



## EXERCISE # I

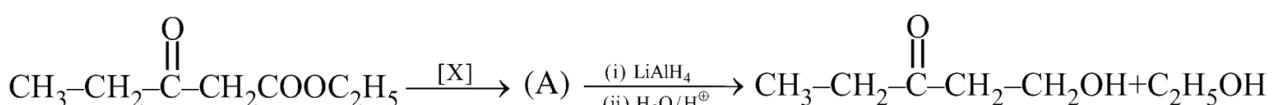
**Q.1** Arrange these compounds in decreasing order of reactivity for the nucleophilic attack.

- (I) Acid chloride    (II) Aldehyde    (III) Ketone    (IV) Ester

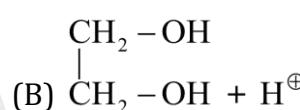
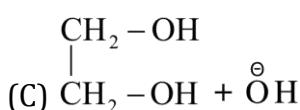
Select the correct answer from the codes given below:

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

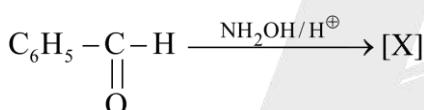
**Q.2** In the given reaction



[X] Will be:



**Q.3** In the given reaction:



[X] will be:

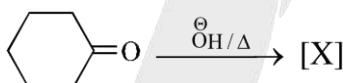
- (A) Only syn oxime

- (B) Only anti oxime

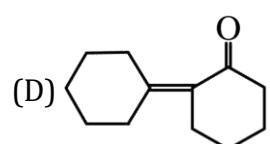
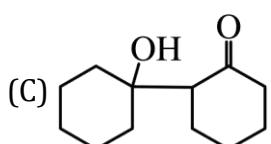
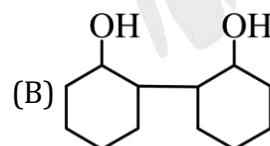
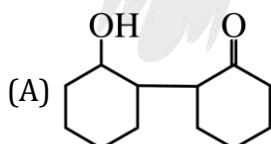
- (C) Mixture of syn and antioxime

- (D) Secondary amide

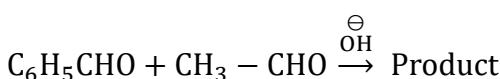
**Q.4** In the reaction:



[X] Will be:



**Q.5** Number of aldol products (without counting stereoisomers) in the given reaction:



will be:

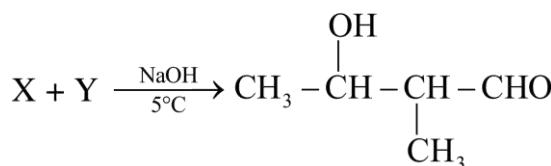
- (A) One

- (B) Three

- (C) Two

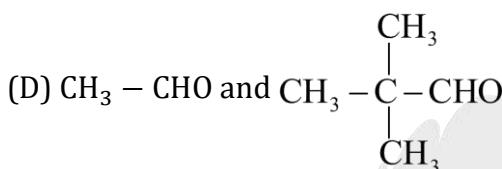
- (D) Four

**Q.6** In the given reaction



(X) and (Y) will respectively be :

- (A)  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$  and  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$
- (B)  $\text{CH}_3 - \text{CHO}$  and  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$
- (C)  $\text{CH}_3 - \text{CHO}$  and  $\text{CH}_3 - \text{CHO}$



**Q.7** Acetophenone can be obtained by the distillation of :

- (A)  $(\text{C}_6\text{H}_5\text{COO})_2\text{Ca}$
- (B)  $(\text{CH}_3\text{COO})_2\text{Ca}$
- (C)  $(\text{C}_6\text{H}_5\text{COO})_2\text{Ca}$  and  $(\text{CH}_3\text{COO})_2\text{Ca}$
- (D)  $(\text{C}_6\text{H}_5\text{COO})_2\text{Ca}$  and  $(\text{HCOO})_2\text{Ca}$

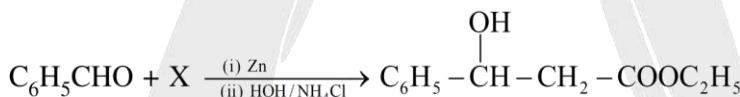
**Q.8** Gem dihalide on hydrolysis gives :

- (A) Vic diol      (B) Gem diol      (C) Carbonyl compound      (D) Carboxylic acid

**Q.9** Acetal or ketal is:

- (A) Vic dialkoxy compound
- (B)  $\alpha, \omega$ -dialkoxy compound
- (C)  $\alpha$ -alkoxy alcohol
- (D) Gem dialkoxy compound

**Q.10** In the given reaction :



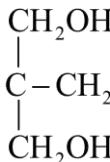
[X] will be :

- (A)  $\text{CH}_3 - \text{COOC}_2\text{H}_5$
- (B)  $\text{CH}_3 - \text{CH}_2 - \text{COOC}_2\text{H}_5$
- (C)  $\text{Br} - \text{CH}_2 - \text{COOC}_2\text{H}_5$
- (D)  $\begin{array}{c} \text{Br} \\ | \\ \text{Br}-\text{CH}-\text{COOC}_2\text{H}_5 \end{array}$

**Q.11** Cross cannizzaro reaction is example of :

- (A) Redox reaction
- (B) Disproportionation
- (C) Both (A) and (B)
- (D) Only oxidation

**Q.12** Acetaldehyde can be converted into  $\text{HOCH}_2 - \underset{\text{CH}_2\text{OH}}{\underset{|}{\text{C}}} - \text{CH}_2\text{OH}$  by which reagent ?



- (A) KOH
- (B) KOH followed by LAH
- (C) excess of HCHO and KOH
- (D) KCN followed by SBH



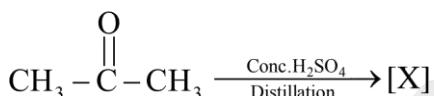
**Q.13** Product of Perkin reaction is :

- (A)  $\alpha, \beta$ -unsaturated aldehyde      (B)  $\beta$ -cyclohexyl  $\alpha, \beta$ -unsaturated aldehyde  
(C)  $\beta$ -Aryl-  $\alpha, \beta$ -unsaturated acid    (D) All of these

**Q.14** Which one of the combinations will give propanaldehyde on dry distillation?

- (A)  $(C_6H_5COO)_2Ca$  and  $(HCOO)_2Ca$
  - (B)  $(CH_3COO)_2Ca$  and  $(CH_3CH_2 - COO)_2Ca$
  - (C)  $(CH_3 - CH_2 - COO)_2Ca$  and  $(HCOO)_2Ca$
  - (D)  $(CH_3COO)_2Ca$  and  $(CH_3COO)_2Ca$

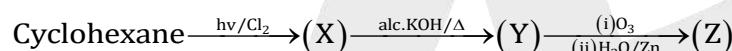
**Q.15** In the given reaction:



[X] will be:

- (A) Methyl oxide    (B) Phorone                (C) 1,3,5-Trimethylbenzene (D) 2-Butyne

**Q.16** In the reaction sequence:



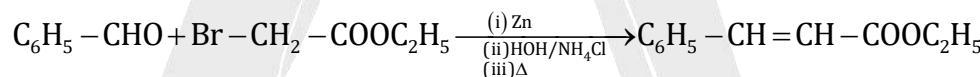
(Z) will be:

- (A) Hexanal      (B) 2-Hexanone      (C) 3-Hexanone      (D) Hexanedial

**Q.17** Grignard reagents can never give carbonyl compounds with:

- (A)  $\text{CO}_2$       (B)  $\text{RCOCl}$       (C)  $\text{RCN}$       (D)  $\text{RCOOR}'$

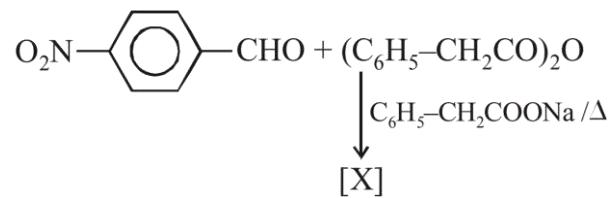
**Q.18** The given reaction:



is known as :



**Q.19** The product of the reaction:



Will be:

- (A)  $\text{C}_6\text{H}_5 - \text{CH} = \text{CH} - \text{COOH}$

(B)  $\text{NO}_2 - \text{C}_6\text{H}_4 - \text{CH} = \text{CH} - \text{COOH}$

(C)  $\text{C}_6\text{H}_5 - \text{CH} = \text{C}(\text{CH}_3) - \text{COOH}$

(D)  $\text{NO}_2 - \text{C}_6\text{H}_4 - \text{CH} = \text{C}(\text{C}_6\text{H}_5) - \text{COOH}$

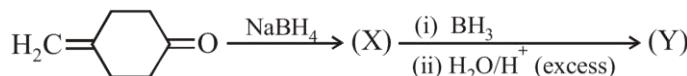
## (ORGANIC CHEMISTRY)

## CARBONYL COMPOUND

**Q.20** Cyanohydrin of which compound on hydrolysis will give lactic acid?

- (A)  $\text{C}_6\text{H}_5\text{CHO}$       (B)  $\text{HCHO}$       (C)  $\text{CH}_3\text{CHO}$       (D)  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$

**Q.21** In the given reaction:

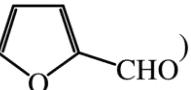


(X) and (Y) are:

- (A)  $\text{CH}_2 = \text{C}_6\text{H}_5-\text{OH}$  and  $\text{HO}-\text{CH}_2-\text{C}_6\text{H}_5-\text{O}$   
 (B)  $\text{CH}_3-\text{C}_6\text{H}_5-\text{O}$  and  $\text{HO}-\text{CH}_2-\text{C}_6\text{H}_5-\text{O}$   
 (C)  $\text{CH}_2 = \text{C}_6\text{H}_5-\text{OH}$  and  $\text{CH}_3-\text{C}_6\text{H}_5-\text{OH}$   
 (D)  $\text{CH}_2-\text{C}_6\text{H}_5-\text{OH}$  and  $\text{CH}_3-\overset{\text{OH}}{\underset{\text{O}}{\text{C}}}(\text{C}_6\text{H}_5)-\text{O}$

**Q.22** Acetaldehyde cannot give :

- (A) Iodoform test      (B) Lucas test      (C) Benedict test      (D) Tollens test

**Q.23** Compound  formed by the reaction of furfural () with ethanol is :

- (A) an aldol      (B) an acetal      (C) a ketal      (D) a hemiacetal

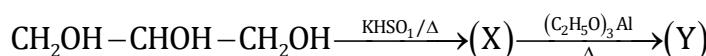
**Q.24** The reaction in which  $\text{NaCN}/\text{C}_2\text{H}_5\text{OH}/\text{HOH}$  is used is :

- (A) Perkin reaction      (B) Benzoin condensation  
 (C) Reimer-Tieman reaction      (D) Rosenmunds reduction

**Q.25** A compound with molecular formula  $\text{C}_8\text{H}_{18}\text{O}_4$  does not give litmus test and does not give colour with 2,4-DNP. It reacts with excess  $\text{MeCOCl}$  to give a compound whose vapour density is 152. Compound A contains how many hydroxy groups?

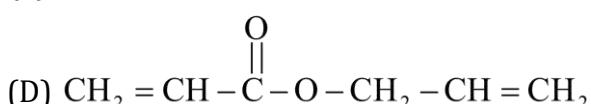
- (A) 1      (B) 2      (C) 3      (D) 4

**Q.26** In the reaction sequence:



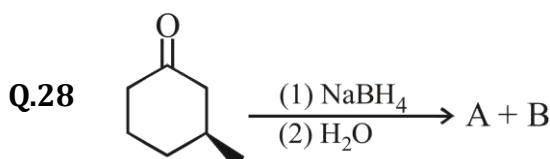
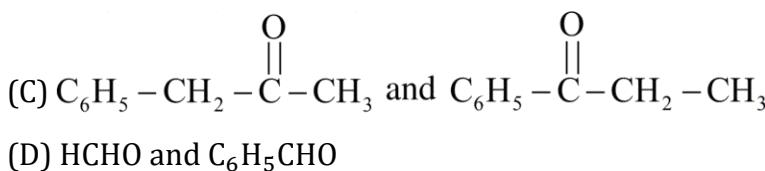
(Y) will be:

- (A)  $\text{CH}_2 = \text{CH}-\text{CHO}$   
 (B)  $\text{CH}_2 = \text{CH}-\text{CH}_2\text{OH}$   
 (C) Mixture of  $\text{CH}_2 = \text{CH}-\text{COOH}$  and  $\text{CH}_2 = \text{CH}-\text{CH}_2\text{OH}$



**Q.27** Tollen's reagent is used for the differentiation between:

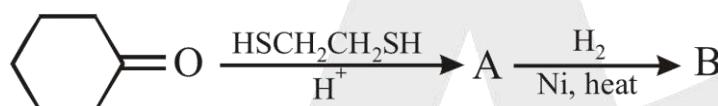
- (A) HCHO and CH<sub>3</sub>CHO
- (B) CH<sub>3</sub>COCH<sub>3</sub> and CH<sub>3</sub>CHO



Identify relationship between A & B products?

- (A) Diastereoisomers
- (B) Enantiomers
- (C) Positional isomer
- (D) Identical

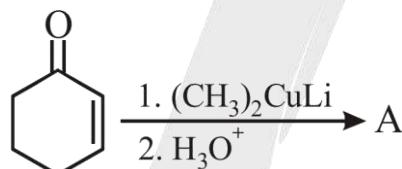
**Q.29** In the reaction sequence



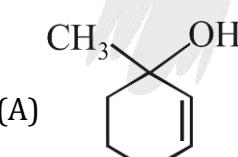
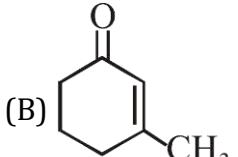
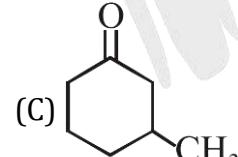
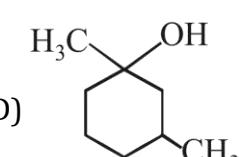
The product (B) is:

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

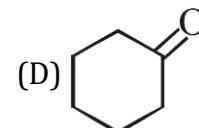
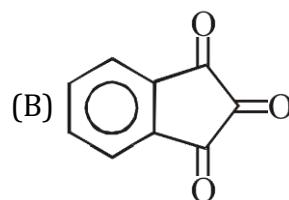
**Q.30** In the reaction



The product (A) is:

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

**Q.31** Which of the following does not form a stable hydrate by the addition of H<sub>2</sub>O?

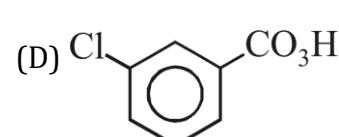
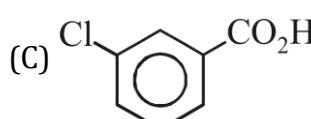


**Q.32** The conversion

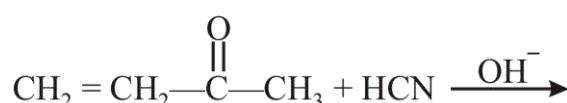
Can be effected by using the reagent

(A) Tollen's reagent

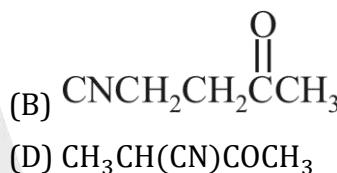
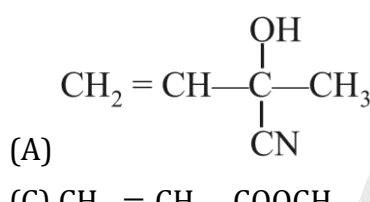
(B)  $O_2$



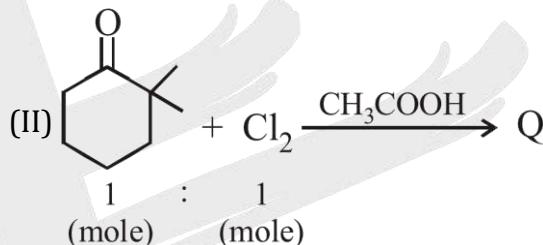
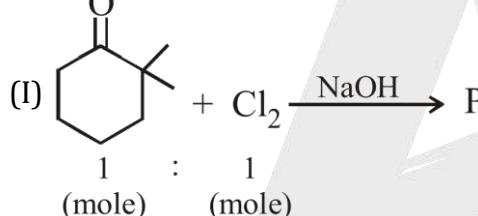
**Q.33** In the reaction



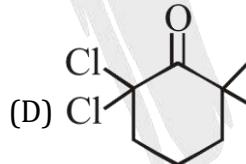
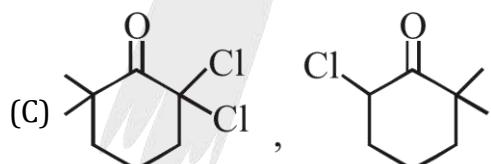
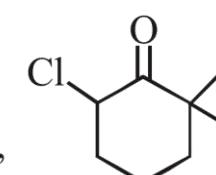
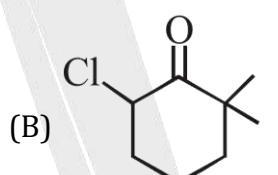
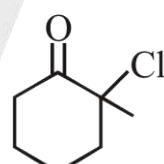
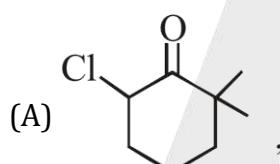
The major product is:



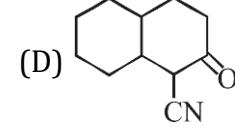
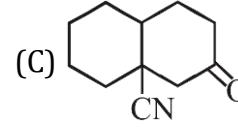
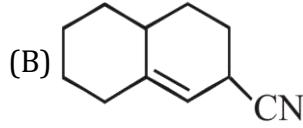
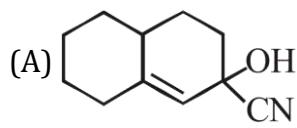
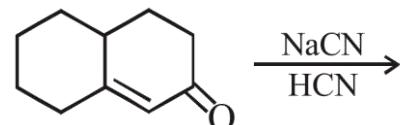
**Q.34**



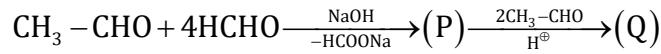
Organic product P & Q are respectively –



**Q.35** The major product obtained in the reaction is



**Q.36** Total number of stereoisomers of major product (Q) are:

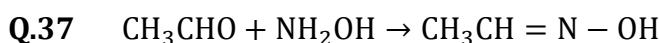


(A) 0

(B) 4

(C) 8

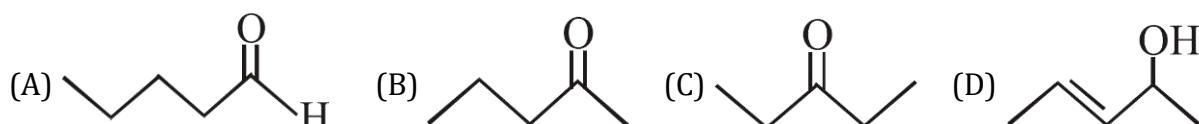
(D) 2



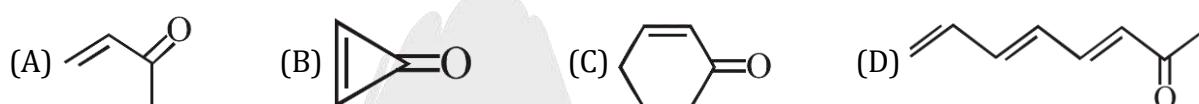
The above reaction occurs satisfactorily at

- (A) pH = 1      (B) pH = 4.5      (C) pH = 12      (D) any value of pH

**Q.38** An organic compound (A),  $\text{C}_5\text{H}_{10}\text{O}$ , reacts with hydrazine to form a hydrazone derivative (B). The hydrazone (B) on being heated with KOH at about  $180^\circ\text{C}$ , gives n-pentane. The compound (A) does not respond positively to Tollen's reagent and to the iodoform test. The compound (A) is



**Q.39** The compound having the highest dipole moment is:



**Q.40**  $\xrightarrow[(2)\text{ H}_2\text{O}]{(1)\text{ Excess MeMgCl}} \text{(A)} \xrightarrow[\text{conc. H}_2\text{SO}_4]{\text{'B'}} \text{Identify 'B' product ?}$



### Question No. 41 to 43 (3 questions)

An alkene (A)  $\text{C}_{16}\text{H}_{16}$  on ozonolysis gives only product (B)  $\text{C}_8\text{H}_8\text{O}$ . (B) also can be obtained by hydrolysis of the product obtained by reaction between cyano benzene and  $\text{CH}_3\text{MgBr}$ . (A) can show geometrical isomerism and it can decolourise  $\text{Br}_2$  water. (B) on treatment with  $\text{SeO}_2$  produces (C)

**Q.41** Which is not correct about (A)?

- (A) A is optically inactive  
 (B) On catalytic hydrogenation 'trans' form of A produces racemic mixture  
 (C) A can be prepared by Wittig reaction on acetophenone with  $\text{Ph}_3\text{P} = \text{C}(\text{CH}_3)\text{Ph}$ .  
 (D) On treatment with per acid followed by hydrolysis 'trans' form of A produces racemic mixture

**Q.42** Which is not correct about B ?

- (A) It gives iodoform test  
 (B) On treatment with  $\text{LiAlH}_4, \text{H}_2\text{O}$  it produces a compound which also responds to iodoform test.  
 (C) It gives Tollen's test  
 (D) On treatment with  $\text{NH}_2\text{NH}_2$  followed by alc. KOH at high temperature, it produces ethyl benzene



**Q.43** Which is not correct about C ?

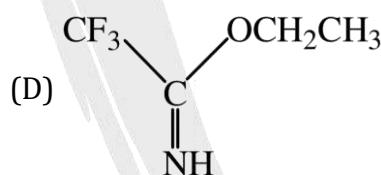
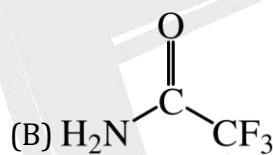
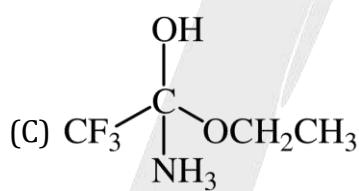
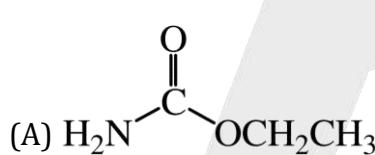
- (A) On treatment with  $\text{NaBH}_4$  it will produce a diol.
- (B) On treatment with  $\text{OH}^-$  (conc.) followed by acidification racemic mixture of a carboxylic acid is obtained
- (C) It gives Tollen's test
- (D) It can take part in aldol condensation

**Question No.44 to 48 (5 questions)**

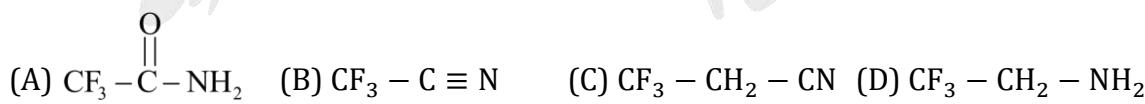
Compound 'C'  $\left[ \text{CF}_3 - \underset{\text{O}}{\overset{||}{\text{C}}} - \text{C}(\text{CH}_3)_3 \right]$  was prepared in a three step sequence from ethyl trifluoroacetate.

