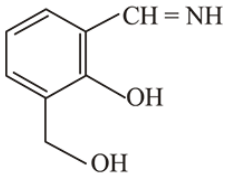
11 Jan Morning

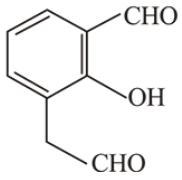
Q9

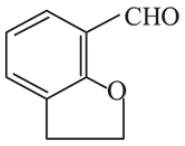
The major product of the following reaction is:



(1) 

(2) 

(3) 

(4) 

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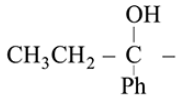
Q10



cannot be prepared by:

(1) $CH_3CH_2COCH_3 + PhMgX$

(2) $PhCOCH_2CH_3 + CH_3MgX$

(3) $PhCOCH_3 + CH_3CH_2MgX$

(4) $HCHO + PhCH(CH_3)CH_2MgX$

12 Jan Morning

Q11

In the following reaction

$$\text{Aldehyde} + \text{Alcohol} \xrightarrow{HCl} \text{Acetal}$$

Aldehyde	Alcohol
HCHO	^{t}BuOH
CH_3CHO	MeOH

The best combination is:

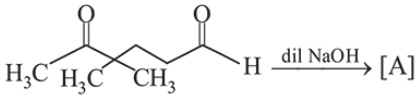
(1) CH_3CHO and ^{t}BuOH (2) HCHO and MeOH

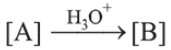
(3) CH_3CHO and MeOH (4) HCHO and ^{t}BuOH

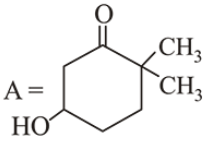
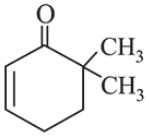
12 Jan Morning

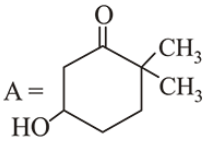
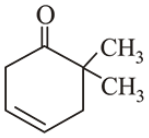
Q12

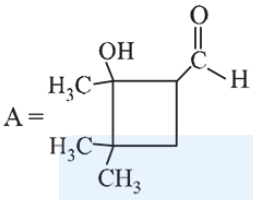
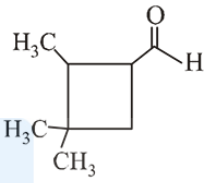
In the following reactions, products A and B are:

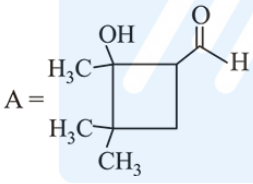
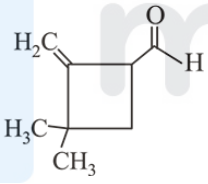




(1) A =  ; B = 

(2) A =  ; B = 

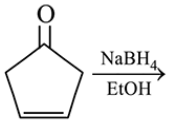
(3) A =  ; B = 

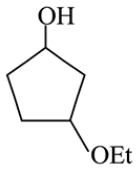
(4) A =  ; B = 

12 Jan Morning

Q13

The major product of the following reaction is :



(1) 

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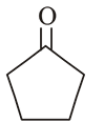
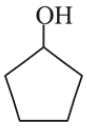
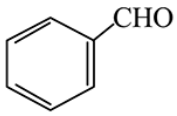
(3) 

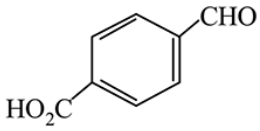
(4) 

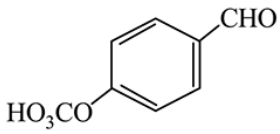
12 Jan Evening

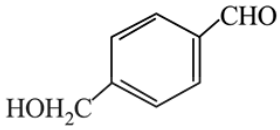
Q14

The aldehydes which will **not** form Grignard product with one equivalent Grignard reagents are :

(A) 

(B) 

(C) 

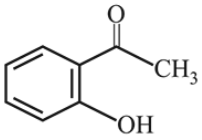
(D) 

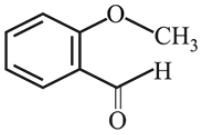
(1) (B), (D) (2) (B), (C)
(3) (B), (C), (D) (4) (C), (D)