The first step in a sequence involved treating ethyl trifluoroacetate with  $\text{NH}_3$  to give a compound A. A on treatment with reagent ' X ' (alongwith gentle heating) produces a compound B (which on hydrolysis can produce an acid). B on treatment with an orange metallic, ' Y ', followed by hydrolysis produces C. Based on above passing attempt the following questions:

**Q.44** Structure of 'A' would be



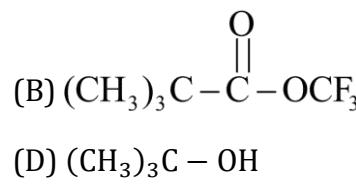
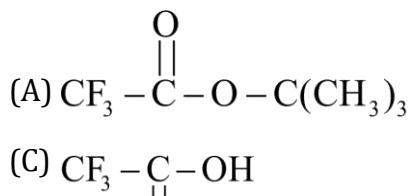
**Q.45** Structure of B would be

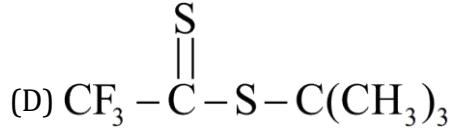
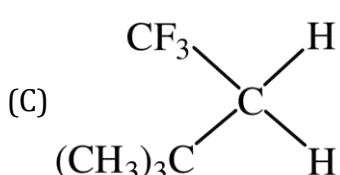
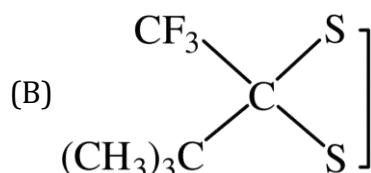
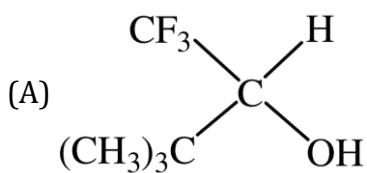
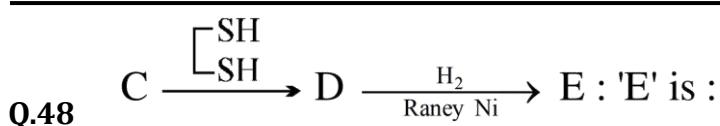


**Q.46** 'X' should be

- (A)  $\text{BaO}_2$
- (B)  $\text{H}_2\text{O}_2$
- (C)  $\text{P}_4\text{O}_{10}$
- (D)  $\text{N}_2\text{O}$

**Q.47** When 'C' is treated with perbenzoic acid it will produce





**(Question No. 49 & 50)**

Questions given below consist of two statements each printed as Assertion (A) and Reason (R); while answering these questions you are required to choose any one of the following four responses:

- (A) If both (A) and (R) are true and (R) is the correct explanation of (A)
- (B) If both (A) and (R) are true but (R) is not correct explanation of (A)
- (C) If (A) is true but (R) is false
- (D) If (A) is false and (R) is true

**Q.49 Assertion :** Benzaldehyde with HCN gives two isomeric compounds

**Reason :** Both nitrile and isonitrile compounds are possible when HCN reacts with carbonyl group.

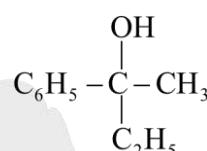
**Q.50 Assertion:**  $Cl_3C - C \begin{array}{c} O \\ || \end{array} - H \xrightarrow{\text{NaOH}} Cl_3C - CH_2OH + Cl_3C - COONa$

**Reason:** There are no  $\alpha - H$  in this compound, so it can't give aldol.



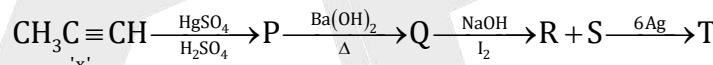
## EXERCISE # II

- Q.1** Two isomeric ketones, 3-pentanone and 2-pentanone can be distinguished by :  
 (A) I<sub>2</sub>/NaOH      (B) NaSO<sub>3</sub>H      (C) NaCN/HCl      (D) 2,4-DNP
- Q.2** An optically inactive alcohol (A) C<sub>6</sub>H<sub>12</sub>O is oxidized by MnO<sub>2</sub> to produce optically inactive carbonyl compound while reduction of (A) by H<sub>2</sub>/Ni produces optically active compound. Possible structure(s) of alcohol is/are  
 (A) Hex-2-ene-1-ol      (B) Hex-3-ene-2-ol  
 (C) 2-Methyl pent-2 - ene-1-ol      (D) 3-Methyl pent-2 - ene-1-ol
- Q.3** Consider the structure of given alcohol:



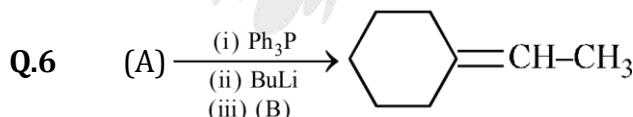
This alcohol can be prepared from:

- (A)  $\text{C}_6\text{H}_5 - \overset{\text{O}}{\underset{\parallel}{\text{C}}} - \text{CH}_3$  and  $\text{C}_2\text{H}_5\text{MgBr}$
- (B)  $\text{CH}_3 - \text{CH}_2 - \overset{\text{O}}{\underset{\parallel}{\text{C}}} - \text{CH}_3$  and  $\text{C}_6\text{H}_5\text{MgBr}$
- (C)  $\text{C}_6\text{H}_5 - \overset{\text{O}}{\underset{\parallel}{\text{C}}} - \text{C}_2\text{H}_5$  and  $\text{CH}_3\text{MgBr}$
- (D)  $\text{C}_6\text{H}_5 - \overset{\text{O}}{\underset{\parallel}{\text{C}}} - \text{Cl}$  and  $\text{C}_2\text{H}_5\text{MgCl}$
- Q.4** Correct option(s) regarding following reaction sequence is/are :



- (A) T is homologue of ' X '
- (B) R is sodium salt of
- (C) P can produce S with NaOI
- (D) R is sodium salt of

- Q.5** Which of the following compounds will not give aldol condensation:  
 (A) Acetaldehyde    (B) Formaldehyde    (C) Pivaldehyde    (D) Crotonaldehyde



In above reaction (A) and (B) will respectively be

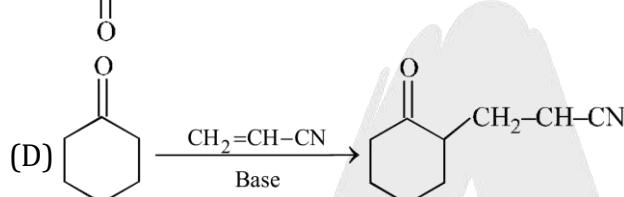
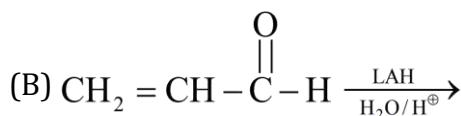
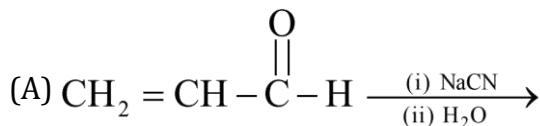
- (A) & CH<sub>3</sub>CHO
- (B) CH<sub>3</sub>CH<sub>2</sub>Cl &
- (C)
- (D) Cl & CH<sub>3</sub>CHO

- Q.7** Stability of hydrates of carbonyl compounds depends on:  
 (A) Steric hindrance      (B) Presence of -I group on gemdiol carbon  
 (C) Intramolecular hydrogen bonding      (D) angle strain in carbonyl compound

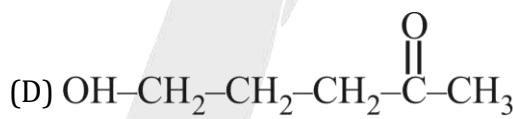
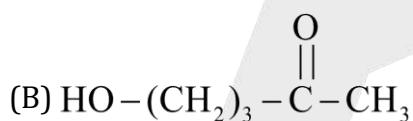
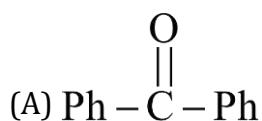


- Q.8** Which of the following can be used for protection of carbonyl group  
 (A)  $\text{CH}_2\text{OH} - \text{CH}_2\text{OH}/\text{H}^{\oplus}$       (B)  $\text{CH}_2\text{OH} - \text{CH}_2 - \text{CH}_2\text{OH}/\text{H}^{\oplus}$   
 (C)  $\text{HS} - (\text{CH}_2)_3 - \text{SH}$       (D)  $\text{CH}_2\text{OH} - \text{CH}_2 - \text{CHO}$

- Q.9** Which of the following is/are example of 1,4-addition reaction



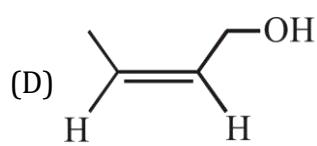
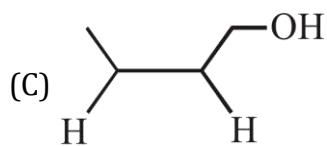
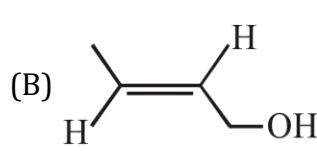
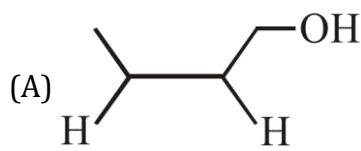
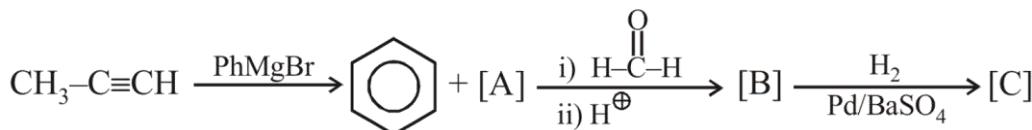
- Q.10** Which of the following(s) will form stable hemiketal:



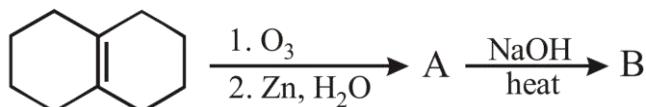
- Q.11** Mixture of  $\text{Ph} - \text{CHO}$  &  $\text{HCHO}$  is treated with  $\text{NaOH}$  then Cannizzaro reaction involves:

- (A) Oxidation of  $\text{HCHO}$       (B) Reduction of  $\text{HCHO}$   
 (C) Oxidation of  $\text{Ph} - \text{CHO}$       (D) Reduction of  $\text{Ph} - \text{CHO}$

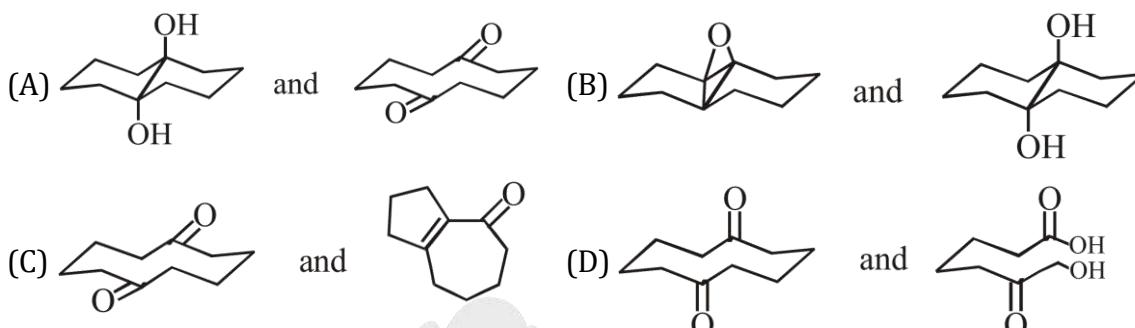
- Q.12** Final product in the given reaction sequence is:



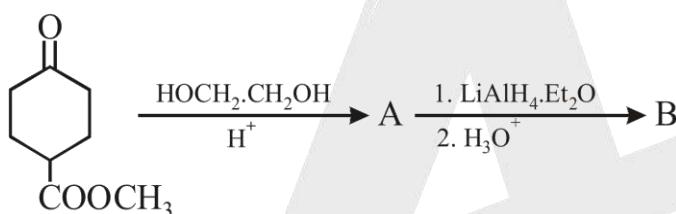
**Q.13** Consider the following reaction sequence.



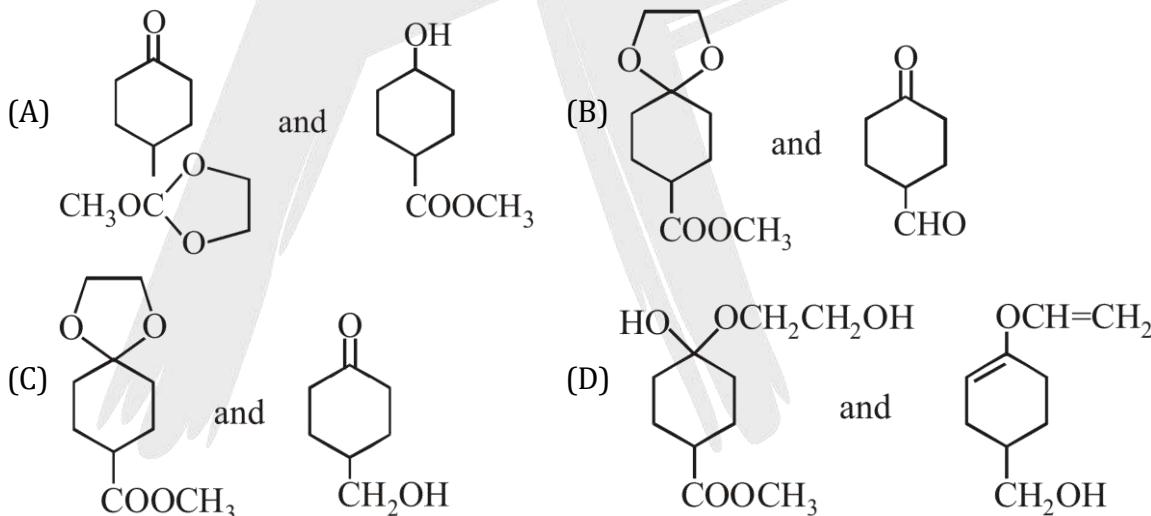
The products (A) and (B) are, respectively,



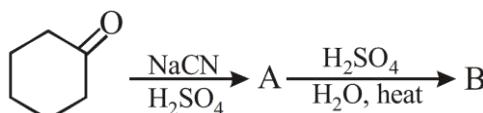
**Q.14** Consider the following sequence of reactions.



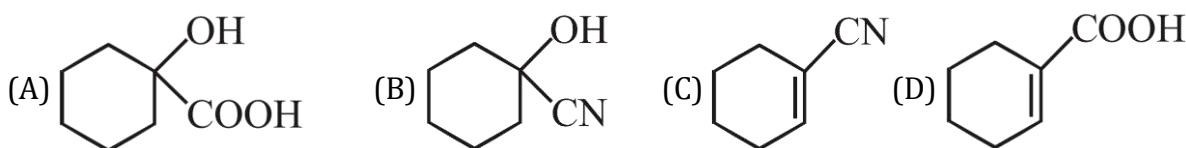
The products (A) and (B) are, respectively,



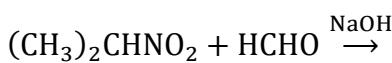
**Q.15** Consider the following sequence of reactions.



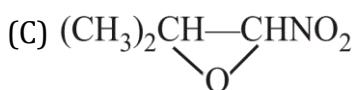
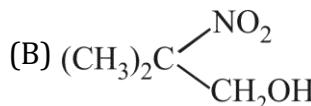
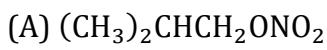
The major product (B) is:



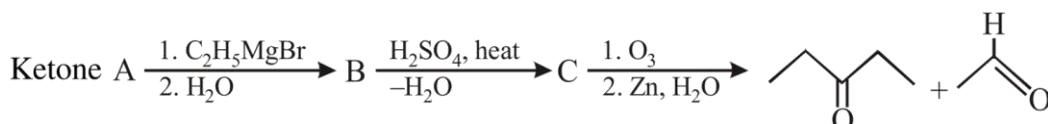
**Q.16** In the reaction



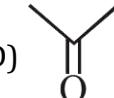
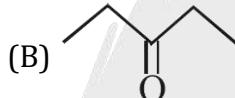
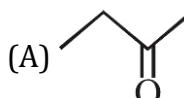
the major product is



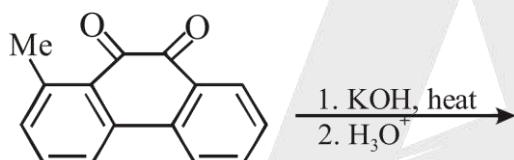
**Q.17** Consider the following sequence of reactions.



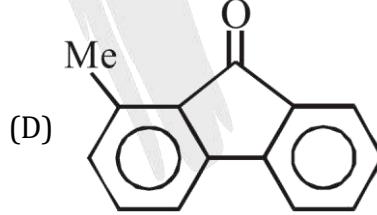
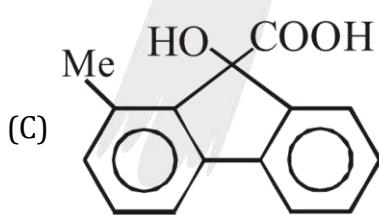
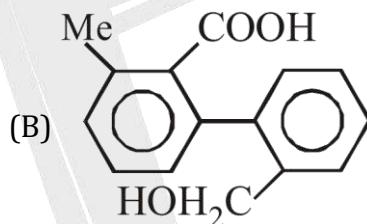
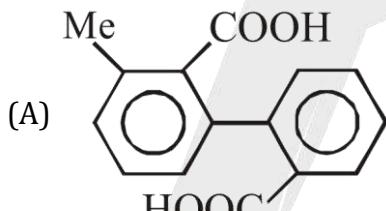
The ketone (A) is:



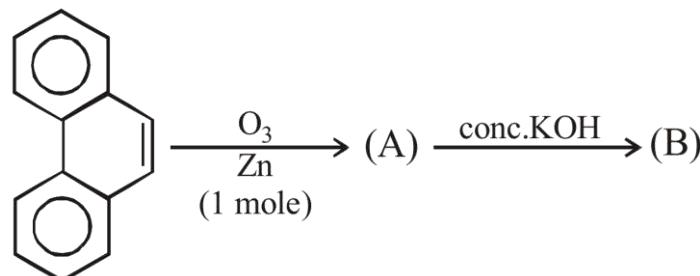
**Q.18** In the reaction



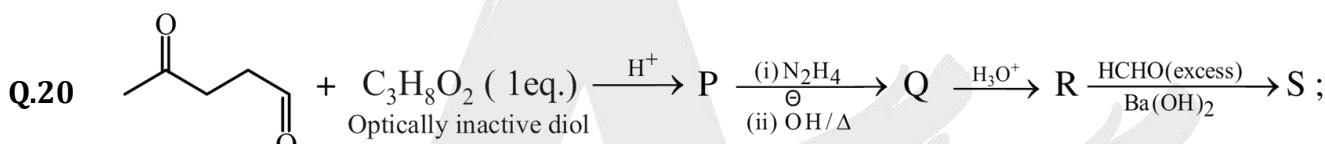
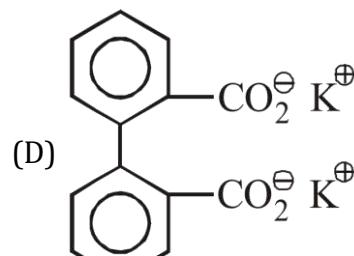
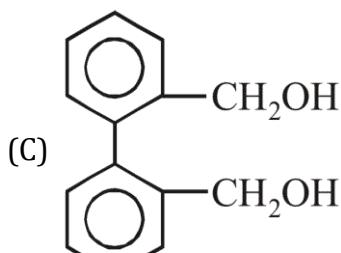
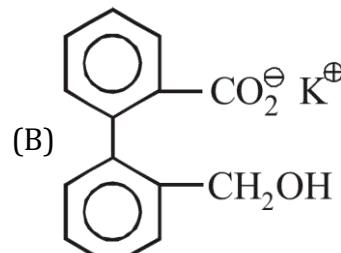
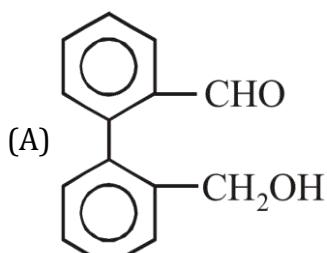
the product (X) is:



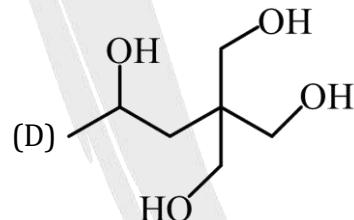
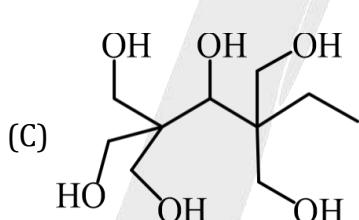
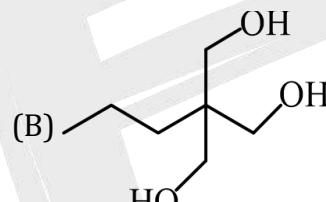
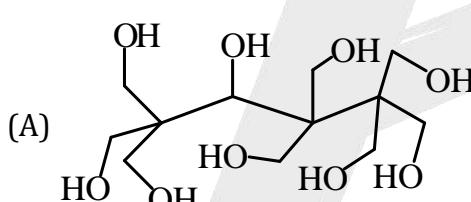
**Q.19**



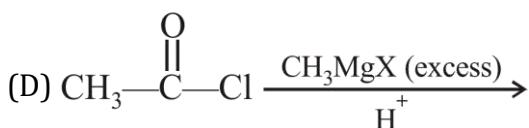
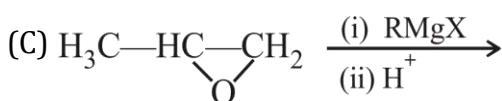
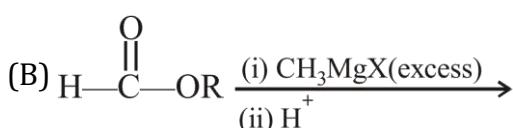
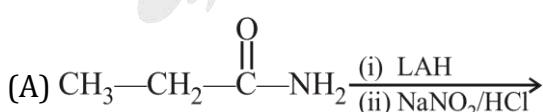
End product (B) of above reaction is:



Final Product 'S' is -

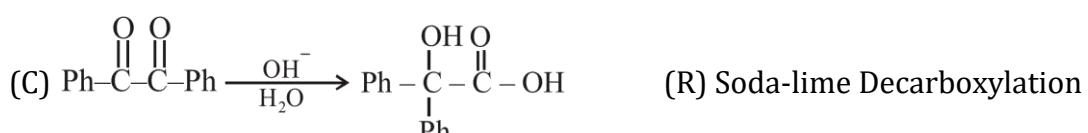
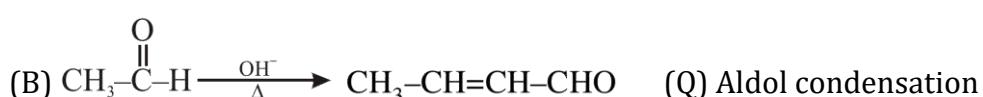
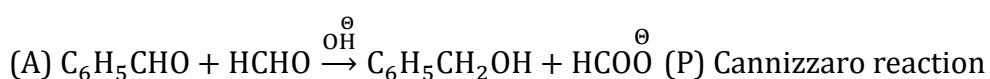


**Q.21** Which of the following reactions will give(s) 2° alcohol as a major product:

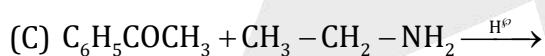
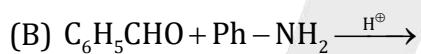
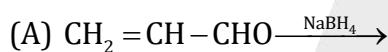




Q.22 Match list-I with list-II

**List-I**

Q.23 Match list-I with list-II

**List - I****List - II**

(P) Acetal

(Q) Schiff's base



(S) Imine



## EXERCISE # III

**Q.1** Predict the product of the reaction of propanal with each of the following :

- (a) Methylmagnesium iodide, followed by dilute acid.
- (b) Sodium acetylide, followed by dilute acid
- (c) Phenyllithium, followed by dilute acid.
- (d) Methanol containing dissolved hydrogen chloride
- (e) Ethylene glycol, p-toluenesulfonic acid, benzene
- (f) Aniline ( $C_6H_5NH_2$ )
- (g) Dimethylamine, p-toluenesulfonic acid, benzene
- (h) Hydroxylamine
- (i) Hydrazine
- (j) Product of part (i) heated in triethylene glycol with sodium hydroxide
- (k) p-Nitrophenylhydrazine
- (l) Semicarbazide
- (m) Sodium cyanide with addition of sulfuric acid
- (n) Chromic acid

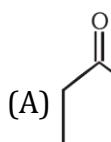
**Q.2** Give structure for the products of the reaction when butanal is treated with each of the following reagents

- (a)  $[Ag(NH_3)_2]OH$  then  $HOH/H^\oplus$
- (b)  $\overset{\ominus}{OH}/HOH, \Delta$
- (c)  $NH_2OH/H^\oplus$
- (d)  $C_6H_5Li$  then  $HOH$
- (e)  $C_6H_5CHO, \overset{\ominus}{OH}, \Delta$
- (f)  $CH \equiv CNa$  then  $HOH/H^\oplus$
- (g)  $CH_2OH - CH_2OH, H^\oplus$
- (h)  $SH - CH_2 - CH_2 - CH_2 - SH$  then Raney Ni/ $H_2$
- (i)  $CH_3MgBr$  then  $H_2O$
- (j) HCN
- (k)  $NaBH_4$
- (l)  $CH_3 - CH_2 - \overset{Br}{CH} - COOC_2H_5$  and Zn then  $H_2O/H^\oplus$

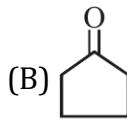


## Q.3 Column - I

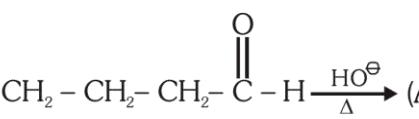
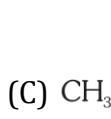
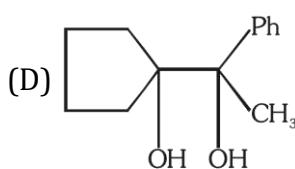
## Column - II



(P) Formation of six member ring takes place

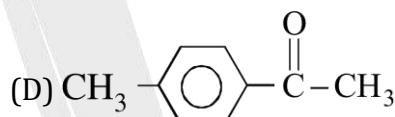
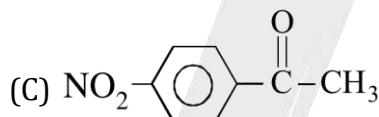
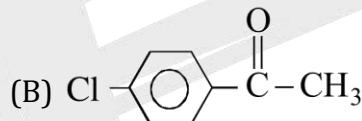


(Q) Final product is Ketone

(R) Final product formed will give positive  
Iodoform test

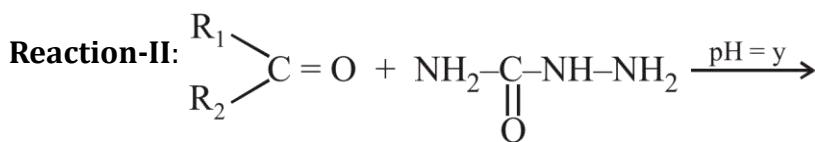
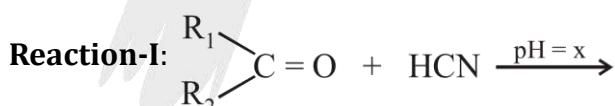
(S) Final product formed will react with 2,4-

DNP. (2,4-Di-nitrophenyl hydrazine)

Q.4 Arrange the following compounds in decreasing order of  $K_{\text{eq}}$ . for hydrate formation.

## Paragraph for Q. 05 to 06

Two reactions which are example of nucleophilic attack are given as below.



## Q.5 Value of x is:

- (A)  $x \leq 4.5$       (B)  $x = 6$       (C)  $x > 7$       (D) Can't decide

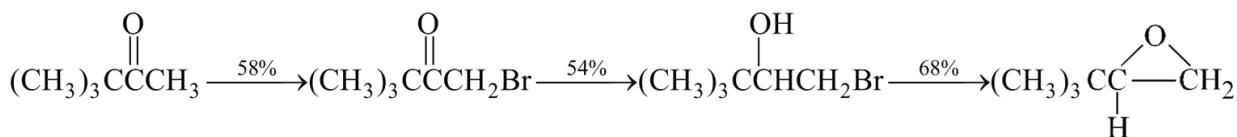
## Q.6 Value of y is:

- (A)  $x = 4.5$       (B)  $x = 1.5$       (C)  $x = 7$       (D)  $x = 9$

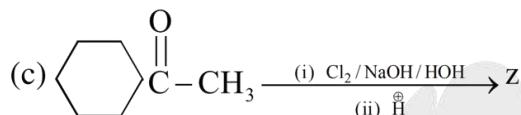
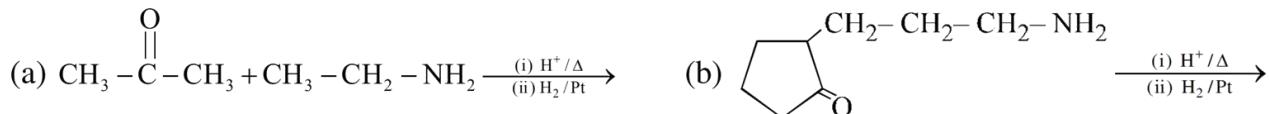
## Q.7 Some Grignard reagents react with ethyl orthoformate, followed by acidic hydrolysis, to give aldehydes. Propose mechanisms for the two steps in this synthesis.



- Q.8** A synthesis that begins with 3,3-dimethyl-2-butanone gives the epoxide shown. Suggest reagents appropriate for each step in the synthesis.

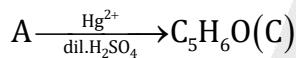
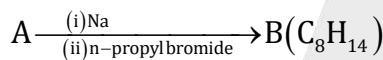


- Q.9** Predict the organic products:

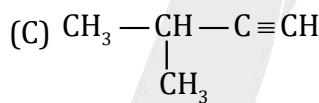
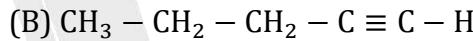


### Paragraph for Q.No.10 to 11

A (Hydrocarbon )( $C \Rightarrow 88.24\%$ ) [Molecular weight of A = 68 ]



- Q.10** 'A' can be:



- Q.11** Correct statement regarding C is.

(A) C reacts with fehling solution to give red ppt.

(B) C gives +ve iodoform test

(C) C give -ve 2, 4, D.N.P test

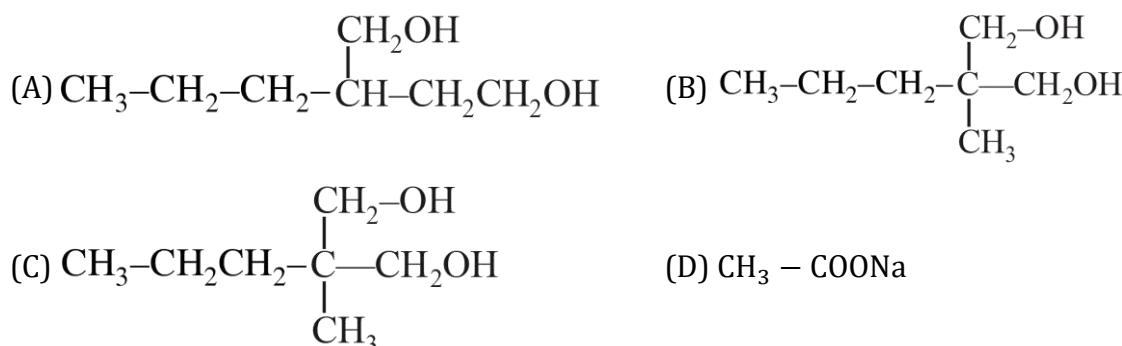
(D) C is aldehyde

- Q.12**  $\text{CH}_3\text{CH}_2\text{CH}_2\text{---CH} \begin{cases} | \\ \text{CH}_3 \end{cases} \text{---CH} = \text{O} \xrightarrow{\text{HCHO}, \text{OH}^-} \text{A(C}_7\text{H}_{14}\text{O}_2\text{)}$



B ( $\text{C}_7\text{H}_{16}\text{O}_2$ ) (formed as one of the product)

'B' is:

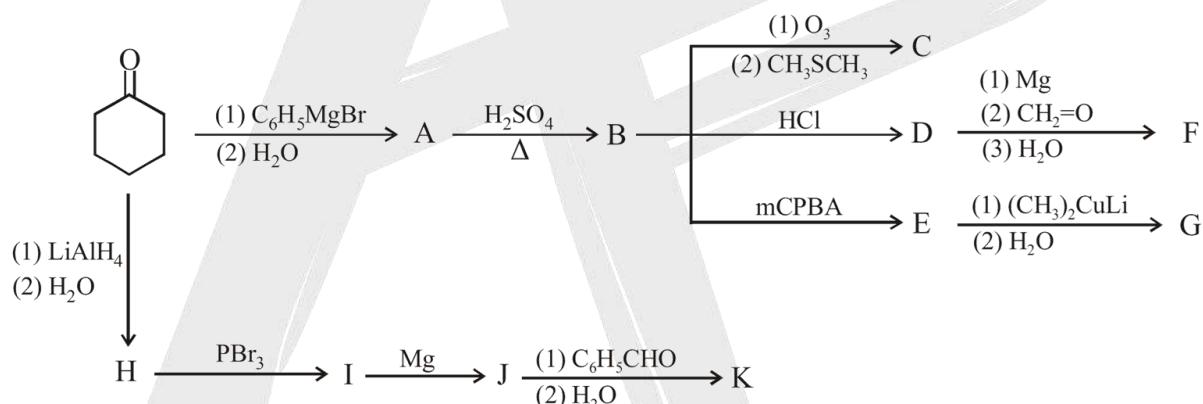


**Q.13** Identify A to E:

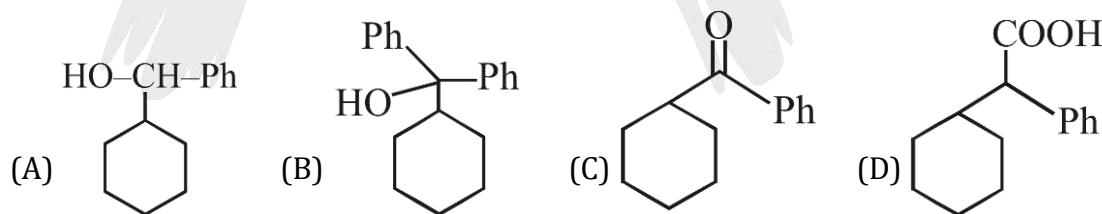
**Q.14** Show how you would accomplish the following syntheses efficiently and in good yield. You may use any necessary reagents.

**Paragraph for Q.No. 15 to 16**

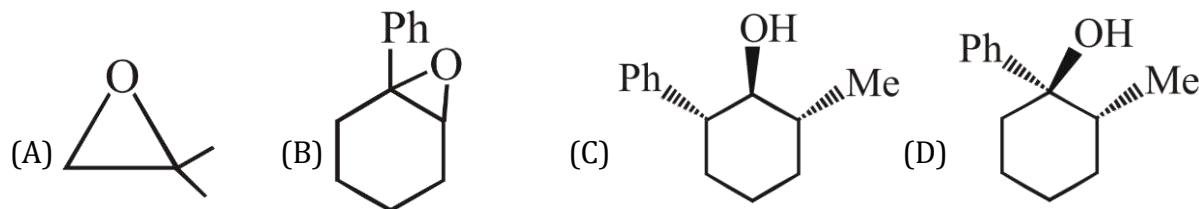
Identify the lettered compounds in the following reaction scheme. Compounds F, G and K are isomers of molecular formula  $C_{13}H_{18}O$ . How could  $^1\text{H}$  NMR spectroscopy distinguish these three compounds from each other?



**Q.15** Identify 'K' product?



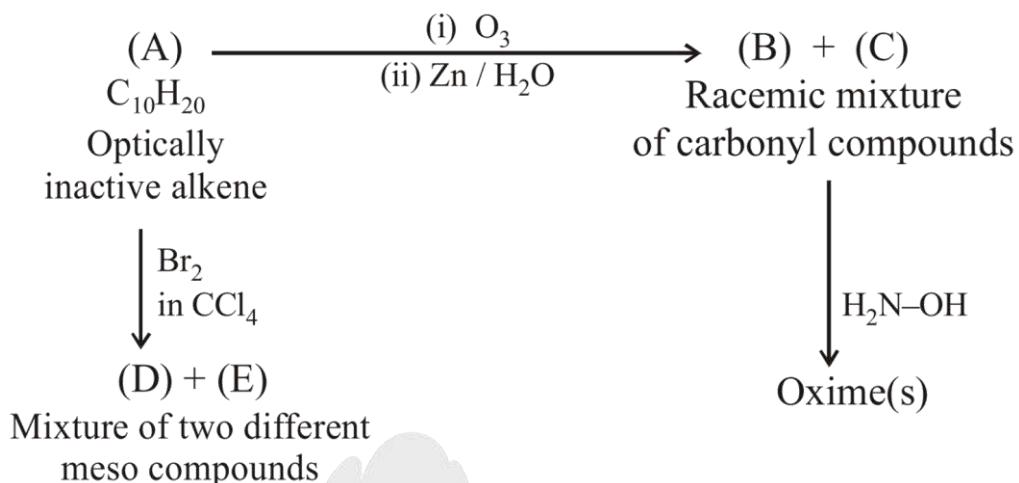
**Q.16** Identify 'G' product?



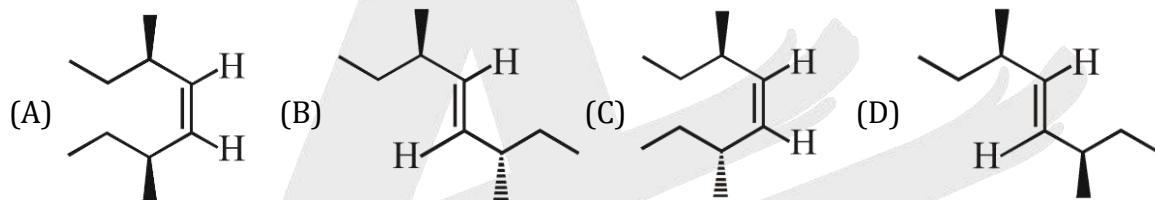


## Paragraph for Q.No. 17 to 18

In given reaction sequence



**17.** Alkene A is:



**18.**

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

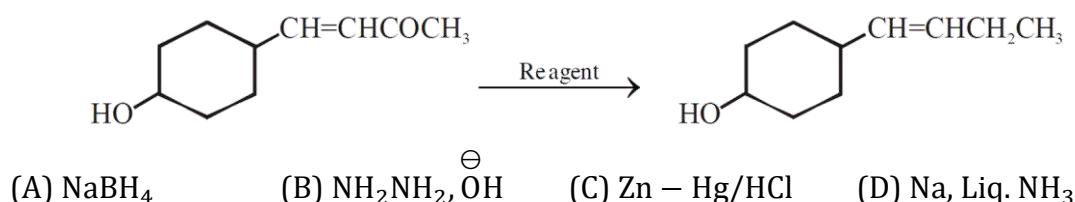


## EXERCISE # IV (MAINS)

- Q.1** When  $\text{CH}_2 = \text{CH} - \text{COOH}$  is reduced with  $\text{LiAlH}_4$ , the compound obtained will be – [AIEEE-2003]
- (A)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{OH}$       (B)  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$   
 (C)  $\text{CH}_3 - \text{CH}_2 - \text{COOH}$       (D)  $\text{CH}_2 = \text{CH} - \text{CH}_2\text{OH}$
- Q.2** Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid ? [AIEEE-2004]
- (A) Phenol      (B) Benzaldehyde      (C) Butanal      (D) Benzoic acid
- Q.3** Which one of the following is reduced with  $\text{Zn} - \text{Hg}/\text{HCl}$  to give the corresponding hydrocarbon [AIEEE-2004]
- (A) Butan-2-one      (B) Acetic acid      (C) Acetamide      (D) Ethyl acetate
- Q.4** On mixing ethyl acetate with aqueous sodium chloride, the composition of the resultant solution is [AIEEE-2004]
- (A)  $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaCl}$       (B)  $\text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$   
 (C)  $\text{CH}_3\text{COCl} + \text{C}_2\text{H}_5\text{OH} + \text{NaOH}$       (D)  $\text{CH}_3\text{Cl} + \text{C}_2\text{H}_5\text{COONa}$
- Q.5** The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is - [AIEEE-2005]
- (A) Acidic dichromate      (B) Acidic permanganate  
 (C) Pyridinium chloro-chromate      (D) Chromic anhydride in glacial acetic acid
- Q.6** Rate of the reaction-
- $$\text{R}-\overset{\text{O}}{\underset{\text{X}}{\text{C}}}\text{---Nu}^\ominus \longrightarrow \text{R}-\overset{\text{O}}{\underset{\text{Nu}}{\text{C}}}\text{---X}^\ominus$$
- is fastest when X is -
- (A)  $\text{NH}_2$       (B) Cl      (C)  $\text{OCOR}$       (D)  $\text{OC}_2\text{H}_5$
- Q.7** Among the following the one that gives positive iodoform test upon reaction with  $\text{I}_2$  and  $\text{NaOH}$  is- [AIEEE-2006]
- (A)  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$       (B)  $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{OH}$   
 (C)      (D)  $\text{PhCHOHCH}_3$
- Q.8** In the following sequence of reactions  $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{P+I}_2} \text{A} \xrightarrow[\text{Ether}]{\text{Mg}} \text{B} \xrightarrow{\text{HCHO}} \text{C} \xrightarrow{\text{H}_2\text{O}} \text{D}$  then compound 'D' is – [AIEEE-2007]
- (A) Butanal      (B) n-Butyl alcohol      (C) n-Propyl alcohol      (D) Propanal
- Q.9** In the following sequence of reactions, the alkene affords the compound 'B' :- [AIEEE-2008]
- $$\text{CH}_3\text{CH}=\text{CHCH}_3 \xrightarrow{\text{O}_3} \text{A} \xrightarrow[\text{Zn}]{\text{H}_2\text{O}} \text{B}$$
- The compound B is
- (A)  $\text{CH}_3\text{CH}_2\text{CHO}$       (B)  $\text{CH}_3\text{COCH}_3$       (C)  $\text{CH}_3\text{CH}_2\text{COCH}_3$       (D)  $\text{CH}_3\text{CHO}$



- Q.10** Bakelite is obtained from phenol by reacting with [AIEEE-2008]  
 (A)  $(CH_2OH)_2$       (B)  $CH_3CHO$       (C)  $CH_3COCH_3$       (D)  $HCHO$
- Q.11** Which of the following on heating with aqueous KOH, produces acetaldehyde ? [AIEEE-2009]  
 (A)  $CH_2ClCH_2Cl$       (B)  $CH_3CHCl_2$       (C)  $CH_3COCl$       (D)  $CH_3CH_2Cl$
- Q.12** In Cannizzaro reaction given below :- [AIEEE-2009]
- $$2\text{PhCHO} \xrightarrow{:\text{OH}} \text{PhCH}_2\text{OH} + \text{PhCO}_2^\ominus$$
- the slowest step is :-
- (A) The abstraction of proton from the carboxylic group  
 (B) The deprotonation of  $\text{PhCH}_2\text{OH}$   
 (C) The attack of  $:\text{OH}^\ominus$  at the carboxyl group  
 (D) The transfer of hydride to the carbonyl group
- Q.13** One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is :- [AIEEE-2010]  
 (A) Ethene      (B) Propene      (C) 1-Butene      (D) 2-Butene
- Q.14** Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of :- [AIEEE-2011]  
 (A) An isopropyl group      (B) An acetylenic triple bond  
 (C) Two ethylenic double bonds      (D) A vinyl group
- Q.15** Ozonolysis of an organic compound 'A' produces acetone and propionaldehyde in equimolar mixture. Identify 'A' from the following compounds : - [AIEEE-2011]  
 (A) 2-Methyl - 1- pentene      (B) 1-Pentene  
 (C) 2-Pentene      (D) 2-Methyl-2-pentene
- Q.16** Trichloroacetaldehyde was subjected to Cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate and another compound. The other compound is: [AIEEE-2011]  
 (A) 2,2,2-Trichloropropanol      (B) Chloroform  
 (C) 2,2,2-Trichloroethanol      (D) Trichloromethanol
- Q.17** Silver Mirror test is given by which one of the following compounds? [AIEEE-2011]  
 (A) Formaldehyde    (B) Benzophenone    (C) Acetaldehyde    (D) Acetone
- Q.18** In the given transformation, which of the following is the most appropriate reagent ? [AIEEE-2012]

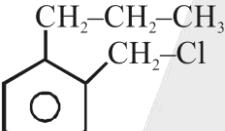
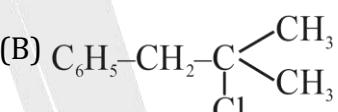


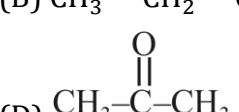
- Q.19** Iodoform can be prepared from all except :- [AIEEE-2012]  
 (A) Isobutyl alcohol (B) Ethyl methyl ketone  
 (C) Isopropyl alcohol (D) 3-Methyl-2-butanone

**Q.20** A compound with molecular mass 180 is acylated with  $\text{CH}_3\text{COCl}$  to get a compound with molecular mass 390. The number of amino groups present per molecule of the former compound is :- [JEE(Main)-2013]  
 (A) 2 (B) 5 (C) 4 (D) 6

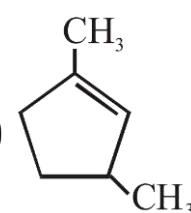
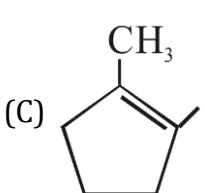
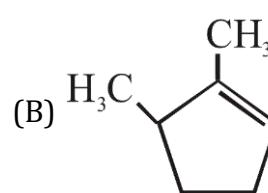
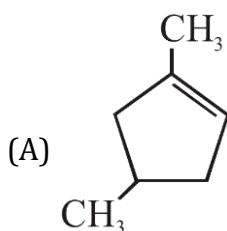
**Q.21** The major organic compound formed by the reaction of 1,1,1-trichloroethane with silver powder is :- [JEE(Main)-2014]  
 (A) 2-Butyne (B) 2-Butene (C) Acetylene (D) Ethene

**Q.22** The most suitable reagent for the conversion of  $\text{R} - \text{CH}_2 - \text{OH} \rightarrow \text{R} - \text{CHO}$  is :- [JEE(Main)-2014]  
 (A)  $\text{CrO}_3$  (B) PCC (Pyridinium chlorochromate)  
 (C)  $\text{KMNO}_4$  (D)  $\text{K}_2\text{Cr}_2\text{O}_7$

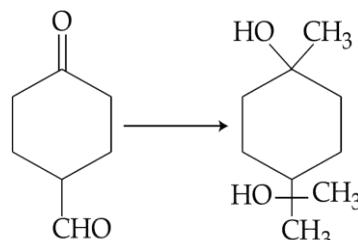
**Q.23** A compound A with molecular formula  $\text{C}_{10}\text{H}_{13}\text{Cl}$  gives a white precipitate on adding silver nitrate solution. A on reacting with alcoholic KOH gives compound B as the main product. B on ozonolysis gives C and D. C gives Cannizaro reaction but not aldol condensation. D gives aldol condensation but not Cannizaro reaction. A is : [JEE(Main)-2015]  
 (A)   
 (B)   
 (C)  $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{Cl}$  (D)  $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}(\text{Cl}) - \text{CH}_3$

**Q.24** In the reaction sequence  
 $2\text{CH}_3\text{CHO} \xrightarrow{\text{OH}^-} \text{A} \xrightarrow{\Delta} \text{B}$ ; the product B is:- [JEE(Main)-2015]  
 (A)  $\text{CH}_3 - \text{CH} = \text{CH} - \text{CHO}$  (B)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$   
 (C)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{OH}$  (D) 

**Q.25** Which compound would give 5-keto-2-methyl hexanal upon ozonolysis? [JEE(Main)-2015]



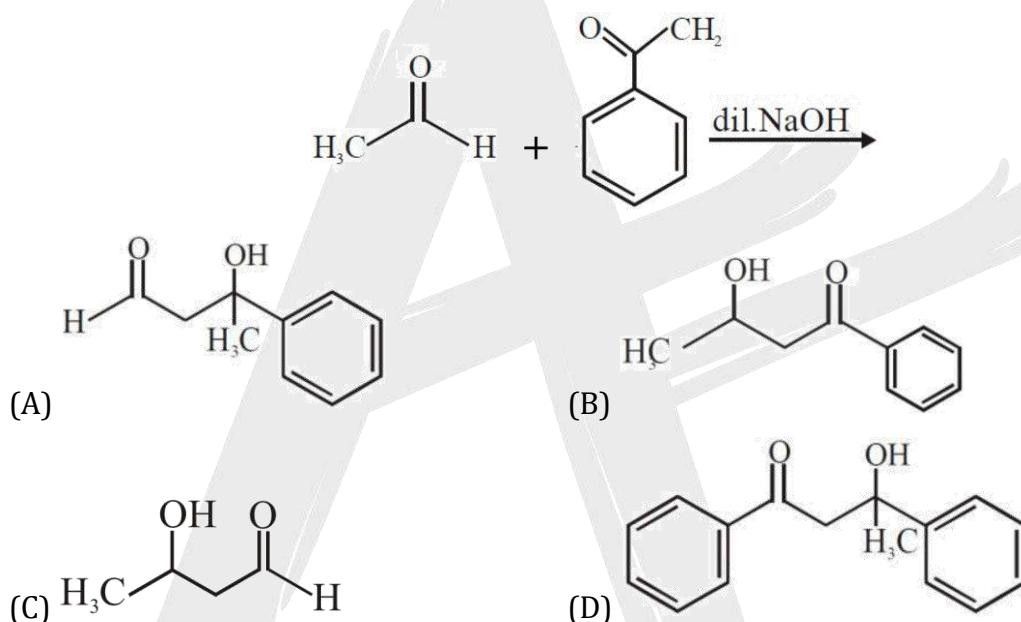
**Q.26** The correct sequence of reagents for the following conversion will be: [JEE(Main) 2017]



- (A)  $\text{CH}_3\text{MgBr}$ ,  $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$ ,  $\text{H}^+/\text{CH}_3\text{OH}$
- (B)  $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$ ,  $\text{CH}_3\text{MgBr}$ ,  $\text{H}^+/\text{CH}_3\text{OH}$
- (C)  $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$ ,  $\text{H}^+/\text{CH}_3\text{OH}$ ,  $\text{CH}_3\text{MgBr}$
- (D)  $\text{CH}_3\text{MgBr}$ ,  $\text{H}^+/\text{CH}_3\text{OH}$ ,  $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$

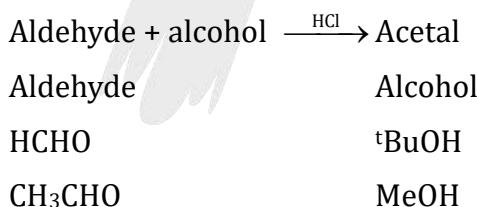
**Q.27** The major product formed in the following reaction is:

[JEE MAIN-2019]



**Q.28** In the following reaction

[JEE MAIN-2019]



The best combinations is :

- (A)  $\text{CH}_3\text{CHO}$  and  $t\text{BuOH}$
- (B) HCHO and  $t\text{BuOH}$
- (C)  $\text{CH}_3\text{CHO}$  and MeOH
- (D) HCHO and MeOH