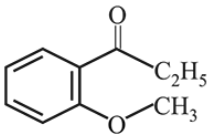
12 Jan Evening

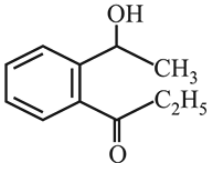
Q15

An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution. It however, reacts with Grignard reagent and gives positive iodoform test. The compound is :

(1) 

(2) 

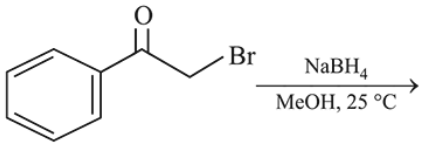
(3) 

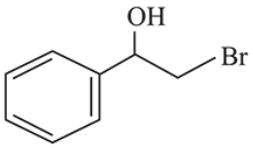
(4) 

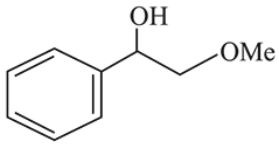
8 April Morning

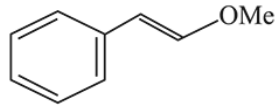
Q16

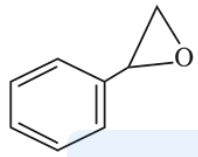
The major product of the following reaction is :



(1) 

(2) 

(3) 

(4) 

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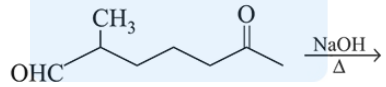
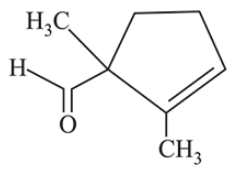
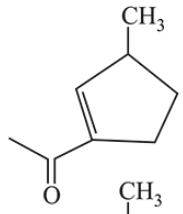
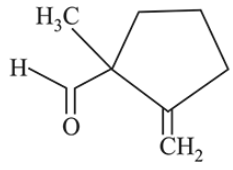
Q17

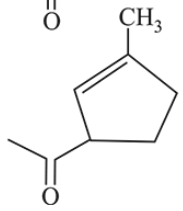
The major product obtained in the following reaction is :



(1) 

(2) 

(3) 

(4) 

8 April Evening

Q18

In the following reaction

Carbonyl compound + MeOH $\overset{HCl}{\rightleftharpoons}$ acetal

Rate of the reaction is the highest for:

(1) Acetone as substrate and methanol in excess.
(2) Propanal as substrate and methanol in stoichiometric amount.
(3) Propanal as substrate and methanol in excess.
(4) Acetone as substrate and methanol in stoichiometric amount.

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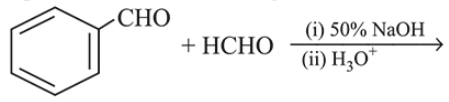
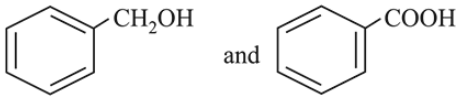
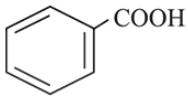
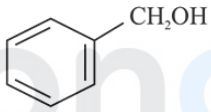
Q19

Major products of the following reaction are :



(1) 

(2) CH_3OH and 

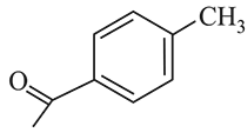
(3) HCOOH and 

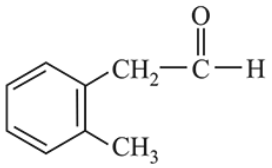
(4) CH_3OH and HCO_2H

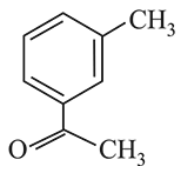
10 April Morning

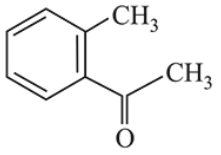
Q20

Compound $A(C_9H_{10}O)$ shows positive iodoform test. Oxidation of A with $KMnO_4/KOH$ gives acid $B(C_8H_6O_4)$. Anhydride of B is used for the preparation of phenolphthalein. Compound A is :

(1) 

(2) 

(3) 

(4) 