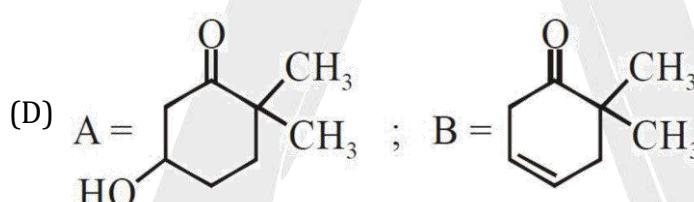
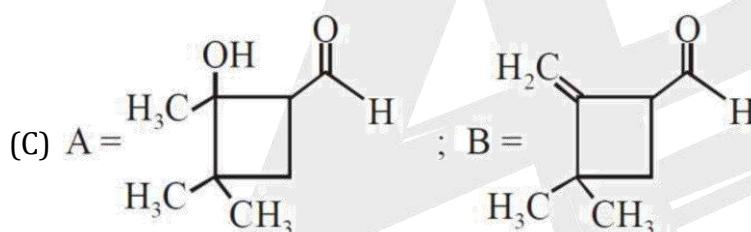
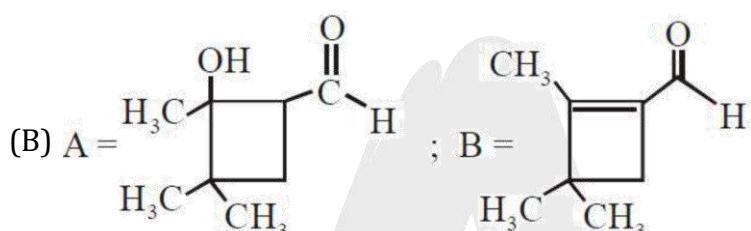
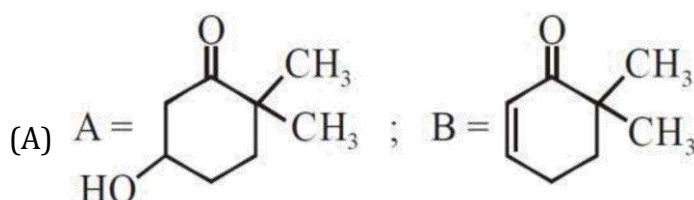
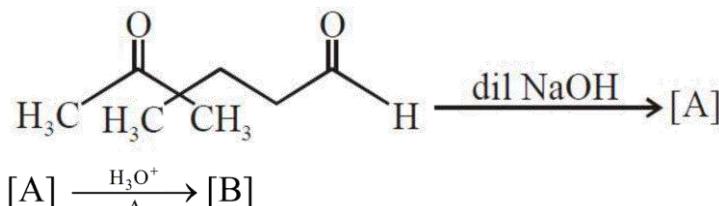
**Q.29** cannot be prepared by :

[JEE MAIN-2019]

- (A)  $\text{PhCOCH}_3$  +  $\text{CH}_3\text{CH}_2\text{MgX}$
- (B)  $\text{PhCOCH}_2\text{CH}_3$  +  $\text{CH}_3\text{MgX}$
- (C) HCHO +  $\text{PhCH}(\text{CH}_3)\text{CH}_2\text{MgX}$
- (D)  $\text{CH}_3\text{CH}_2\text{COCH}_3$  +  $\text{PhMgX}$

**Q.30** In the following reactions, products A and B are:

[JEE MAIN-2019]



**Q.31** The increasing order of the reactivity of the following with  $\text{LiAlH}_4$  is: [JEE MAIN-2019]

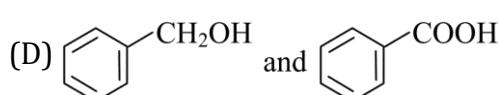
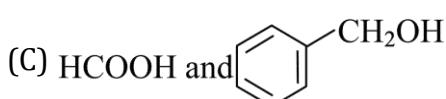
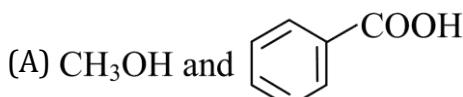
- |  |   |  |  |
|--|---|--|--|
| (A) $\text{C}_2\text{H}_5\text{C}(=\text{O})\text{NH}_2$ | (B) $\text{C}_2\text{H}_5\text{C}(=\text{O})\text{OCH}_3$ | (C) $\text{C}_2\text{H}_5\text{C}(=\text{O})\text{Cl}$ | (D) $\text{C}_2\text{H}_5\text{C}(=\text{O})\text{OOCCH}_2\text{CH}_3$ |
| (A) (A) < (B) < (C) < (D)                                | (B) (A) < (B) < (D) < (C)                                 |  |  |
| (C) (B) < (A) < (C) < (D)                                | (D) (B) < (A) < (D) < (C)                                 |  |  |

**Q.32** The aldehydes which will not form Grignard product with one equivalent Grignard reagents are: [JEE MAIN-2019]

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

**Q.33** Major products of the following reaction are:

[JEE MAIN-2019]



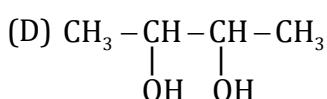
**Q.34** But-2-ene on reaction with alkaline  $\text{KMnO}_4$  at elevated temperature followed by acidification will give:

[JEE MAIN-2019]

(A) one molecule of  $\text{CH}_3\text{CH}\text{HOOC}$  and one molecule of  $\text{CH}_3\text{COOH}$

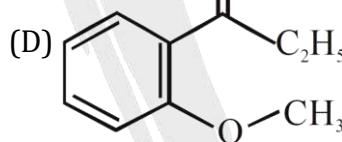
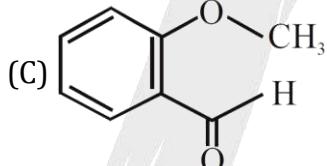
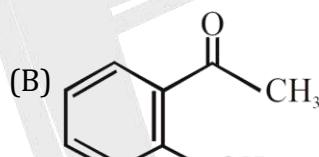
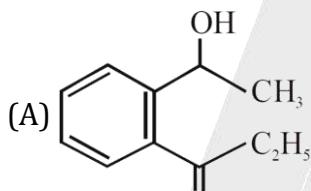
(B) 2 molecules of  $\text{CH}_3\text{CHO}$

(C) 2 molecules of  $\text{CH}_3\text{COOH}$



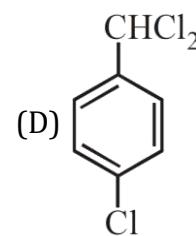
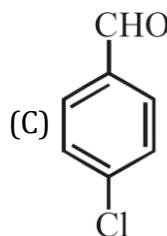
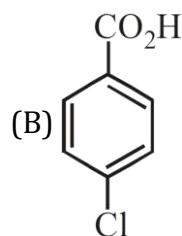
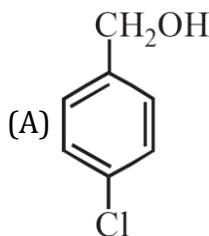
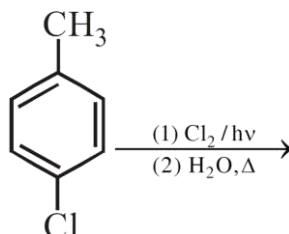
**Q.35** An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution. It however, reacts with Grignard reagent and gives positive iodoform test. The compound is :

[JEE MAIN-2019]



**Q.36** The major product of the following reaction is :

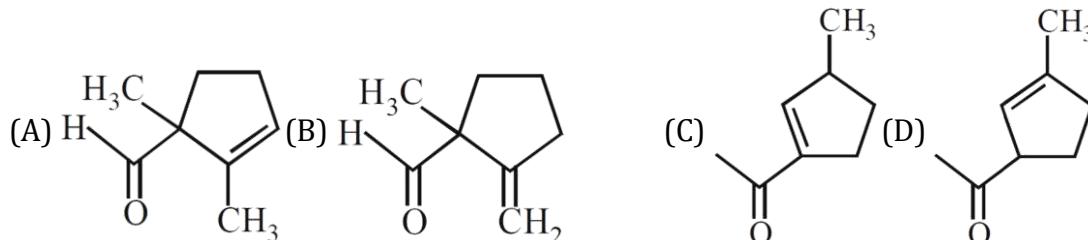
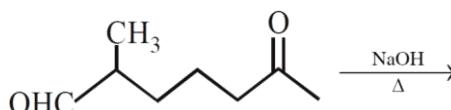
[JEE MAIN-2019]





**Q.37** The major product obtained in the following reaction is :

[JEE MAIN-2019]



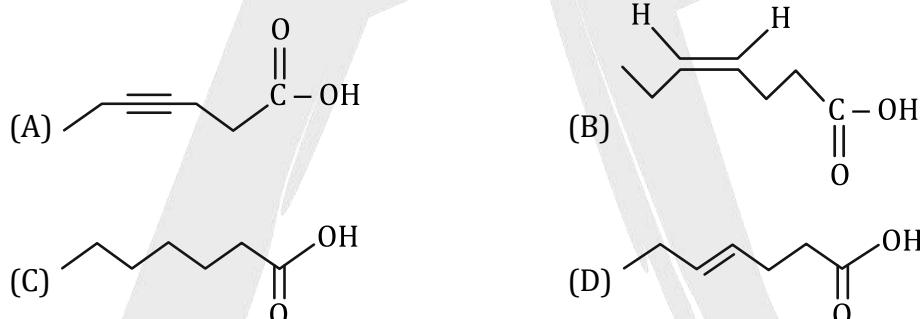
**Q.38** In the following reaction carbonyl compound + MeOH  $\xrightleftharpoons{\text{HCl}}$  acetal. Rate of the reaction is the highest for :

[JEE MAIN-2019]

- (A) Acetone as substrate and methanol in excess
- (B) Acetone as substrate and methanol in stoichiometric amount
- (C) Propanal as substrate and methanol in excess
- (D) Propanal as substrate and methanol in stoichiometric amount.

**Q.39** Hex-3-ynal  $\xrightarrow{(1)\text{NaBH}_4} \xrightarrow{(2)\text{PBr}_3} \xrightarrow{(3)\text{Mg/Ether}} \xrightarrow{(4)\text{CO}_2} \xrightarrow{(5)\text{H}^{\oplus}}$  (X), formed product X will be:

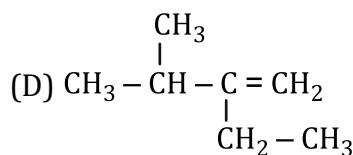
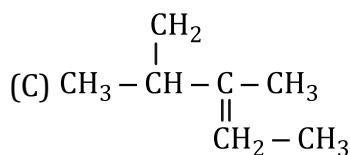
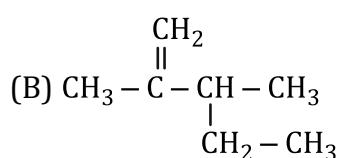
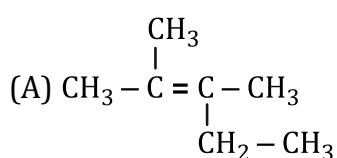
[JEE MAIN 2020]

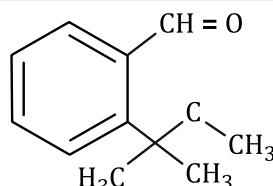
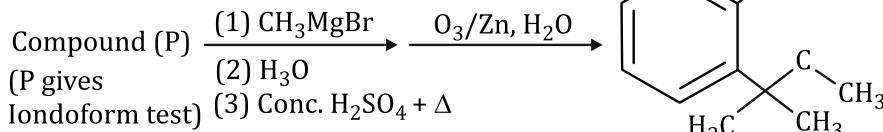


**Q.40**  $\text{H}_3\text{C}-\overset{\text{CH}_3}{\underset{\text{CH}_2-\text{CH}_3}{\text{CH}}}=\text{C}-\text{CH}_3 \xrightarrow[(2)\text{H}_3\text{O}^{\oplus}]{(1)\text{EtMgBr/Ether}} \xrightarrow[\Delta]{\text{H}_3\text{SO}}$

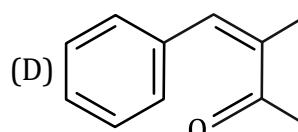
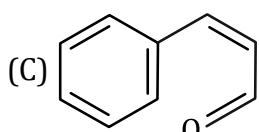
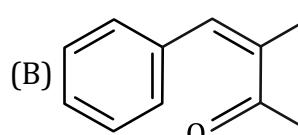
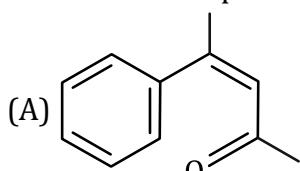
What will be the major product?

[JEE MAIN 2020]



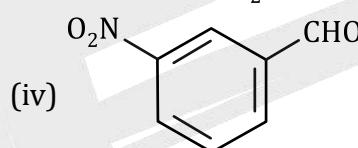
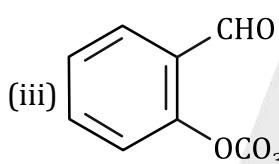
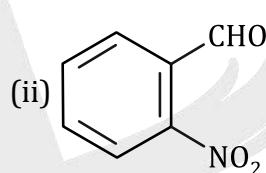
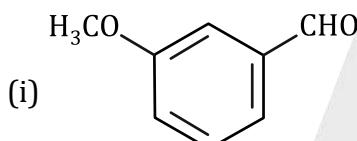
**Q.41**

Predict the compound (P) on the basis of above sequence of the reactions? [JEE MAIN 2020]

**Q.42**

The increasing order of the following compounds towards HCN addition is

[JEE MAIN 2020]



(A) (iii) < (iv) < (ii) < (i)

(B) (iii) < (i) < (iv) < (ii)

(C) (iii) < (iv) < (i) < (ii)

(D) (i) < (iii) < (iv) < (ii)

**Q.43**

The increasing order of the reactivity of the following compounds in nucleophilic addition reaction is Propanal, Benzaldehyde, Propanone, Butanone [JEE MAIN 2020]

(A) Propanal < Propanone < Butanone < Benzaldehyde

(B) Benzaldehyde < Propanal < Propanone < Butanone

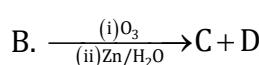
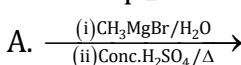
(C) Benzaldehyde < Butanone < Propanone < Propanal

(D) Butanone < Propanone < Benzaldehyde < Propanal

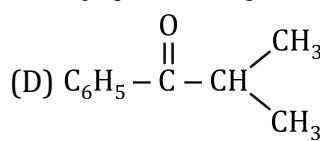
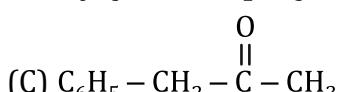
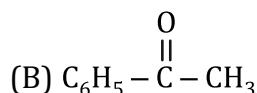
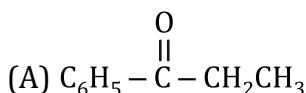
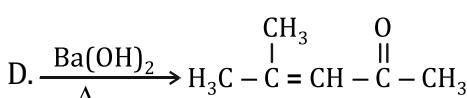
**Q.44**

The compound A in the following reactions is

[JEE MAIN 2020]

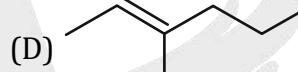
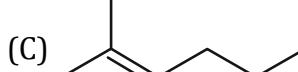
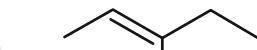
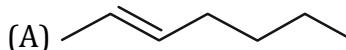
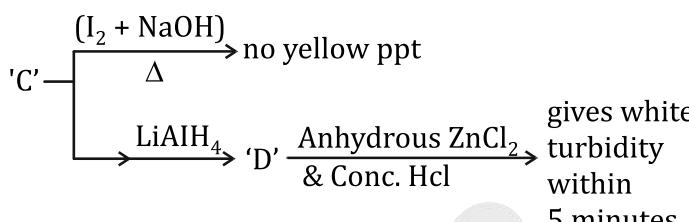
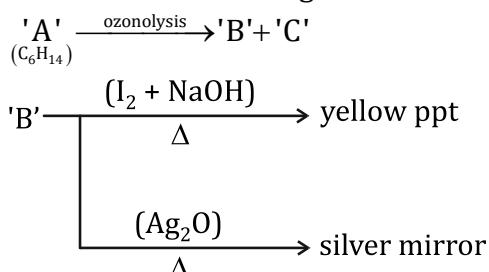


C.



**Q.45** Consider the following reactions

[JEE MAIN 2020]



**Q.46** Given below are two statements :

[JEE MAIN 2021]

**Statement I :** The nucleophilic addition of sodium hydrogen sulphite to an aldehyde or a ketone involves proton transfer to form a stable ion.

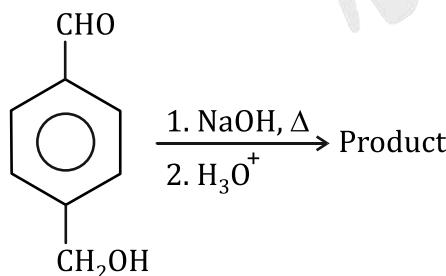
**Statement II :** The nucleophilic addition of hydrogen cyanide to an aldehyde or a ketone yields amine as final product.

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

- (A) Both Statement I and Statement II are true.
- (B) Statement I is true but Statement II is false.
- (C) Statement I is false but Statement II is true.
- (D) Both Statement I and Statement II are false.

**Q.47** For the reaction given below :

[JEE MAIN 2021]

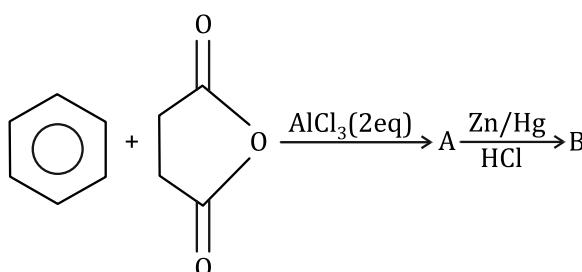


The compound which is not formed as a product in the reaction is a :

- (A) compound with both alcohol and acid functional groups
- (B) monocarboxylic acid
- (C) dicarboxylic acid
- (D) diol

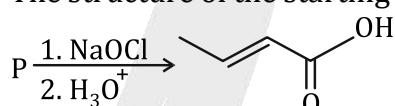
- Q.48** The structures of A and B formed in the following reaction are:  
[Ph =  $-C_6H_5$ ]

[JEE MAIN 2021]



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

- Q.49** The structure of the starting compound P used in the reaction given below is: [JEE MAIN 2021]



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

- Q.50**

- (I) (II) (III) (IV)

Which among the above compound/s does/do not form Silver mirror when treated with Tollen's reagent? [JEE MAIN 2021]

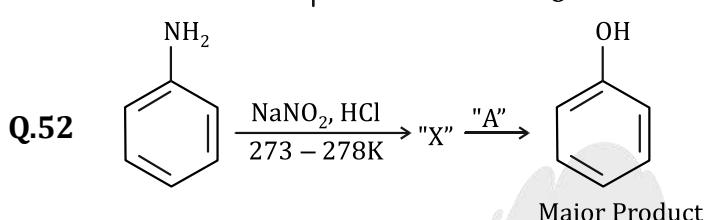
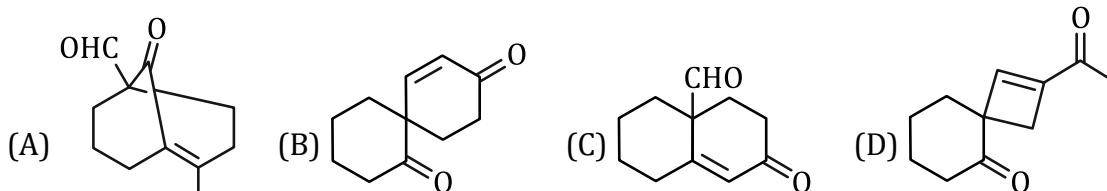
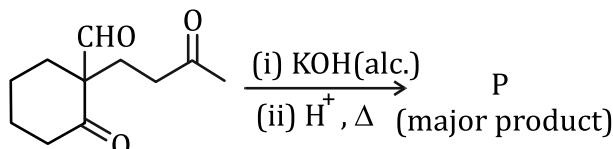
- (1) (I), (III) and (IV) only  
(3) Only (II)

- (2) Only (IV)  
(4) (III) and (IV) only



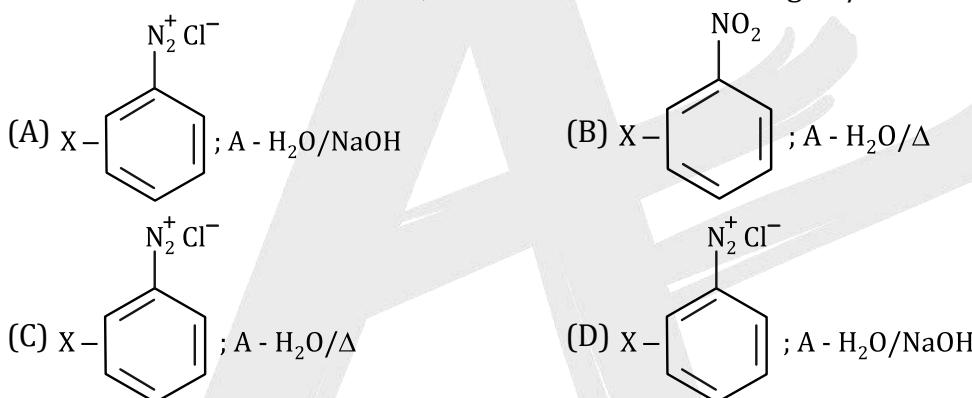
**Q.51** The major product (P) in the following reaction is :

[JEE MAIN 2021]



[JEE MAIN 2021]

In the above chemical reaction, intermediate "X" and reagent/condition "A" are:



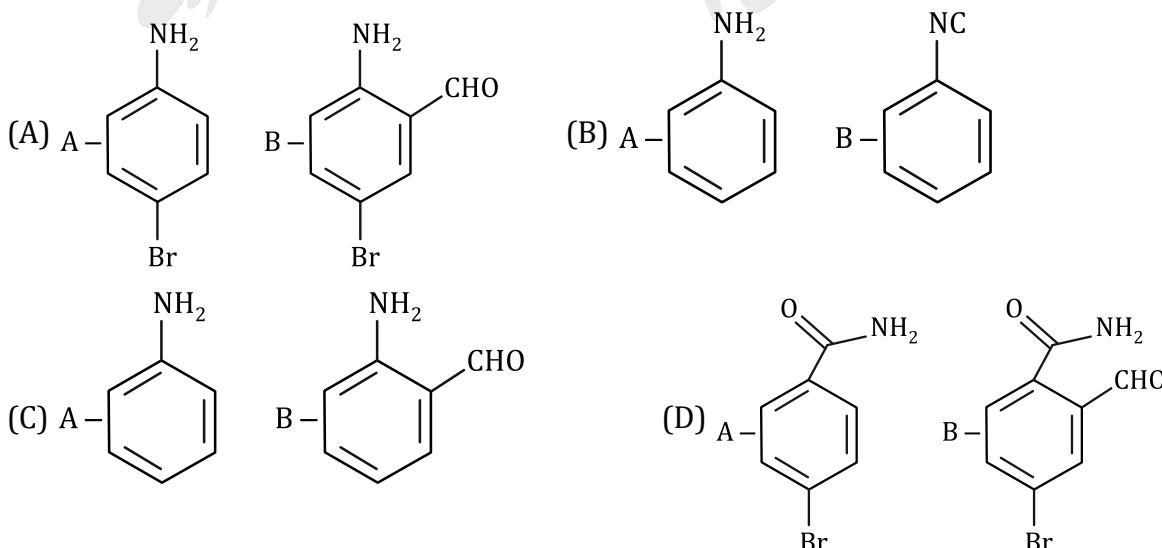
**Q.53** Which of the following is least basic?

[JEE MAIN 2021]

- (A)  $(\text{CH}_3\text{CO})\ddot{\text{N}}\text{HC}_2\text{H}_5$       (B)  $(\text{C}_2\text{H}_5)_3\ddot{\text{N}}$   
 (C)  $(\text{CH}_3\text{CO})_2\ddot{\text{N}}\text{H}$       (D)  $(\text{C}_2\text{H}_5)_2\ddot{\text{N}}\text{H}$

**Q.54** Hoffmann bromamide degradation of benzamide gives product A, which upon heating with  $\text{CHCl}_3$  and  $\text{NaOH}$  gives product B. The structures of A and B are :

[JEE MAIN 2021]

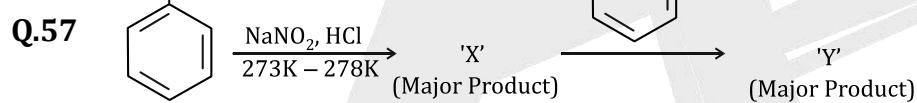
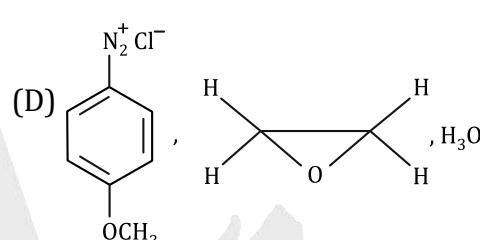
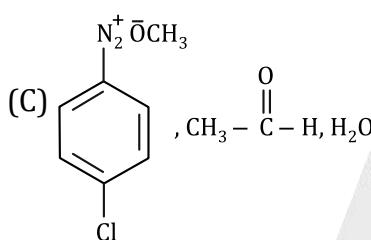
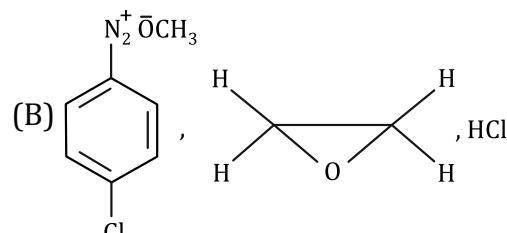
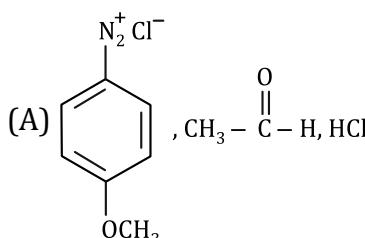


- Q.55** Primary, secondary and tertiary amines can be separated using :-  
 (A) Para-Toluene sulphonyl chloride      (B) Chloroform and KOH  
 (C) Benzene sulphonic acid      (D) Acetyl amide
- Q.56**  $C_7H_7N_2OCl + C_2H_3OH \rightarrow [O + N_2 + "X" + "Y"]$

[JEE MAIN 2021]

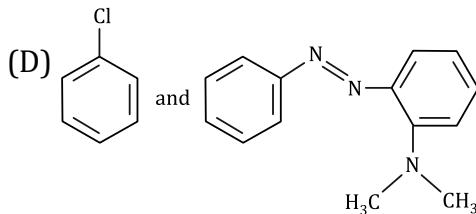
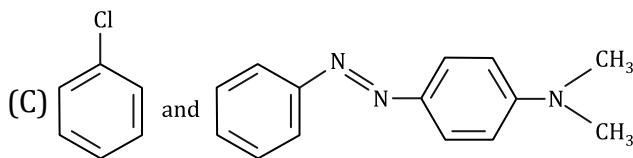
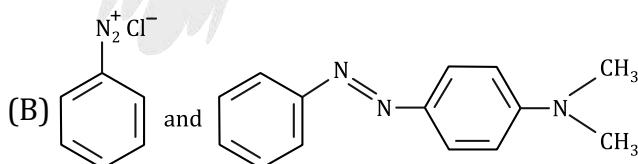
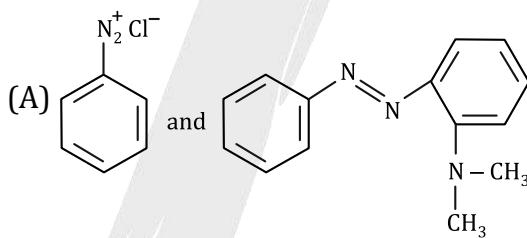
- (A) In the above reaction, the structural formula of

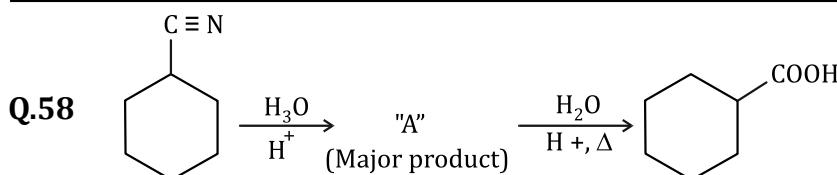
[JEE MAIN 2021]



Considering the above reaction, X and Y respectively are

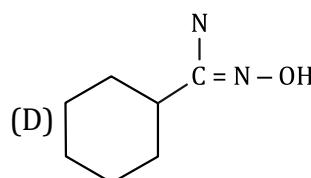
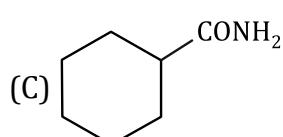
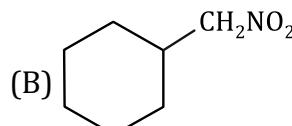
[JEE MAIN 2021]





Consider the above chemical reaction and identify product "A"

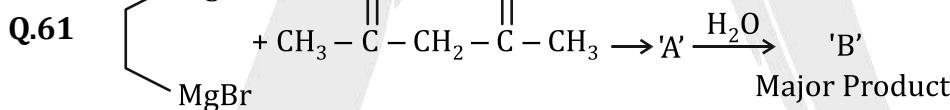
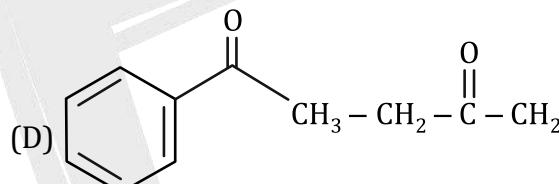
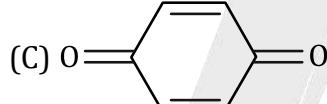
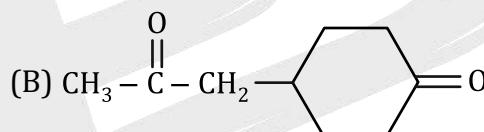
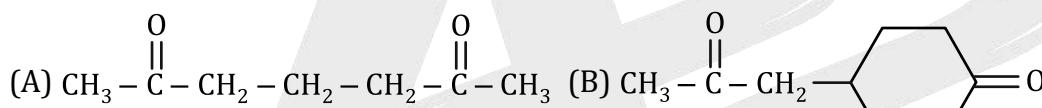
[JEE MAIN 2021]



**Q.59** In the reaction of hypobromite with amide, the carbonyl carbon is lost as : [JEE MAIN 2021]

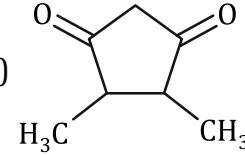
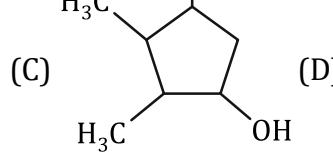
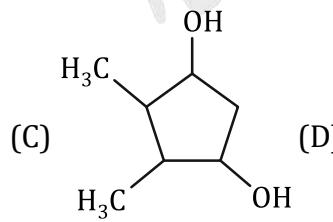
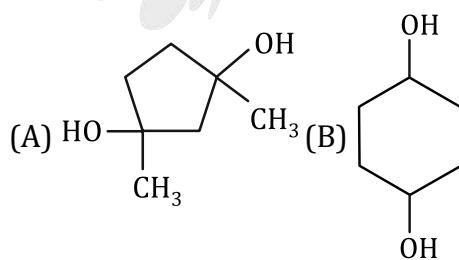
- (1)  $\text{CO}_3^{2-}$       (2)  $\text{HCO}_3^-$       (3)  $\text{CO}_2$       (4) CO

**Q.60** Which of the following is an example of Conjugated diketone? [JEE MAIN 2022]



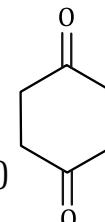
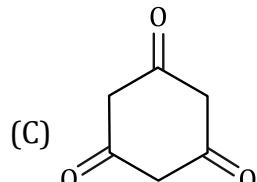
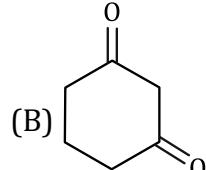
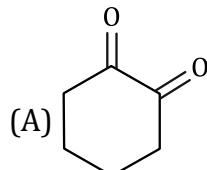
Consider the above reaction sequence and identify the product B.

[JEE MAIN 2022]



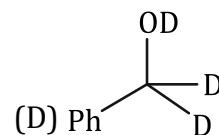
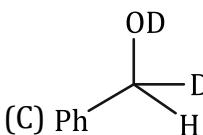
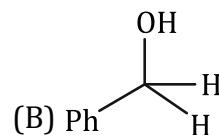
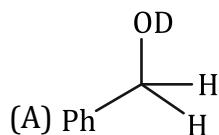
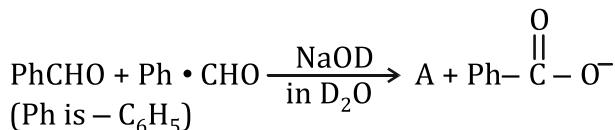
**Q.62** Which will have the highest enol content?

[JEE MAIN 2022]



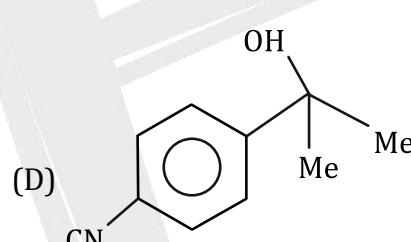
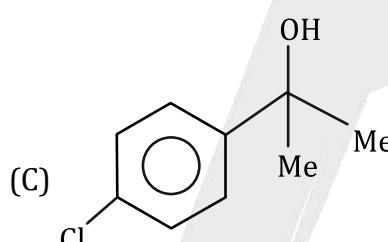
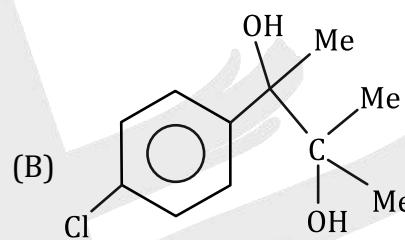
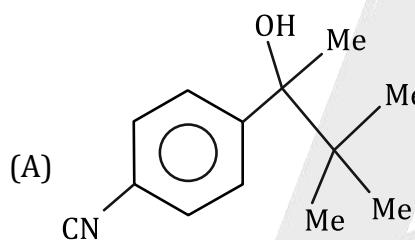
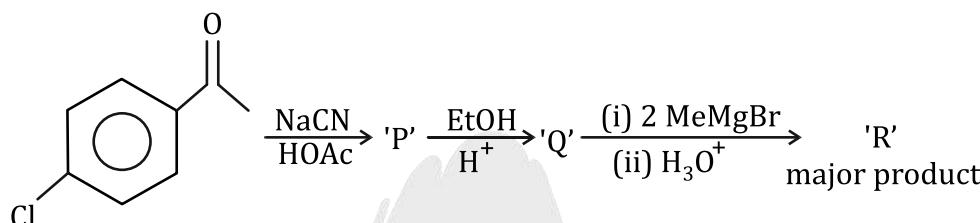
**Q.63** The correct structure of product 'A' formed in the following reaction.

[JEE MAIN 2022]



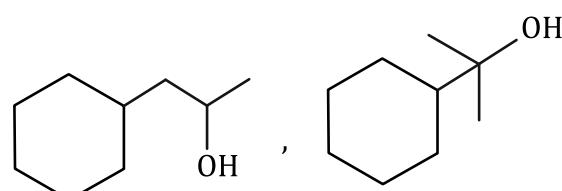
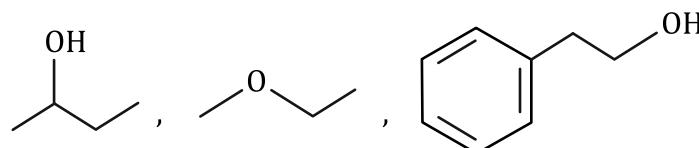
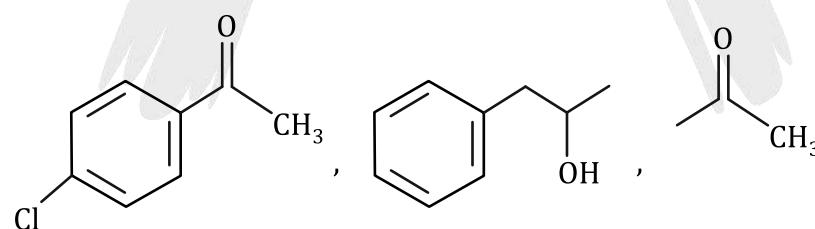
**Q.64** ' R ' formed in the following sequence of reaction is:

[JEE MAIN 2023]



**Q.65** Number of compounds giving (i) red colouration with ceric ammonium nitrate and also (ii) positive iodoform test from the following is \_\_\_\_\_. [JEE MAIN 2023]

[JEE MAIN 2023]



Q.66

[JEE MAIN 2023]

List-I (Reaction)		List-II (Reagents)	
(A)	Hoffmann Degradation	(I)	Conc. KOH, $\Delta$
(B)	Clemenson reduction	(II)	$\text{CHCl}_3, \text{NaOH}/\text{H}_3\text{O}^+$
(C)	Cannizaro reaction	(III)	$\text{Br}_2, \text{NaOH}$
(D)	Reimer-Tiemann reaction	(IV)	$\text{Zn-Hg/HCl}$

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

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

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

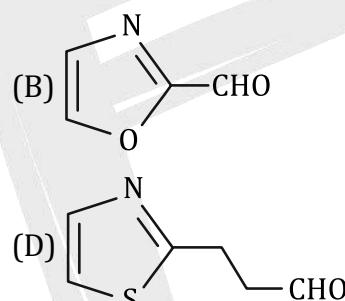
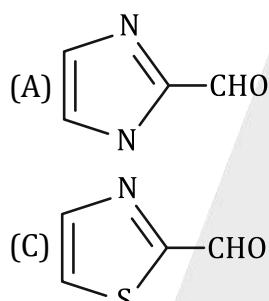
(D) (A) – II, (B) – I, (C) – III, (D) – IV

Q.67 Which of the following compounds would give the following set of qualitative analysis ?

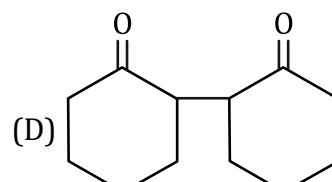
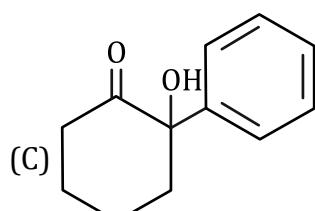
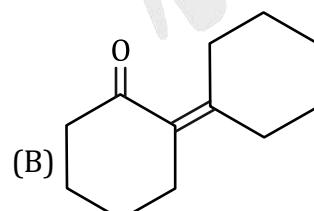
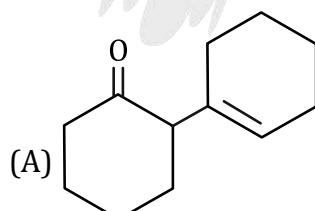
[JEE MAIN 2023]

(i) Fehling's Test : Positive

(ii) Na fusion extract upon treatment with sodium nitroprusside gives a blood red colour but not



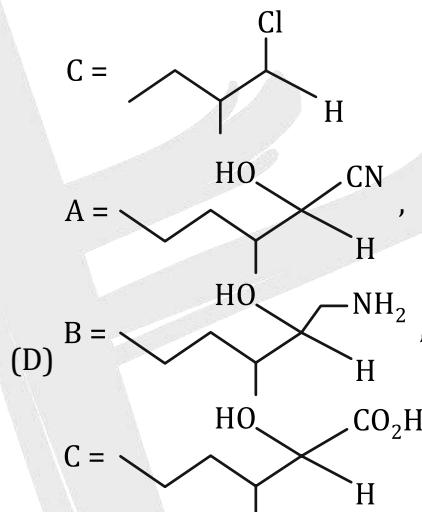
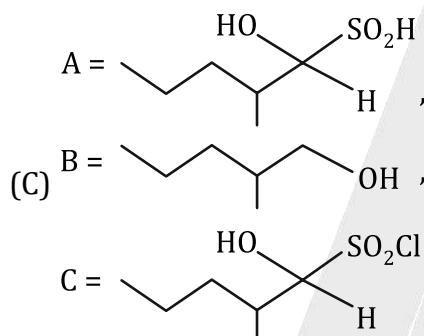
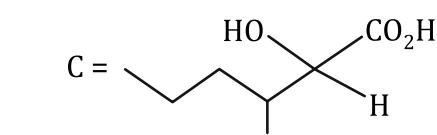
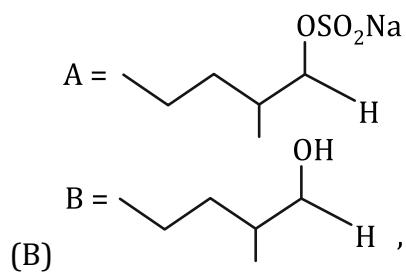
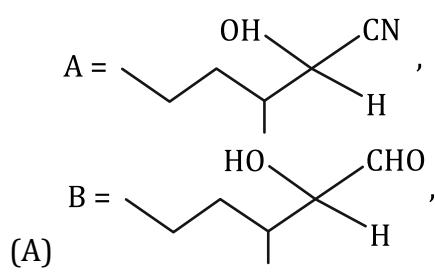
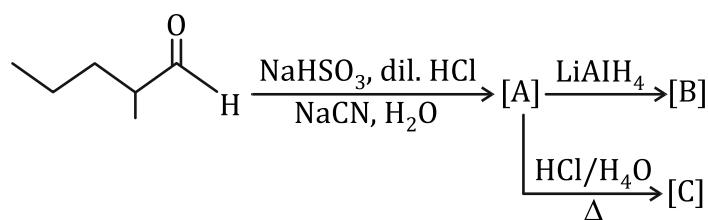
Q.68 Cyclohexylamine when treated with nitrous acid yields (P). On treating (P) with PCC results in (Q). When (Q) is heated with dil. NaOH we get (R) The final product (R) is : [JEE MAIN 2023]





**Q.69** The structures of major products A, B and C in the following reaction are sequence.

[JEE MAIN 2023]

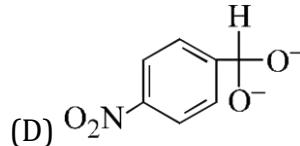
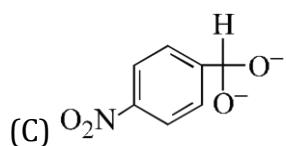
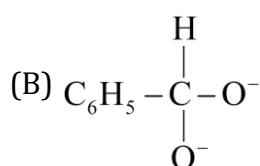
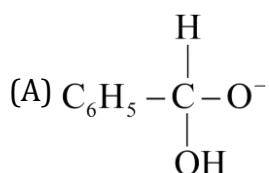




## **EXERCISE-IV # (A) (OBJECTIVE QUESTIONS)**



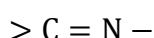
**Q.9** In a Cannizzaro reaction the intermediate which is the best hydride donor is: [IIT 1997]



**Q.10**  $\text{CH}_3\text{CHO} + \text{H}_2\text{NOH} \rightarrow \text{CH}_3 - \text{CH} = \text{N} - \text{OH}$ . The above reaction occurs at: [IIT 1997]

- (A) pH = 1      (B) pH = 4.5      (C) Any value of pH      (D) pH = 12

**Q.11** Among the following compounds, which will react acetone to give a product containing

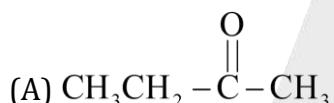


[IIT 1998]

- (A)  $\text{C}_6\text{H}_5\text{NH}_2$       (B)  $(\text{CH}_3)_3\text{N}$       (C)  $\text{C}_6\text{H}_5\text{NHC}_6\text{H}_5$       (D)  $\text{C}_6\text{H}_5\text{NNH}_2$

**Q.12** The product obtained via oxymercuration ( $\text{HgSO}_4 - \text{H}_2\text{SO}_4$ ) of 1-butyne would be

[IIT 1998]



**Q.13** Which of the following will undergo aldol condensation: [IIT 1998]

- (A) Acetaldehyde      (B) Propanaldehyde  
 (C) Benzaldehyde      (D) Trideutero acetaldehyde

**Q.14** Which of the following will react with water: [IIT 1998]

- (A)  $\text{CHCl}_3$       (B)  $\text{Cl}_3\text{CCHO}$       (C)  $\text{CCl}_4$       (D)  $\text{ClCH}_2\text{CH}_2\text{Cl}$

**Q.15** A new carbon-carbon bond formation is possible in [IIT 1998]

- (A) Cannizzaro reaction      (B) Friedel-Crafts alkylation  
 (C) Clemmensen reduction      (D) Reimer-Tiemann reaction

**Q.16** Which of the following has the most acidic hydrogen: [IIT 2000]

- (A) 3-hexanone      (B) 2,4-hexanedione  
 (C) 2,5-hexanedione      (D) 2,3-hexandione

**Q.17** A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives:

[IIT 2001]

- (A) benzyl alcohol and sodium formate  
 (B) sodium benzoate and methyl alcohol  
 (C) sodium benzoate and sodium formate  
 (D) benzyl alcohol and methyl alcohol

**Q.18** 1-propanol & 2-propanol can be best distinguished by : [IIT 2001]

- (A) Oxidation with alkaline  $\text{KMnO}_4$  followed by reaction with Fehling solution
- (B) Oxidation with acidic dichromate followed by reaction with Fehling solution
- (C) Oxidation by heating with copper followed by reaction with Fehling solution
- (D) Oxidation with concentrated  $\text{H}_2\text{SO}_4$  followed by reaction with Fehling solution

**Q.19** Compound A (molecular formula  $\text{C}_3\text{H}_8\text{O}$ ) is treated with acidified potassium dichromate to form a product B (molecular formula  $\text{C}_3\text{H}_6\text{O}$ ). B forms a shining silver mirror on warming with ammonical silver nitrate. B when treated with an aqueous solution of  $\text{H}_2\text{NCONHNH}_2$ ,  $\text{HCl}$  and sodium acetate gives a product C. Identify the structure of C. [IIT 2002]

- (A)  $\text{CH}_3\text{CH}_2\text{CH} = \text{NNHCONH}_2$
- (B)  $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} = \text{NNHCONH}_2$
- (C)  $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} = \text{NCONHNH}_2$
- (D)  $\text{CH}_3\text{CH}_2\text{CH} = \text{NCONHNH}_2$



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

**Q.21**

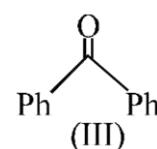
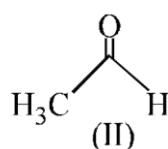
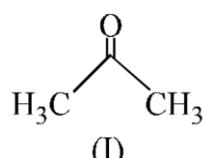
Products formed by P & Q can be differentiated by:

- (A) 2, 4 DNP
- (B) Lucas reagent ( $\text{ZnCl}_2$ ) conc.  $\text{HCl}$
- (C)  $\text{NaHSO}_3$
- (D) Fehlings solution

[IIT 2003]

**Q.22** The order of reactivity of phenyl Magnesium Bromide with the following compounds is

[IIT 2004]



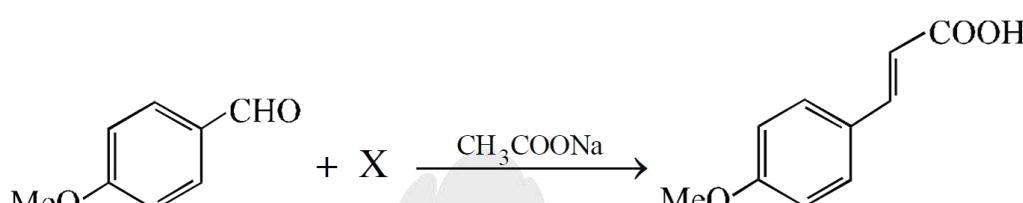
(A) II > III > I

(B) I > III > II

(C) II > I > III

(D) All react with the same rate

**Q.23**



[IIT 2004]

What is X?

(A)  $\text{CH}_3\text{COOH}$

(B)  $\text{BrCH}_2\text{COOH}$

(C)  $(\text{CH}_3\text{CO})_2\text{O}$

(D)  $\text{CHO} - \text{COOH}$

**Q.24**

The smallest ketone and its next homologue are reacted with  $\text{NH}_2\text{OH}$  to form oxime.

[IIT 2006]

(A) Two different oximes are formed

(B) Three different oximes are formed

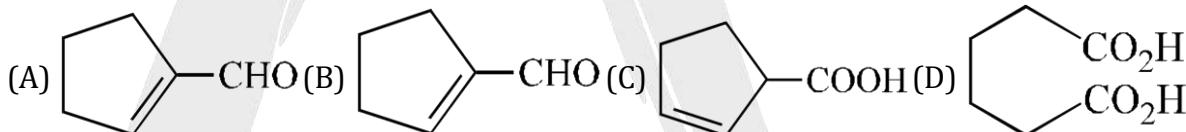
(C) Two oximes are optically active

(D) All oximes are optically active

**Q.25**

Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on further treatment with aqueous KOH yields compound F. Compound F is

[IIT 2007]



**Q.26**

**Statement-1 :** Glucose gives a reddish-brown precipitate with Fehling's solution because

**Statement-2 :** Reaction of glucose with Fehling's solution gives  $\text{CuO}$  and gluconic acid.

[IIT 2007]

(A) Statement- 1 is True, Statement- 2 is True; Statement- 2 is a correct explanation for Statement-1.

(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(C) Statement-1 is True, Statement-2 is False.

(D) Statement-1 is False, Statement- 2 is True.



**Q.27** Match the compounds/ion in column I with their properties/ reaction in Column II. Indicate your answer by darkening the appropriate bubbles of the  $4 \times 4$  matrix given in the ORS.

[IIT 2007]

**Column I**

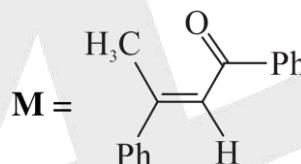
- (A)  $\text{C}_6\text{H}_5\text{CHO}$
- (B)  $\text{CH}_3\text{C} \equiv \text{CH}$
- (C)  $\text{CN}^-$
- (D)  $\text{I}^-$

**Column II**

- (P) gives precipitate with 2,4-dinitrophenylhydrazine
- (Q) gives precipitate with  $\text{AgNO}_3$
- (R) is a nucleophile
- (S) is involved in cyanohydrin formation

**Paragraph for Question No. 28 to 30**

A tertiary alcohol H upon acid catalysed dehydration gives a product I. Ozonolysis of I leads to compounds J and K. Compound J upon reaction with KOH gives benzyl alcohol and a compound L, whereas K on reaction with KOH gives only M.