10 April Evening

JEE Mains 2019 Chapter wise Question Bank

Aldehydes and Ketones - Answers

Q1

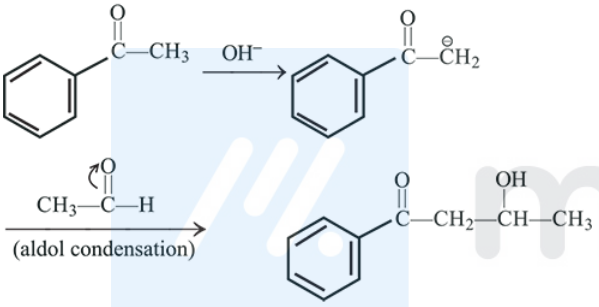
(3) $R-C\equiv N \xrightarrow[(ii)\ H_2O]{(i)\ AlH(i\text{-}Bu)_2} R-CHO$

The reduction of nitriles to aldehydes can be done using DIBAL-H[$AlH(i\text{-}Bu)_2$].

9 Jan Morning

Q2

(3) Reaction mechanism involved:



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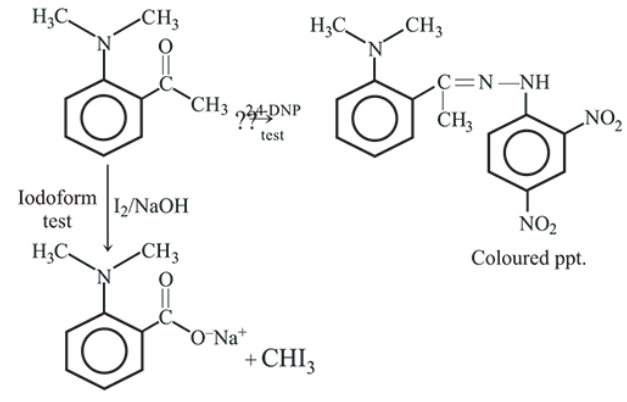
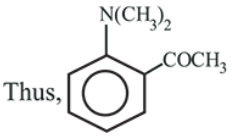
Q3

(2) Reaction involved in the tests performed is a follows:



Thus,



will not give positive azo-dye test due to th presence of an electron-withdrawing group

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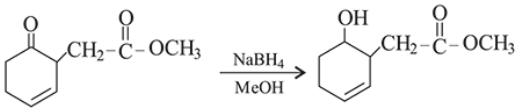
Q4

(4) $NaBH_4$ is a selective reducing agent, used for the reduction of aldehydes and ketones, it does not affect alkene and ester.



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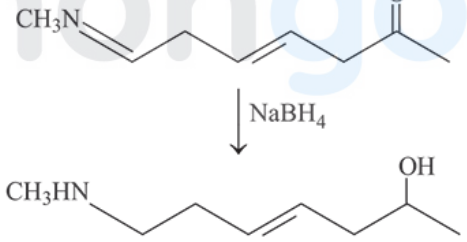
Q5

(4) Reaction involved:



(major product)

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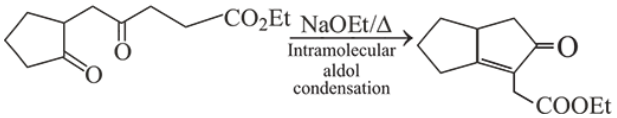
Q6

(4) Reaction involved:



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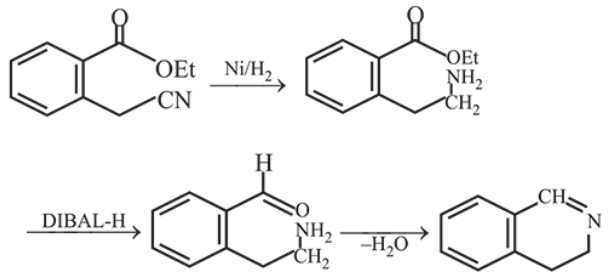
Q7

(4)



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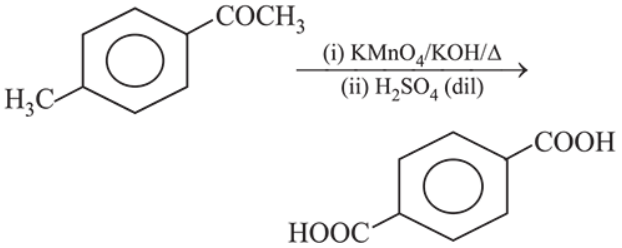
Q8

(3)



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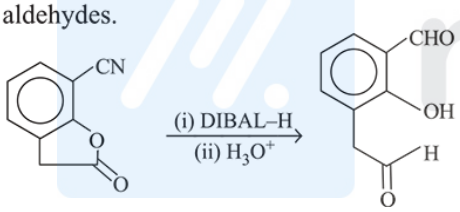
Q9

(3) DIBAL-H will reduce cyanides and esters to aldehydes.