**Q.28** Compound H is formed by the reaction of

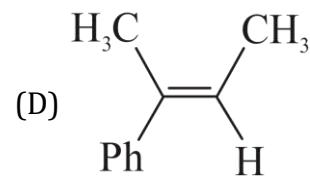
[IIT 2008]

- (A)  $\text{PhCH}_2\text{COCH}_3 + \text{PhMgBr}$
- (B)  $\text{PhCH}_2\text{COCH}_3 + \text{PhCH}_2\text{MgBr}$
- (C)  $\text{PhCHO} + \text{PhCH}_2\text{MgBr}$
- (D)  $\text{PhCHO} + \text{PhCH}_2\text{CH}_2\text{MgBr}$

**Q.29** The structure of compound I is

[IIT 2008]

- (A)  $\text{Ph}-\text{CH}=\text{C}(\text{CH}_3)-\text{Ph}$
- (B)  $\text{H}_3\text{C}-\text{CH}=\text{C}(\text{Ph})-\text{Ph}$
- (C)  $\text{Ph}-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}_2\text{Ph}$



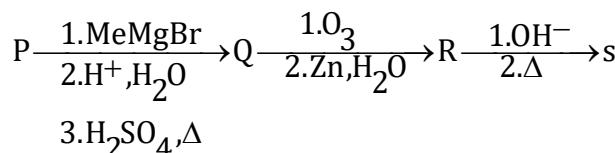
**Q.30** The structures of compounds J, K and L, respectively, are

[IIT 2008]

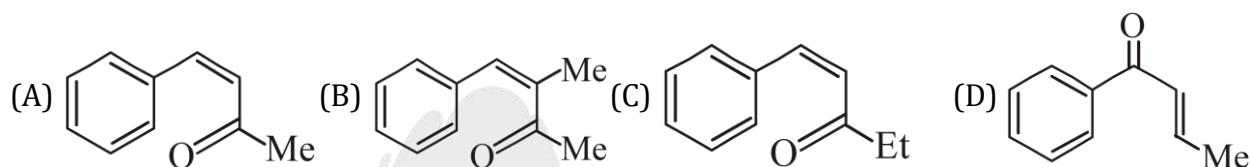
- (A)  $\text{PhCOCH}_3, \text{PhCH}_2\text{COCH}_3$  and  $\text{PhCH}_2\text{COO}^- \text{K}^+$
- (B)  $\text{PhCHO}, \text{PhCH}_2\text{CHO}$  and  $\text{PhCOO}^- \text{K}^+$
- (C)  $\text{PhCOCH}_3, \text{PhCH}_2\text{CHO}$  and  $\text{CH}_3\text{COO}^- \text{K}^+$
- (D)  $\text{PhCHO}, \text{PhCOCH}_3$  and  $\text{PhCOO}^- \text{K}^+$

### **Paragraph for Question Nos. 31 to 33**

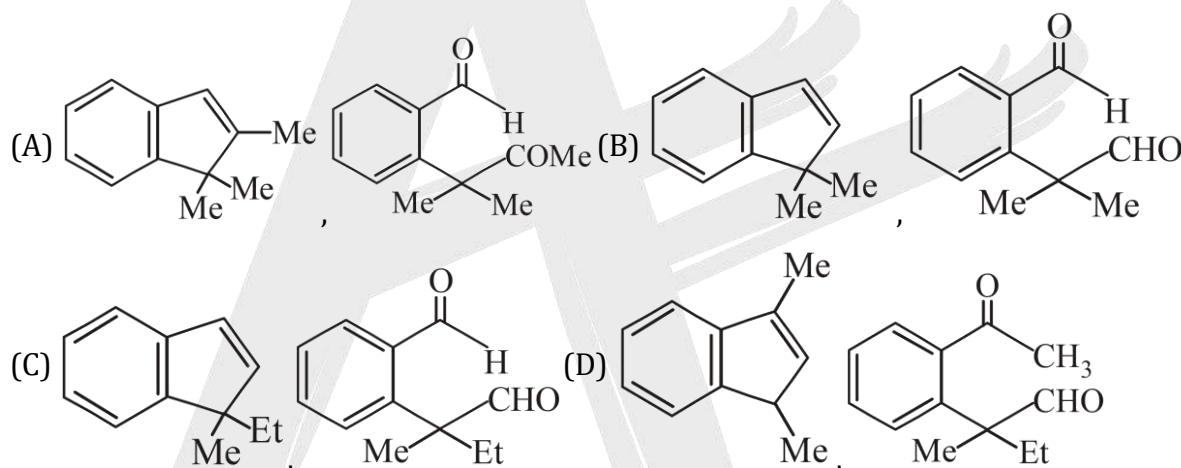
A carbonyl compound P, which gives positive iodoform test, undergoes reaction with  $\text{MeMgBr}$  followed by dehydration to give an olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular aldol reaction to give predominantly S.



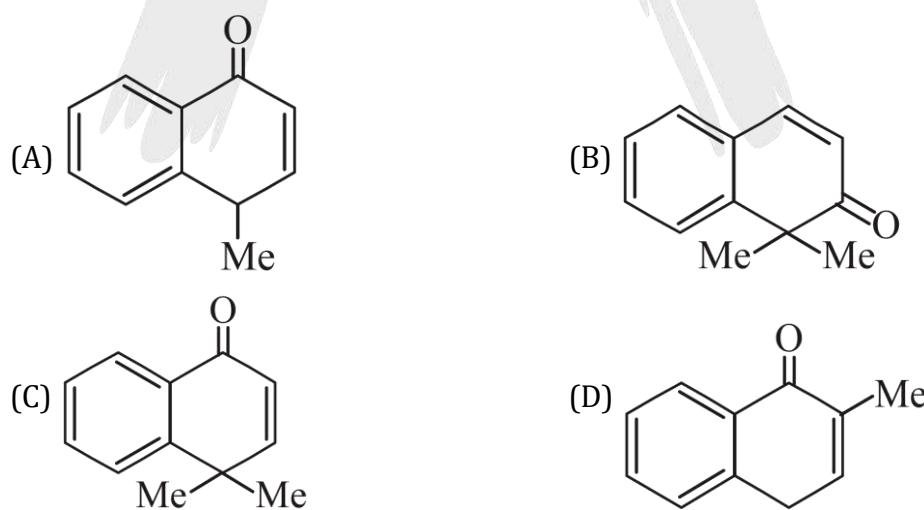
- Q.31** The structure of the carbonyl compound P is [IIT 2009]



- Q.32** The structure of the products Q and R, respectively, are [IIT 2009]



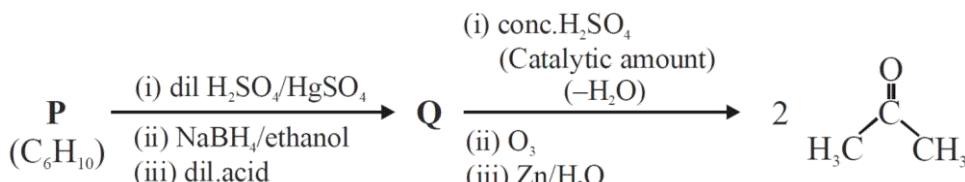
- 0.33 The structure of the product **S** is [IIT 2009]





## Paragraph for Questions Nos. 34 to 35

An acyclic hydrocarbon P, having molecular formula  $C_6H_{10}$ , gave acetone as the only organic product through the following sequence of reactions, in which Q is an intermediate organic compound.



**Q.34** The structure of compound P is -

[IIT 2011]

- (A)  $CH_3CH_2CH_2CH_2-C\equiv C-H$
- (B)  $H_3CH_2C\equiv C-CH_2CH_3$
- (C)
- (D)

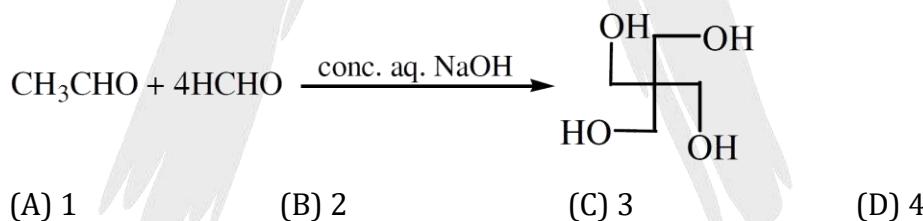
**Q.35** The structure of the compound Q is -

[IIT 2011]

- (A)
- (B)
- (C)
- (D)  $CH_3CH_2CH_2CH(OH)CH_2CH_3$

**Q.36** The number of aldol reaction(s) that occurs in the given transformation is

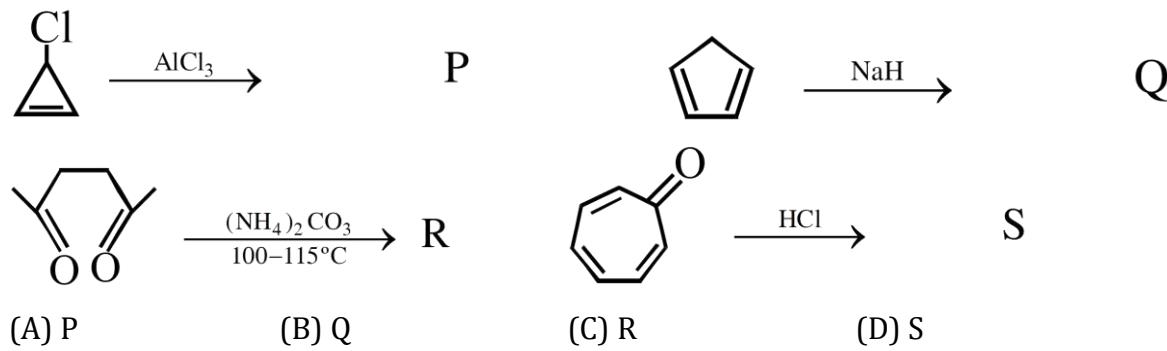
[IIT 2012]



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

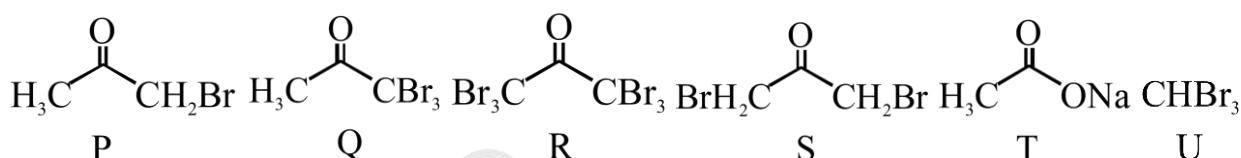
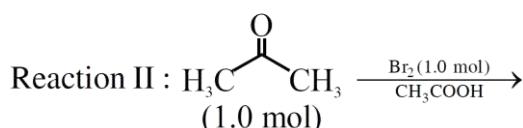
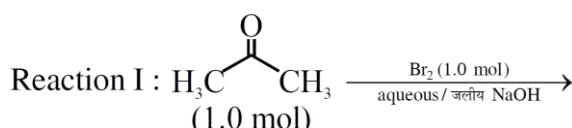
**Q.37** Among P, Q, R and S, the aromatic compound(s) is / are :

[IIT 2013]



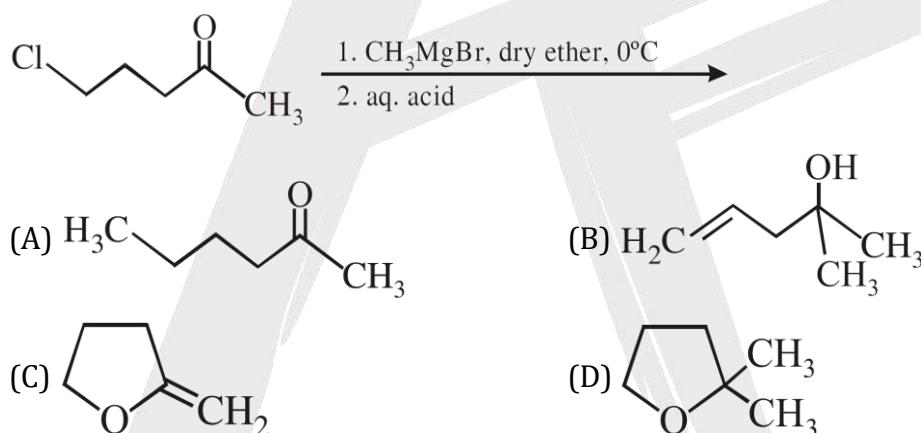
- (A) P      (B) Q      (C) R      (D) S

**Q.38** After completion of the reactions (I and II), the organic compound(s) in the reaction mixtures is(are) [IIT 2013]

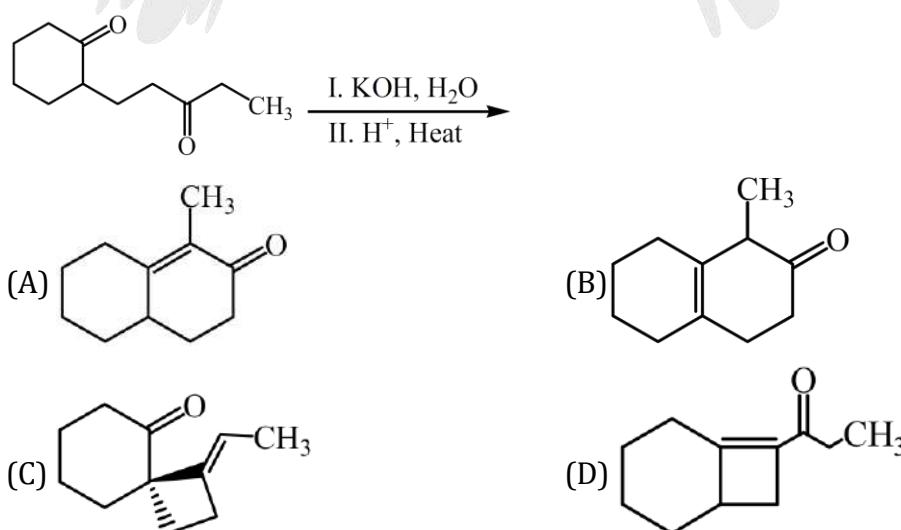


- (A) Reaction I: P and Reaction II : P  
 (B) Reaction I : U, acetone and Reaction II : Q acetone  
 (C) Reaction I : T, U, acetone and Reaction II : P  
 (D) Reaction I : R, acetone and Reaction II : S acetone

**Q.39** The major product in the following reaction is



**Q.40** The major product of the following reaction is -

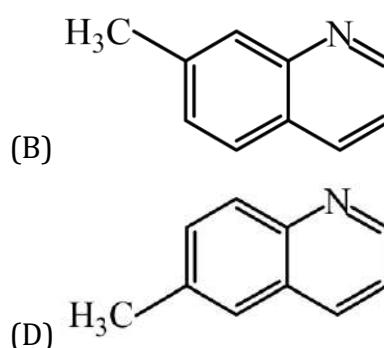
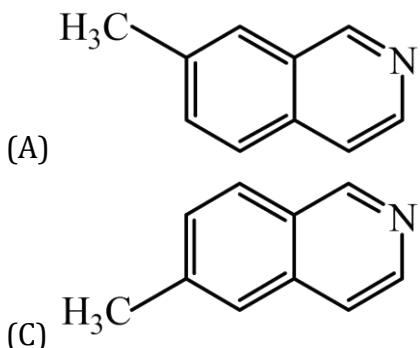
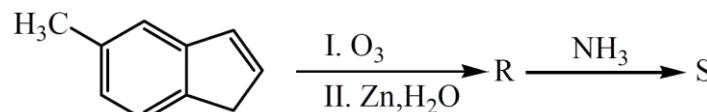


[IIT 2014]

[IIT 2015]

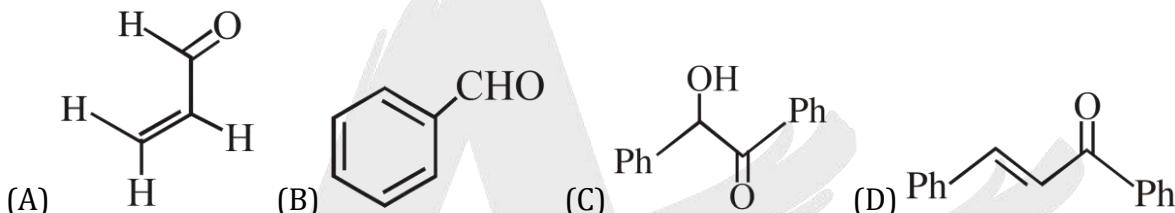
**Q.41** In the following reactions, the product S is -

[IIT 2015]



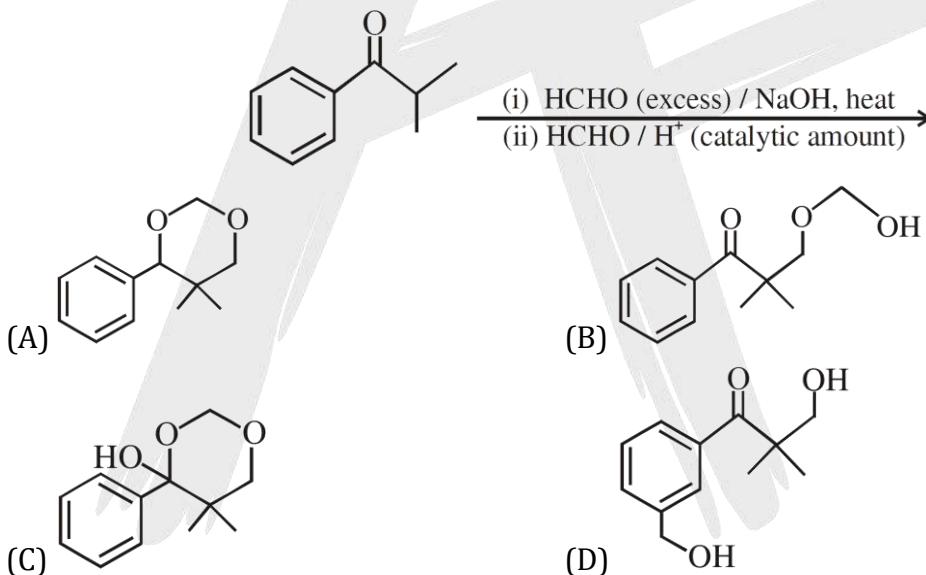
**Q.42** Positive Tollen's test is observed for:

[IIT 2016]



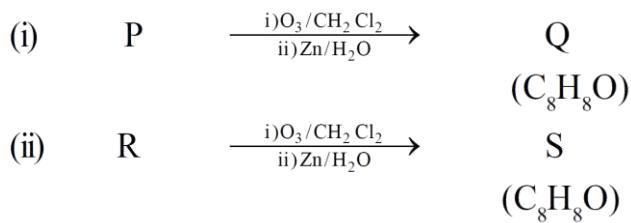
**Q.43** The major product of the following reaction sequence is :

[IIT 2016]

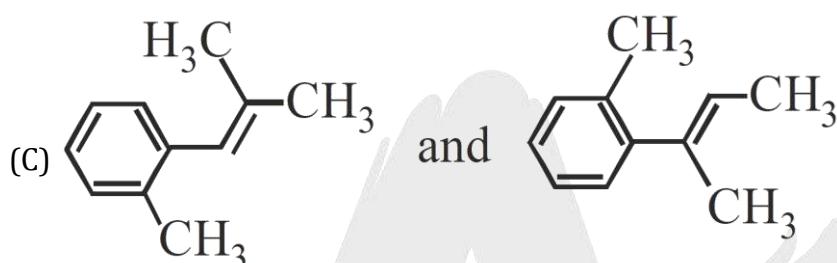
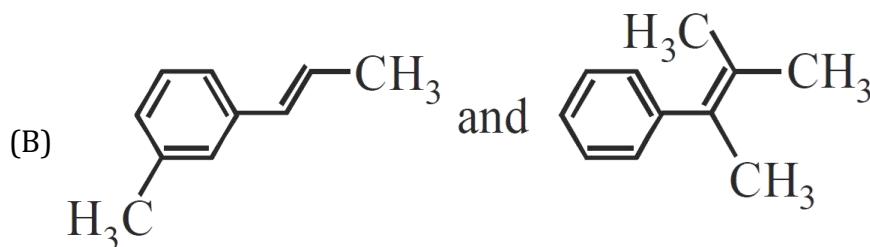
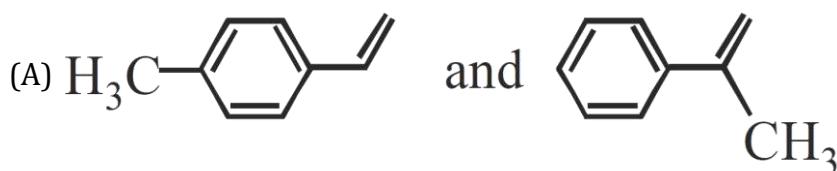


**Q.44** Compound P and R upon ozonolysis produce Q and S, respectively. The molecular formula of Q and S is  $\text{C}_8\text{H}_8\text{O}$ . Q undergoes Cannizzaro reaction but not haloform reaction, where S undergoes haloform reaction but not Cannizzaro reaction.

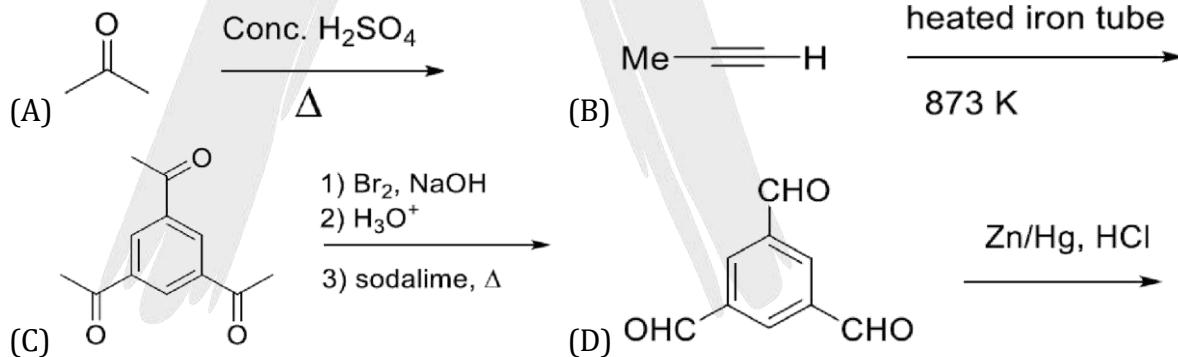
[IIT JEE 2017]



The option(s) with suitable combination of P and R, respectively, is (are)



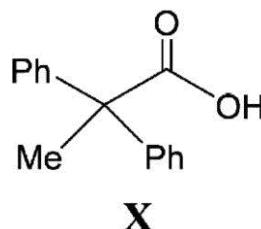
**Q.45** The reaction(s) leading to the formation of 1,3,5-trimethylbenzene is (are) [IIT JEE 2018]



**Q.46** The desired product X can be prepared by reacting the major product of the reactions in LIST-I with one or more appropriate reagents in LIST-II.

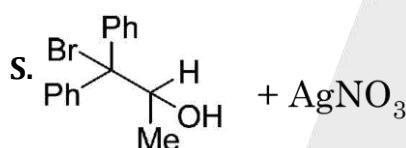
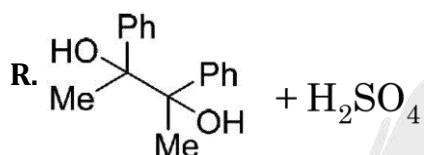
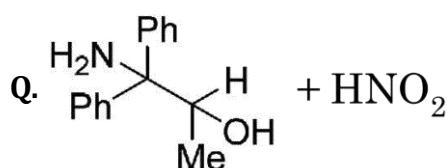
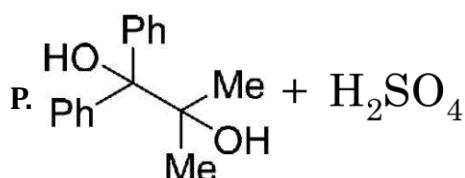
(given, order of migratory aptitude: aryl > alkyl > hydrogen)

[IIT JEE 2018]





## List-I



## List-II

1.  $I_2, NaOH$

2.  $[Ag(NH_3)_2]OH$

3. Fehling solution

4.  $HCHO, NaOH$

5.  $NaOBr$

The correct option is

(A) P  $\rightarrow$  1; Q  $\rightarrow$  2,3; R  $\rightarrow$  1,4; S  $\rightarrow$  2,4

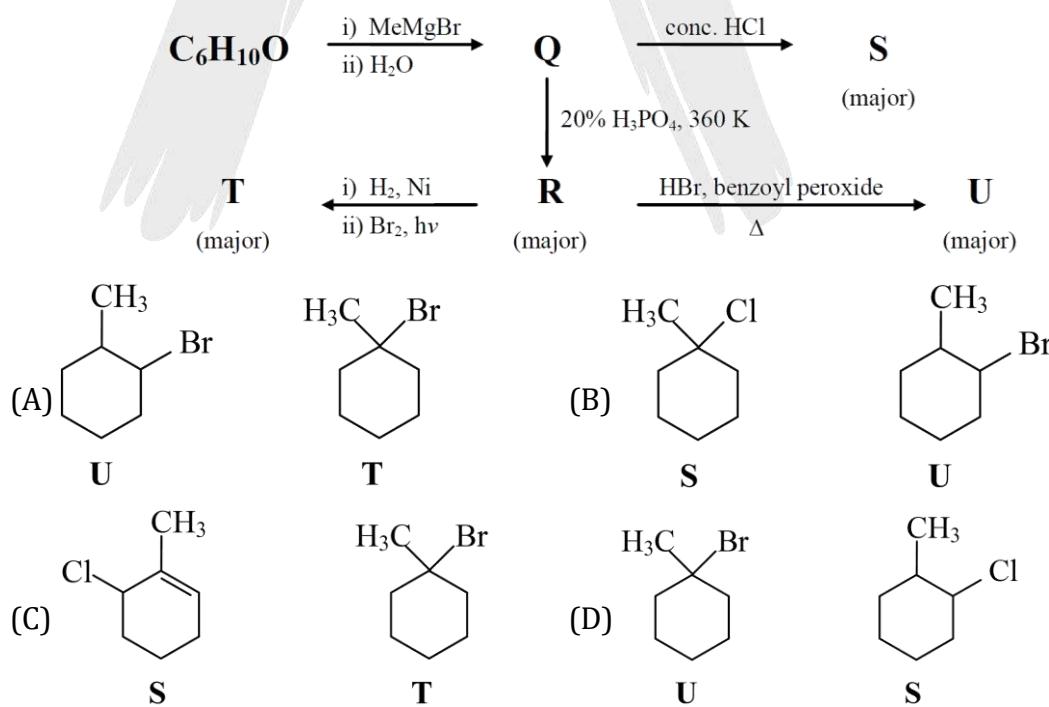
(B) P  $\rightarrow$  1,5; Q  $\rightarrow$  3,4; R  $\rightarrow$  4,5; S  $\rightarrow$  3

(C) P  $\rightarrow$  1,5; Q  $\rightarrow$  3,4; R  $\rightarrow$  5; S  $\rightarrow$  2,4

(D) P  $\rightarrow$  1,5; Q  $\rightarrow$  2,3; R  $\rightarrow$  1,5; S  $\rightarrow$  2,3

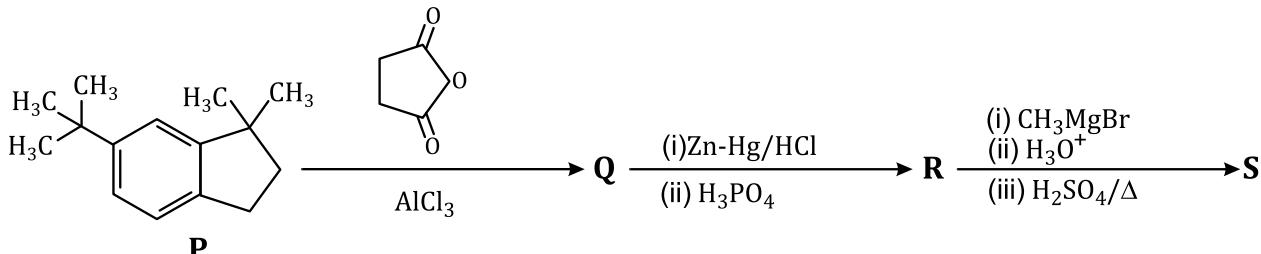
**Q.47** Choose the correct option(s) for the following set of reactions

[IIT JEE 2019]



**Q.48** In the reaction scheme shown below, Q, R, and S are the major products.

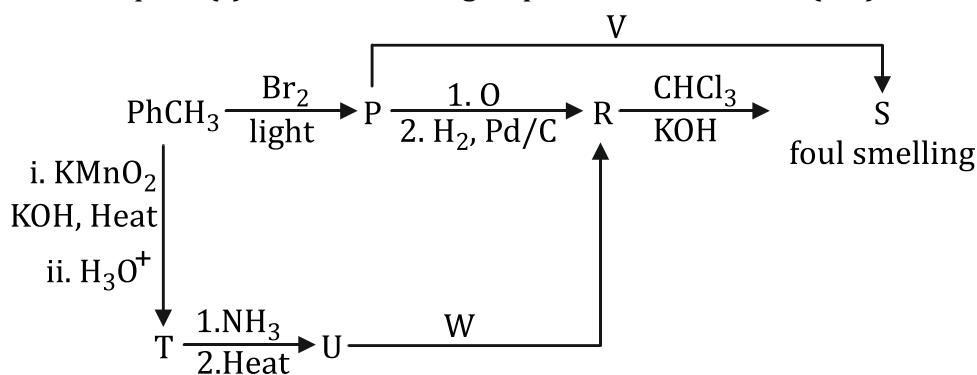
[IIT JEE 2020]



The correct structure of

- (A) S is
- 
- (B) Q is
- 
- (C) R is
- 
- (D) S is
- 

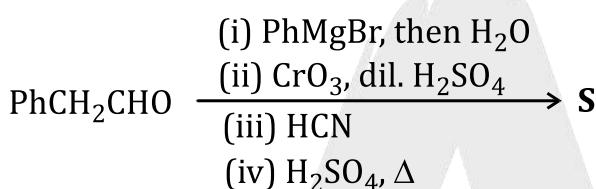
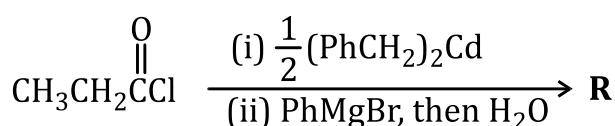
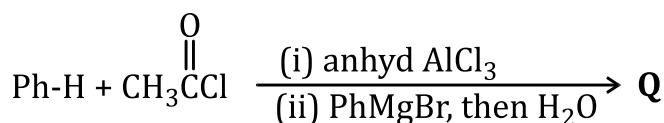
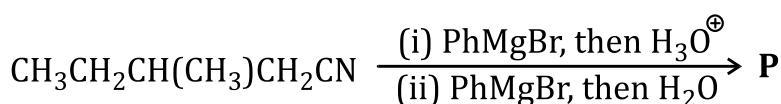
**Q.49** Correct option(s) for the following sequence of reactions is(are)



- (A) Q = KNO<sub>2</sub>, W = LiAlH<sub>4</sub>
- (B) R = benzenamine, V = KCN
- (C) Q = AgNO<sub>2</sub>, R = phenylmethanamine
- (D) W = LiAlH<sub>4</sub>, V = AgCN



**Q.50** In the following reactions, P, Q, R and S are the major products.

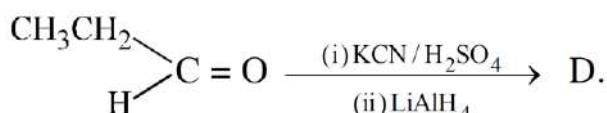
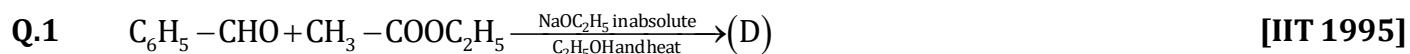


The correct statement(s) about **P**, **Q**, **R**, and **S** is(are)

- (A) Both **P** and **Q** have asymmetric carbon(s).
- (B) Both **Q** and **R** have asymmetric carbon(s).
- (C) Both **P** and **R** have asymmetric carbon(s).
- (D) **P** has asymmetric carbon(s), **S** does not have any asymmetric carbon.



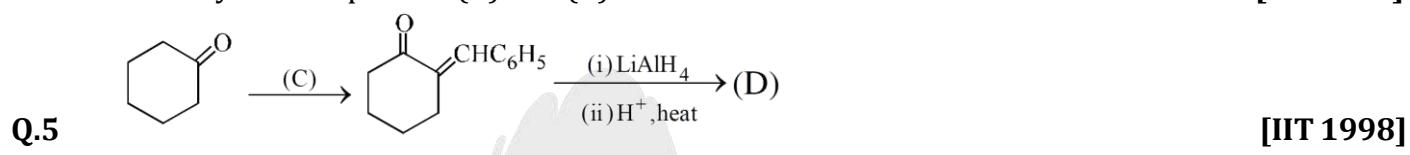
## EXERCISE-IV # (B) (SUBJECTIVE QUESTIONS)



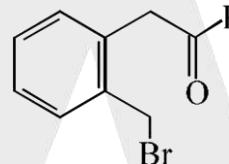
**Q.2** [IIT 1996]

**Q.3** Acetophenone on reaction with hydroxylamine-hydrochloride can produce two isomeric oximes. Write structures of the oximes. [IIT 1997]

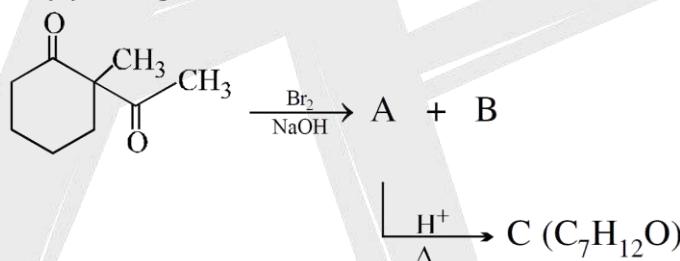
**Q.4** An aldehyde (A) ( $\text{C}_{11}\text{H}_8\text{O}$ ), which does not undergo self aldol condensation, gives benzaldehyde and two mole of (B) on ozonolysis. Compound (B), on oxidation with silver ion, gives oxalic acid. Identify the compounds (A) and (B). [IIT 1998]



**Q.6** What would be the major product in each of the following reaction? [IIT 2000]



**Q.7** Identify (A), (B) and (C), and give their structures. [IIT 2000]



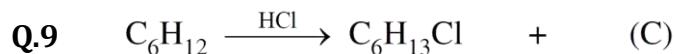
**Q.8** Five isomeric para-disubstituted aromatic compounds A to E with molecular formula  $\text{C}_8\text{H}_8\text{O}_2$  were given for identification. Based on the following observations, give structure of the compounds. [IIT 2002]

(i) Both A and B form a silver mirror with Tollen's reagent; also, B gives a positive test with  $\text{FeCl}_3$  solution.

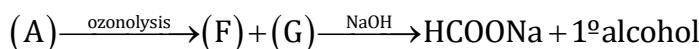
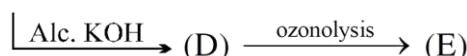
(ii) C gives positive iodoform test.

(iii) D is readily extracted in aqueous  $\text{NaHCO}_3$  solution.

(iv) E on acid hydrolysis gives 1,4-dihydroxybenzene.



(A) (B)



(D) is isomer of A. E gives negative test with Fehling solution but gives iodoform test F and G gives Tollen's test but do not give iodoform test. Identify A to G. [IIT 2003]



## ANSWER KEY

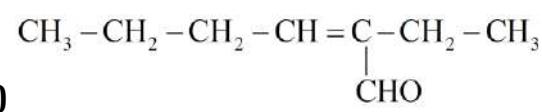
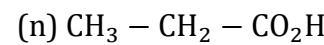
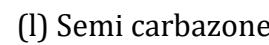
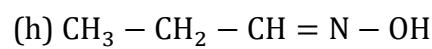
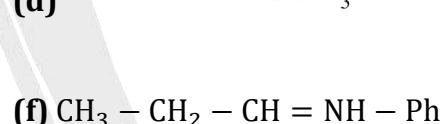
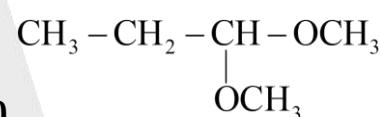
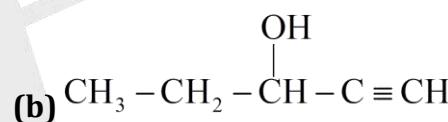
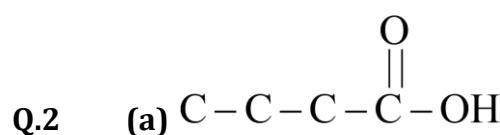
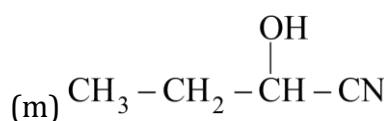
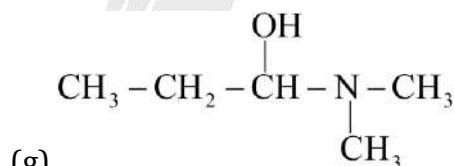
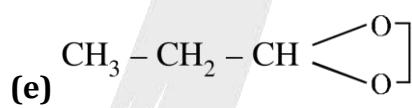
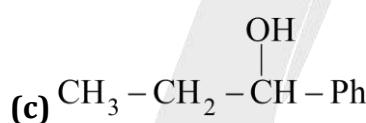
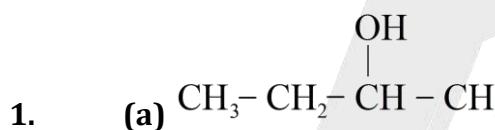
## EXERCISE # I

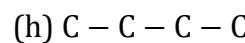
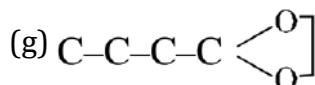
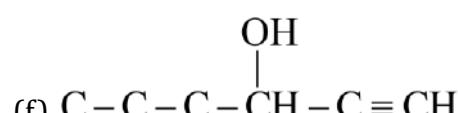
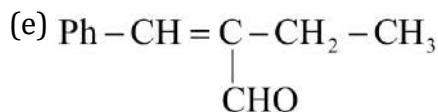
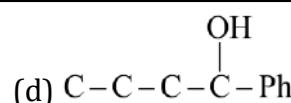
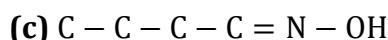
1. (A) 2. (B) 3. (C) 4. (D) 5. (C) 6. (B) 7. (C)  
 8. (C) 9. (D) 10. (C) 11. (A) 12. (C) 13. (C) 14. (C)  
 15. (C) 16. (D) 17. (A) 18. (C) 19. (D) 20. (C) 21. (C)  
 22. (B) 23. (D) 24. (B) 25. (C) 26. (D) 27. (B) 28. (A)  
 29. (B) 30. (C) 31. (D) 32. (D) 33. (B) 34. (C) 35. (C)  
 36. (D) 37. (B) 38. (C) 39. (B) 40. (A) 41. (D) 42. (C)  
 43. (D) 44. (B) 45. (B) 46. (C) 47. (A) 48. (C) 49. (C)  
 50. (D)

## EXERCISE # II

- 1 (A,B) 2 (C,D) 3 (A,B,C) 4 (A,B,C) 5 (B,C) 6 (A,B)  
 7 (A,B,C,D) 8 (A,B,C) 9 (A,C,D) 10 (B,C,D) 11 (A,D) 12 (D)  
 13 (C) 14 (C) 15 (D) 16 (B) 17 (B) 18 (C)  
 19 (B) 20 (B) 21 (A,B,C) 22 (A) → P, (B) → Q, (C) → S, (D) → R  
 23 (A) R, (B) Q,S, (C) S, (D) P

## EXERCISE # III

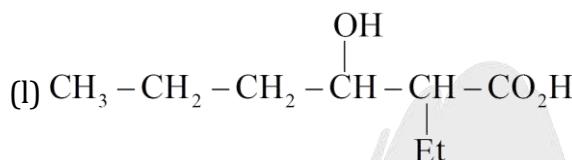
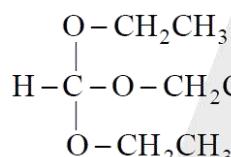
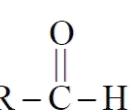
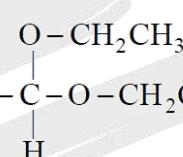




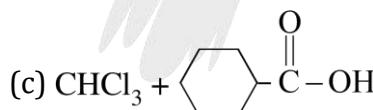
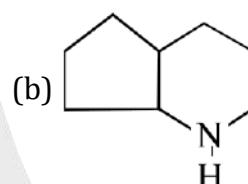
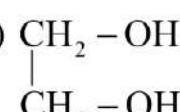
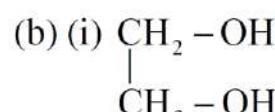
(i) 2° alcohol

(j) Cyanohydrine

(k) 1° alcohol

**Q.3** Ans. (A)P,Q,S;(B)P,Q,S;(C)P,Q,S;(D)P,Q,S**Q.4** Ans. 3 > 2 > 1 > 4**Q.5** Ans.(C)**Q.6** Ans. (A)Ethyl orthoformate  
aldehyde

Acetal

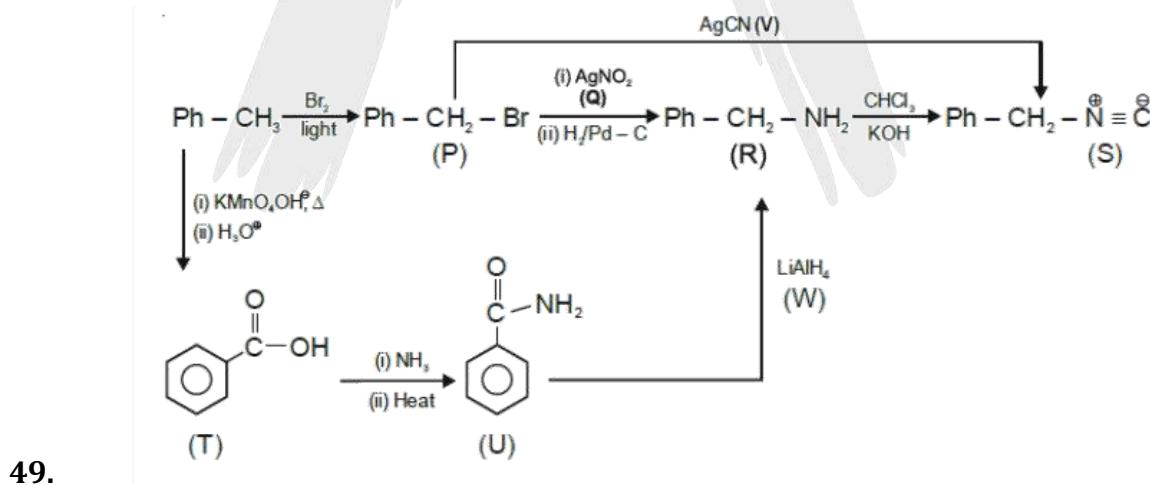
**Q.7** Ans.**Q.8** Ans.  $\text{H}^+/\text{Br}_2$ ;  $\text{H}_2/\text{Ni}$ ;  $\text{NaOH}$ **Q.9** Ans. (a)  $\text{CH}_3 - \underset{\text{CH}_3}{\overset{|}{\text{CH}}} - \text{NH} - \text{CH}_2 - \text{CH}_3$ **Q.10** Ans. (B,C)    **Q.11** Ans. (B)    **Q.12** Ans. (B)    **Q.13****Q.14** (a) (i)  $\text{KMnO}_4$ , (ii)  $\text{CH}_2 - \underset{\text{CH}_2 - \text{OH}}{\overset{|}{\text{OH}}}$ , (iii)  $\text{LiAlH}_4$ , (iv)  $\text{H}_3\text{O}^\oplus$ (d) (i)  $\text{H}_2, \text{Ni}$     (e)  $\text{NH}_2\text{NH}_2/\text{H}_2\text{O}_2$     (f)  $\text{NaBH}_4$ **Q.15** Ans. (A)**Q.16** Ans. (D)**Q.17**. Ans. (B)**Q.18** Ans. (D)

## EXERCISE # IV (MAINS)

- |     |     |     |     |     |        |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.  | (4) | 2.  | (2) | 3.  | (1)    | 4.  | (2) | 5.  | (4) | 6.  | (2) | 7.  | (4) |
| 8.  | (3) | 9.  | (4) | 10. | (4)    | 11. | (2) | 12. | (4) | 13. | (4) | 14. | (4) |
| 15. | (4) | 16. | (3) | 17. | (1, 3) | 18. | (2) | 19. | (1) | 20. | (2) | 21. | (1) |
| 22. | (2) | 23. | (2) | 24. | (1)    | 25. | (4) | 26. | (3) | 27. | (2) | 28. | (4) |
| 29. | (3) | 30. | (1) | 31. | (2)    | 32. | (4) | 33. | (3) | 34. | (3) | 35. | (1) |
| 36. | (3) | 37. | (3) | 38. | (3)    | 39. | (A) | 40. | (A) | 41. | (B) | 42. | (B) |
| 43. | (D) | 44. | (C) | 45. | (B)    | 46. | (B) | 47. | (A) | 48. | (A) | 49. | (A) |
| 50. | (C) | 51. | (B) | 52. | (C)    | 53. | (C) | 54. | (B) | 55. | (A) | 56. | (A) |
| 57. | (B) | 58. | (C) | 59. | (A)    | 60. | (C) | 61. | (A) | 62. | (C) | 63. | (A) |
| 64. | (B) | 65. | (C) | 66. | (C)    | 67. | (D) | 68. | (B) | 69. | (D) |     |     |

## EXERCISE # IV - A (OBJECTIVE QUESTIONS)

- |     |                                    |     |       |     |        |     |         |     |       |    |           |     |          |
|-----|------------------------------------|-----|-------|-----|--------|-----|---------|-----|-------|----|-----------|-----|----------|
| 1   | (B)                                | 2   | (A)   | 3   | (D)    | 4   | (B)     | 5   | (D)   | 6  | (D)       | 7   | (B)      |
| 8   | (A)                                | 9   | (D)   | 10  | (B)    | 11  | (A,D)   | 12  | (A)   | 13 | (A,B,D)   | 14  | (B)      |
| 15  | (B,D)                              | 16  | (B)   | 17  | (A)    | 18  | (C)     | 19  | (A)   | 20 | (C)       | 21  | (D)      |
| 22  | (C)                                | 23  | (C)   | 24  | (B)    | 25  | (A)     | 26  | (C)   |    |           |     |          |
| 27  | (A) P,S; (B) Q; (C) Q,R,S; (D) Q,R |     |       | 28  | (B)    | 29  | (A)     | 30  | (D)   | 31 | (B)       |     |          |
| 32  | (A)                                | 33  | (B)   | 34  | (D)    | 35  | (B)     | 36  | (C)   | 37 | (A,B,C,D) | 38. | (C)      |
| 39  | (D)                                | 40  | (A)   | 41  | (A)    | 42  | (A,B,C) | 43. | (A)   | 44 | (A, B)    | 45  | (A, B,D) |
| 46. | (D)                                | 47. | (A,B) | 48. | (B, D) | 49. | (C,D)   | 50. | (C,D) |    |           |     |          |



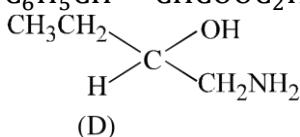
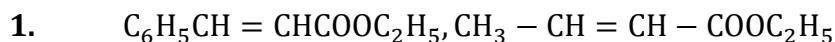
49.