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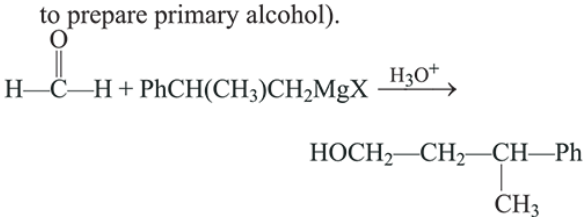
Q10

(4) Tertiary alcohol is prepared by the reaction of Grignard reagent with a ketone (formaldehyde is used to prepare primary alcohol).



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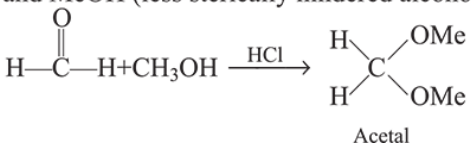
Q11

(2) Best combination is HCHO (more reactive aldehyde) and MeOH (less sterically hindered alcohol).



Acetal

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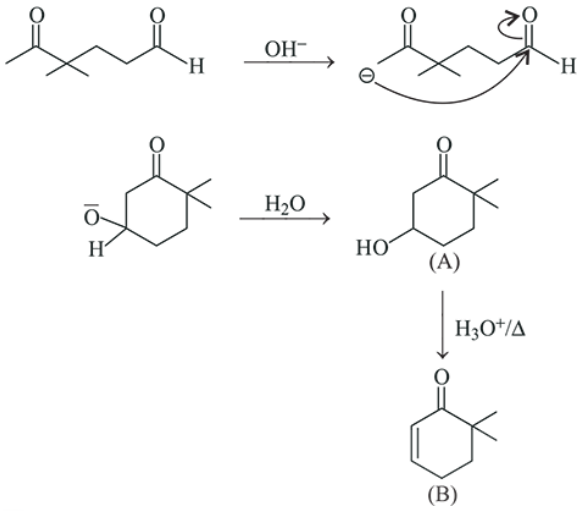
Q12

(1)



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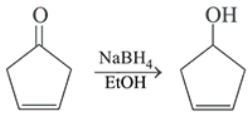
Q13

(2)



$NaBH_4$ does not reduce the double bond but can reduce keto group ($\rangle C{=}O$) into —OH group.

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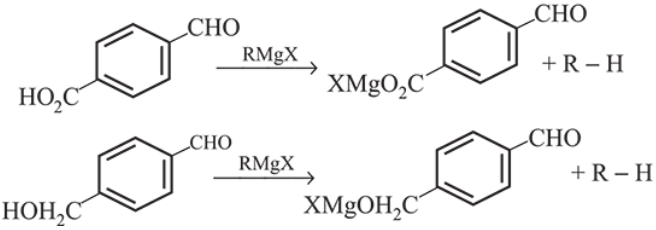
Q14

(1) Grignard reagent will not react with aldehydes if it has a functional group which contains acidic hydrogen. Thus options (B) and (D) have —COOH and $-CH_2OH$ respectively which contain acidic H-atom. Therefore, acid-base reaction occurs.



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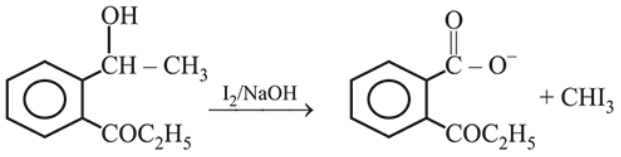
Q15

(4)



Test	Observation	Reason
Reaction with Grignard reagent	+ve	Electrophilic centre or acidic hydrogen is present
Fehling solution test	–ve	CHO group is absent
Neutral $FeCl_3$ test	–ve	phenolic group is absent
Iodoform test	+ve	$-COCH_3$ or $-CH(OH)-CH_3$ is present