Therefore, correct options are

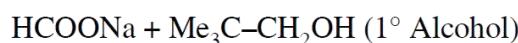
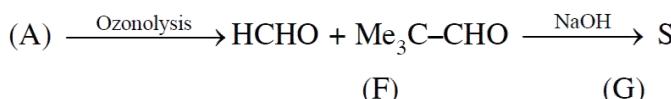
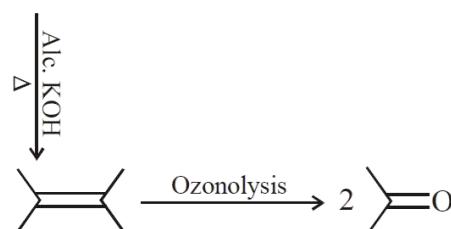
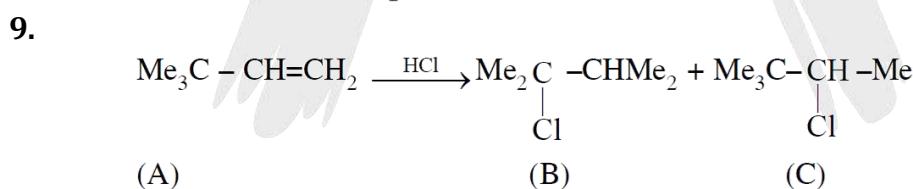
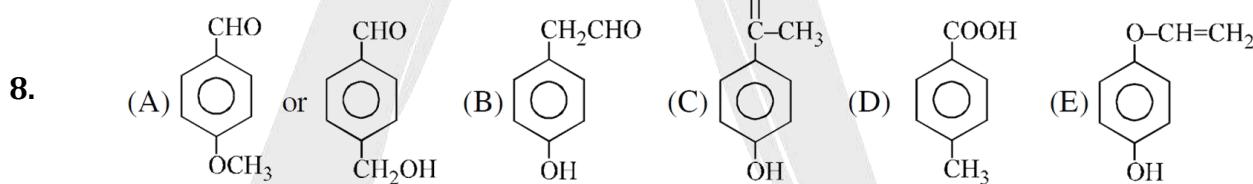
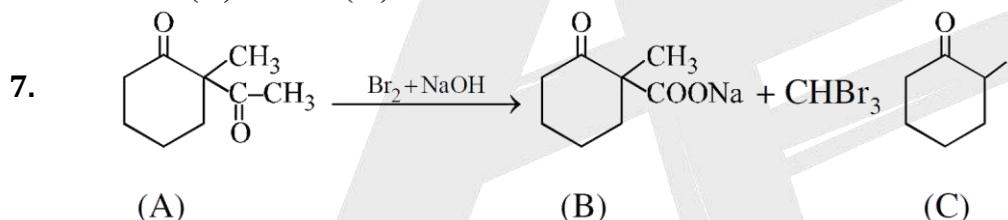
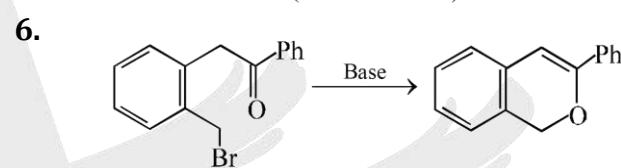
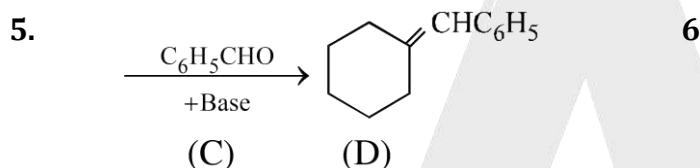
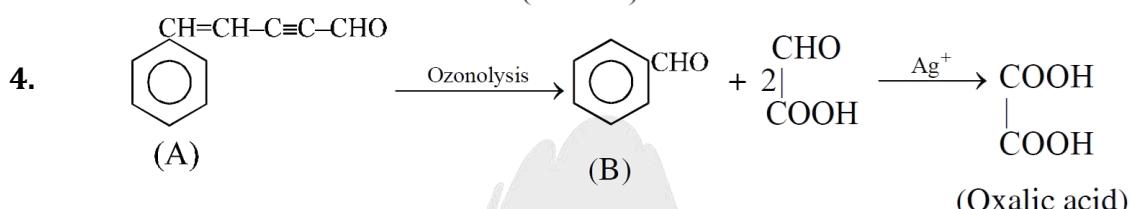
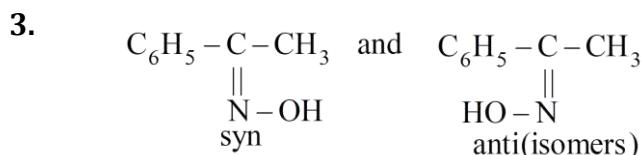
Q = AgNO<sub>2</sub>, R = phenylmethanamineW = LiAlH<sub>4</sub>, V = AgCN



## EXERCISE - IV # B (SUBJECTIVE QUESTIONS)



2. (A racemic mixture)

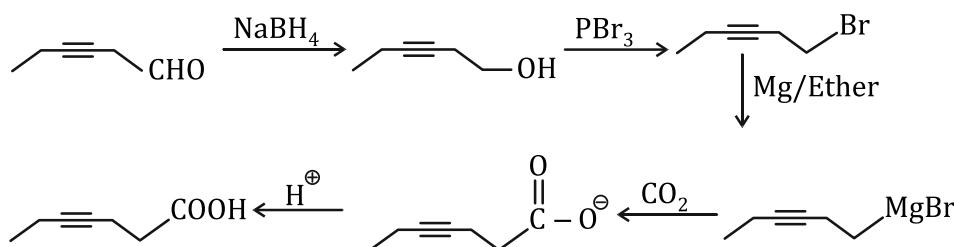




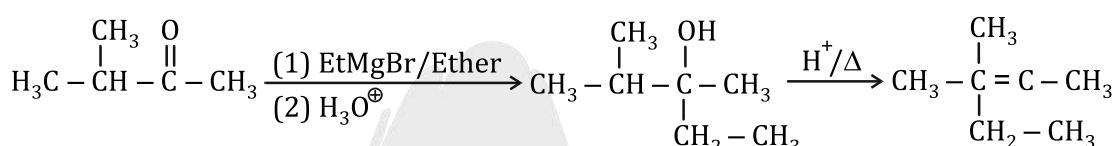
## SOLUTION

## **EXERCISE (JEE-MAIN)**

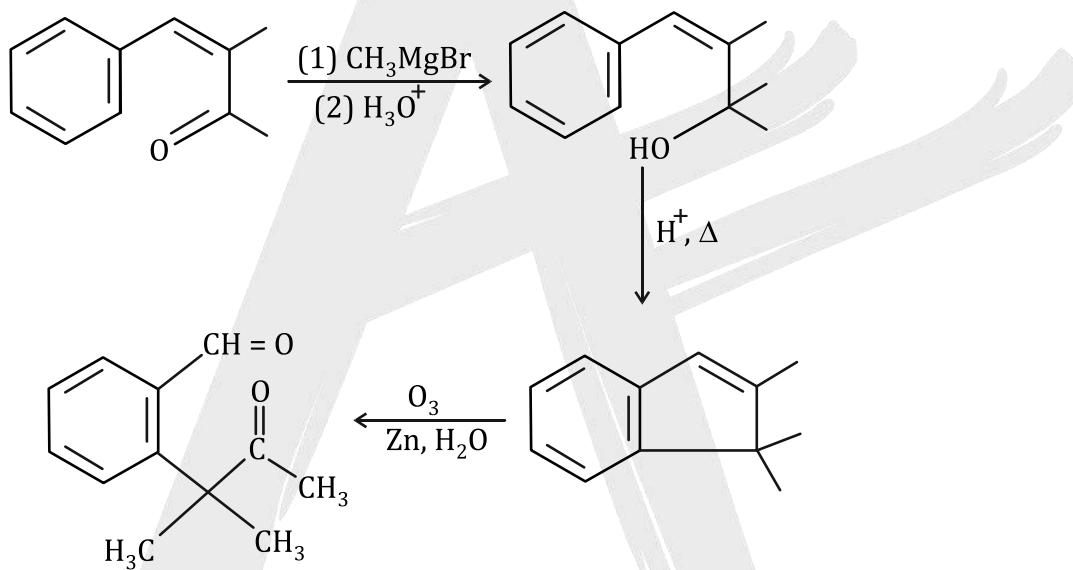
39.



40.



41.



**42.** Attack of nucleophile on carbonyl centre depends upon

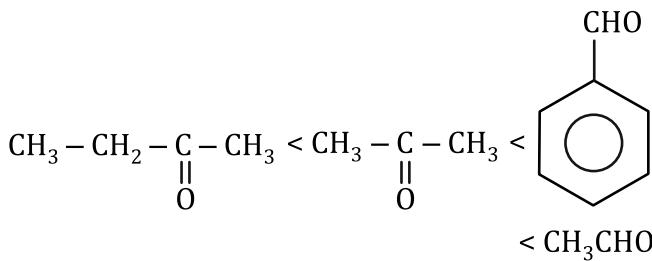


∴ Rate of reaction should follow the order

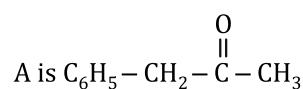
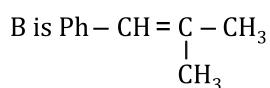
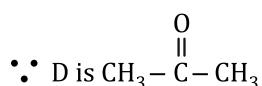
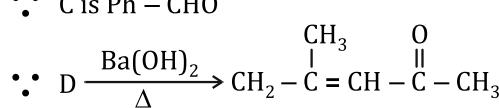
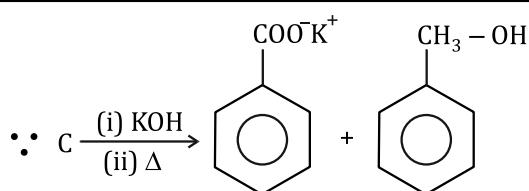
- (ii) > (iv ) > (i) > (iii)

43. Increasing hindrence and electron relasing group (ERG) attached on carboxyl group decrease the reactivity.

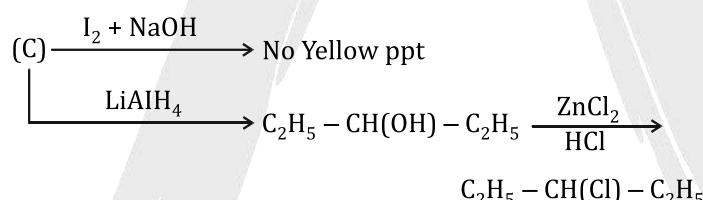
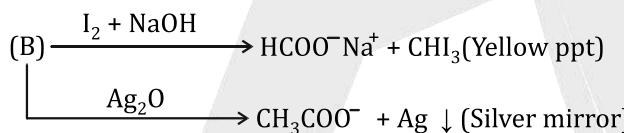
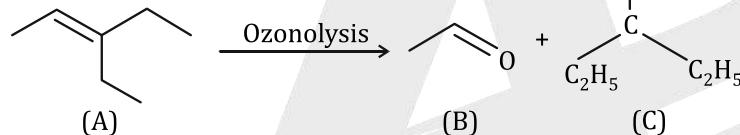
Correct order of nucleophilic addition reaction is



44.

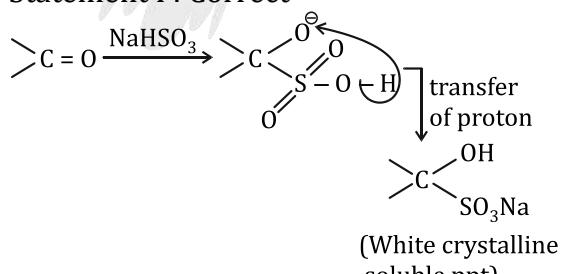


45.

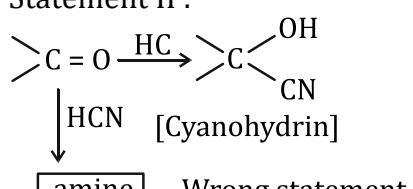


46.

Statement I : Correct

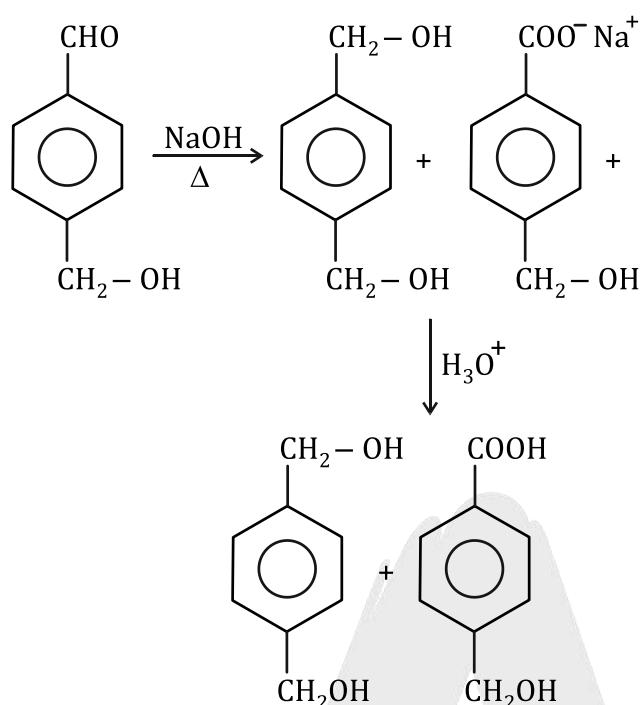


Statement II :

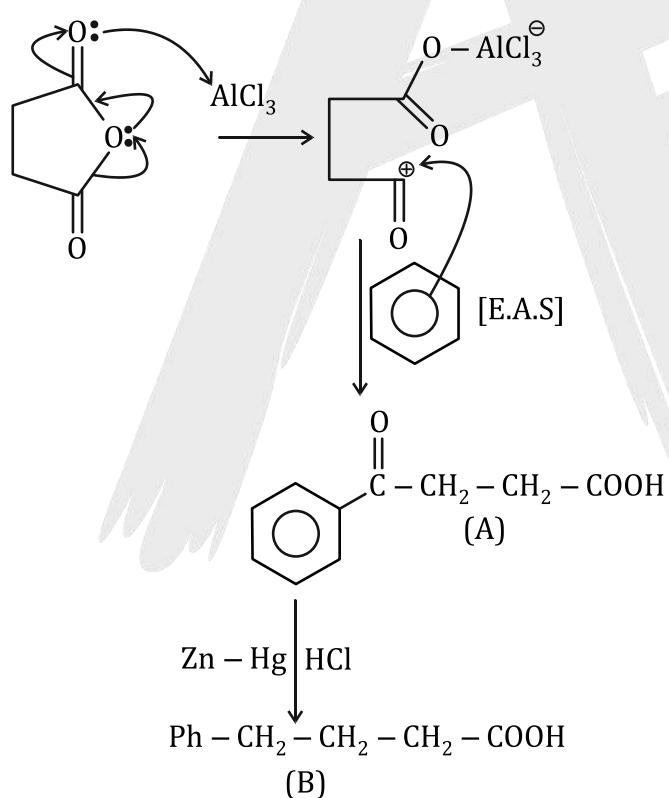


(Amine not formed)

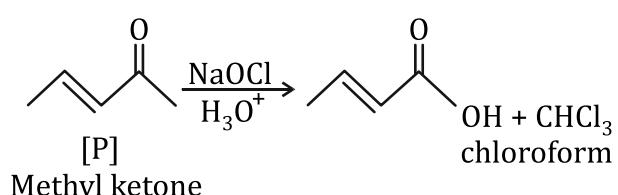
47.



48.

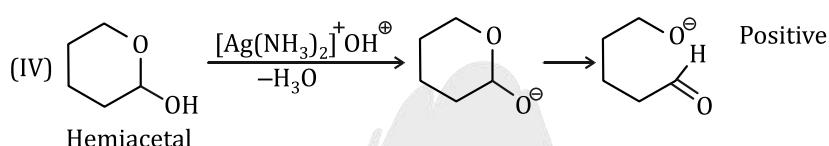
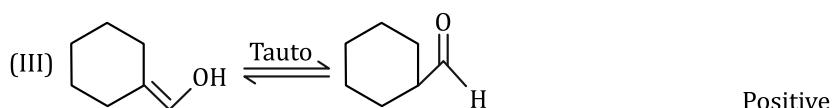


49.

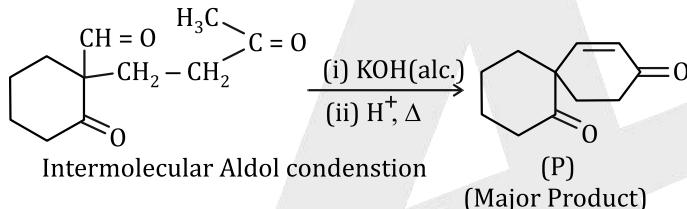


NaOCl is used in haloform reaction as reagent.

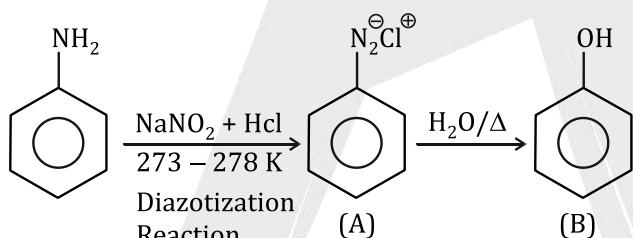
50. Aldehydes gives positive Tollen's test (silver mirror)



- 51.



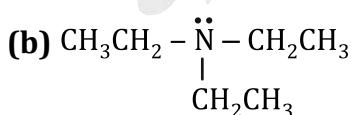
- 52.



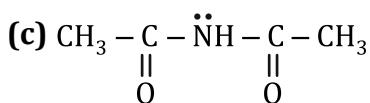
53. For the given compounds:



; L.P. on Nitrogen is delocalised.



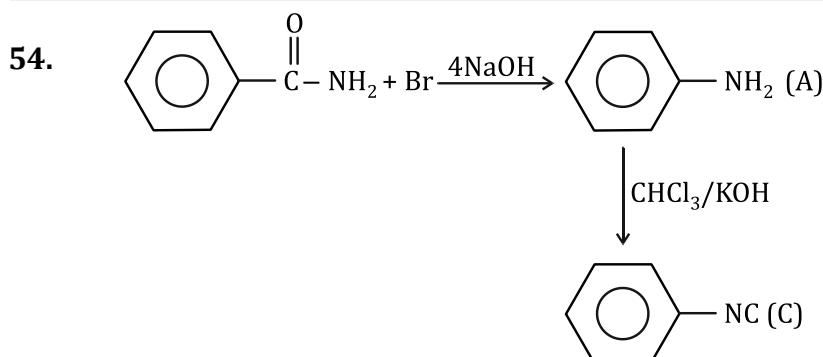
; L.P. on Nitrogen is delocalised.



; L.P. on Nitrogen is delocalised due to conjugation with both  $\text{C}=\text{O}$

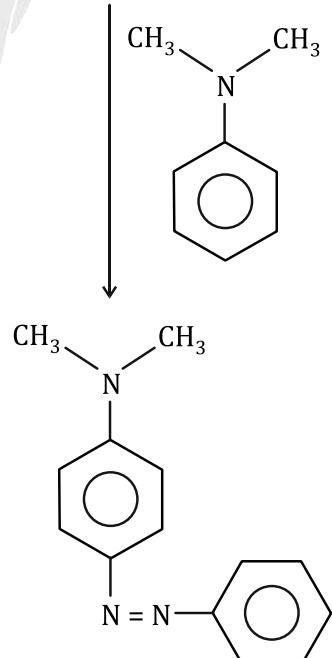
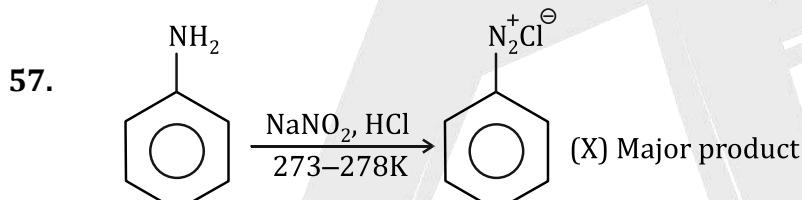
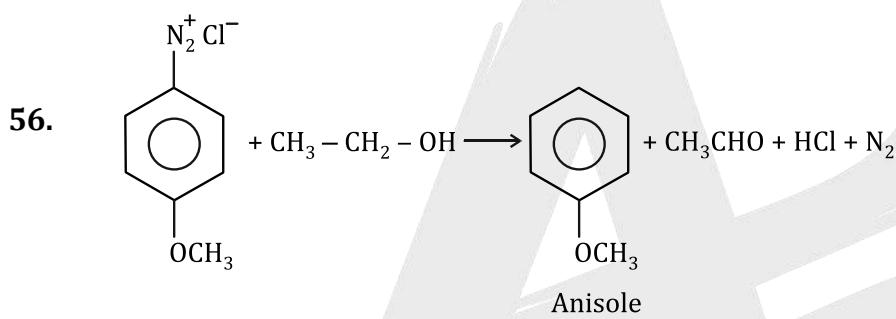
(Hence least basic)

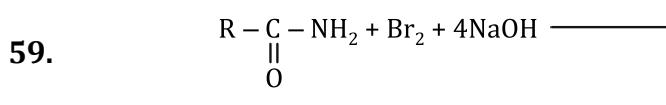
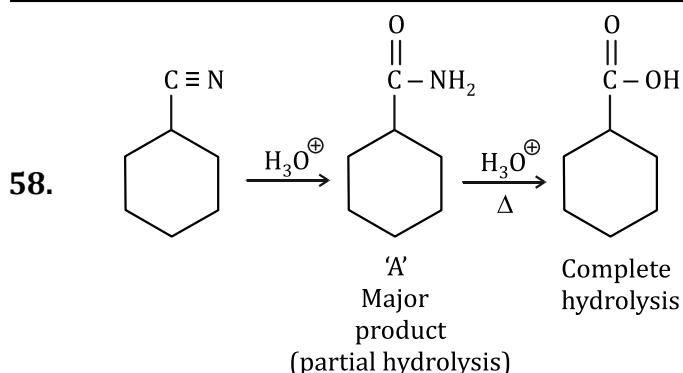
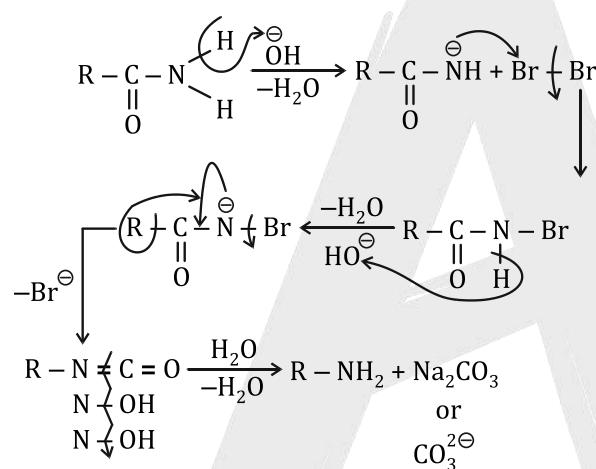
(d)  $\text{CH}_3 - \text{CH}_2 - \ddot{\text{N}}\text{H} - \text{CH}_2 - \text{CH}_3$ ; L.P. on Nitrogen is localised.



Carbylamine reation :

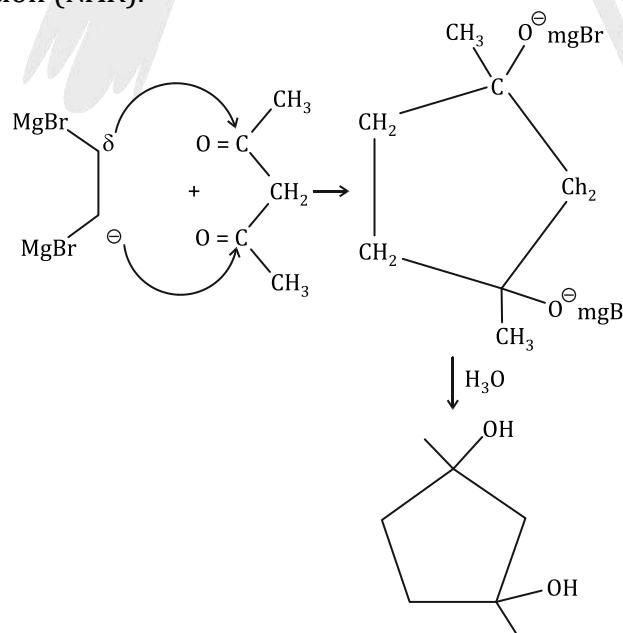
55. Primary amines react with Para Toluene sulfonyl chloride to form a precipitate that is soluble in NaOH. Secondary amines reacts with para toluene sulfonyl chloride to give a precipitate that is insoluble in NaOH. Tertiary amines do not react with para toluen.

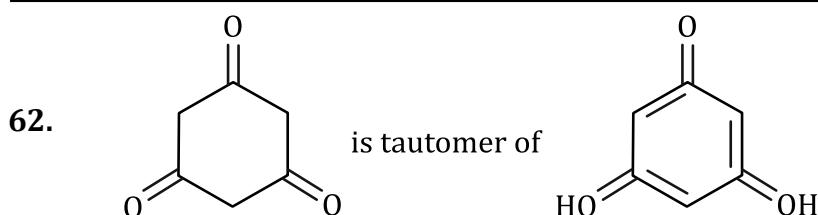
(Y)  
Major product

**Mechanism**

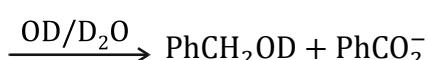
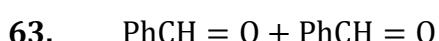
60. is a conjugated diketone

61. Although Acetyl Acetone predominantly gives Acid base reaction with G.R due to Active methylene group but according to given option ans should be based on nucleophilic addition reaction (NAR).

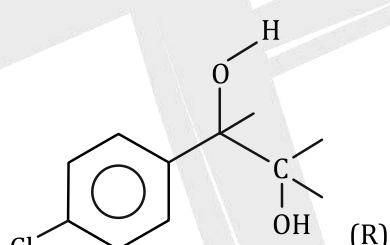
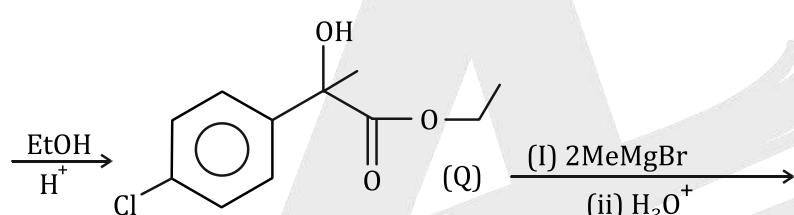
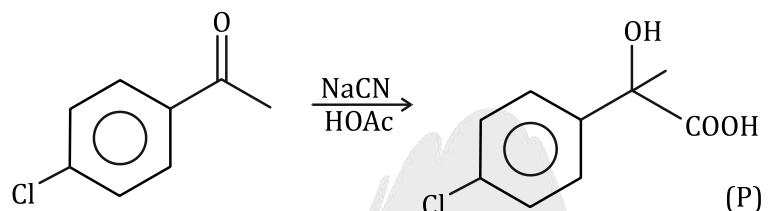




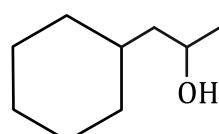
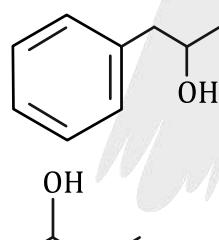
, Which is aromatic in nature.



64.



65.



66.

Reactions

- (A) Hoffmann degradation
- (B) Clemenson reduction
- (C) Cannizaro reaction conc.
- (D) Reimer-Tiemann reaction

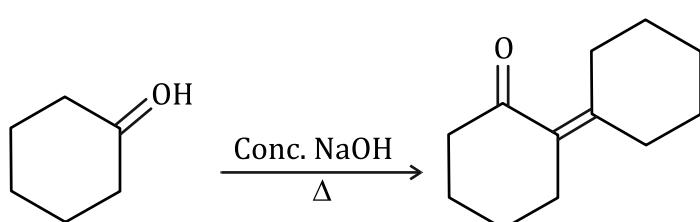
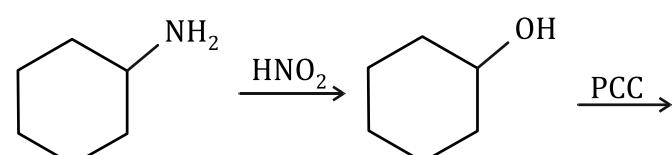
Reagent used

- |  |
|--|
| Br <sub>2</sub> /NaOH                                  |
| Zn – Hg/HCl  |
| KOH/Δ  |
| CHCl <sub>3</sub> , NaOH/H <sub>3</sub> O <sup>+</sup> |



67. Aromatic aldehydes do not give Fehling's test.. Both nitrogen and sulfur must be present to obtain blood red colour Sodium nitroprusside gives blood red colour with S & N.

68.



69.