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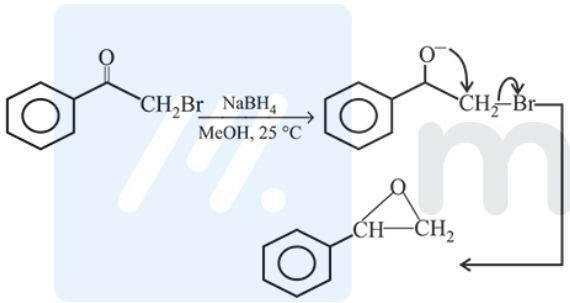
Q16

(4)



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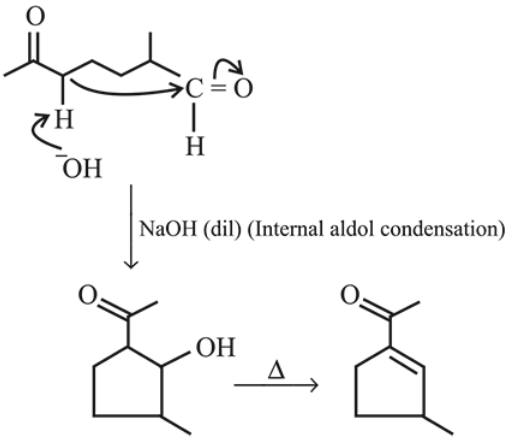
Q17

(2)



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Q18

(3)

$CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ (Acetone) $\qquad$ CH_3-CH_2-CHO (Propanal)

Generally, aldehydes are more reactive than ketones in nucleophilic addition reactions.

$\therefore$ Rate of reaction with alcohol to form acetal and ketal is

CH_3-CH_2-CHO (Propanal) $>$ $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ (Acetone)

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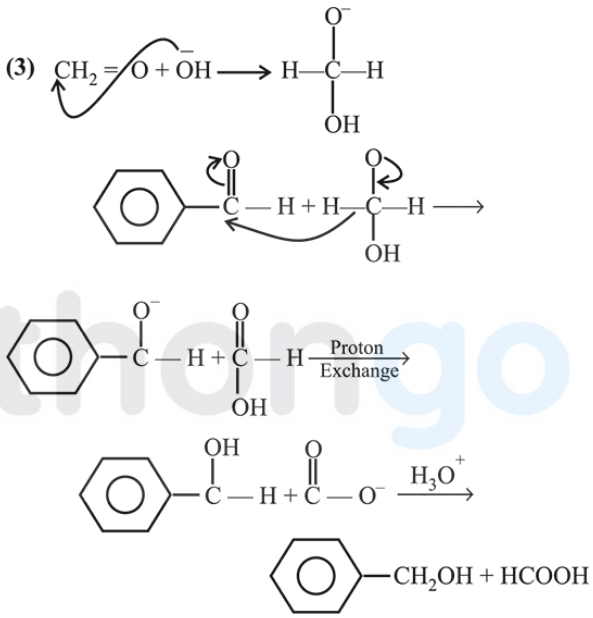
Q19

(3)



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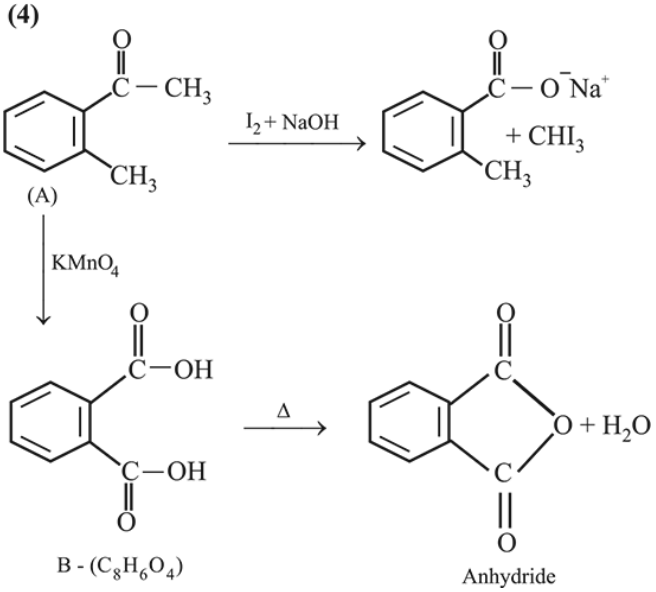
Q20

(4)



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