CARBONYL COMPOUND

EXERCISE # O-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

CL0001

Q.2 In the given reaction

$$CH_3–CH_2–\overset{O}{\overset{\|}{C}}–CH_2COOC_2H_5 \xrightarrow{[X]} (A) \xrightarrow[(ii)\ H_2O/H^{\oplus}]{(i)\ LiAlH_4} CH_3–CH_2–\overset{O}{\overset{\|}{C}}–CH_2–CH_2OH + C_2H_5OH$$

[X] will be :

(A) HCHO (B) $\begin{matrix}CH_2-OH\\|\\CH_2-OH\end{matrix} + H^{\oplus}$ (C) $\begin{matrix}CH_2-OH\\|\\CH_2-OH\end{matrix} + \overset{\ominus}{O}H$ (D) HCN

CL0002

Q.3 In the given reaction:

$$C_6H_5-\underset{\underset{O}{\|}}{C}-H \xrightarrow{NH_2OH/H^{\oplus}} [X]$$

[X] will be:

(A) Only syn oxime (B) Only anti oxime

(C) Mixture of syn and anti oxime (D) Secondary amide

CL0003

Q.4 Acetophenone can be obtained by the distillation of :

(A) $(C_6H_5COO)_2Ca$ (B) $(CH_3COO)_2Ca$

(C) $(C_6H_5COO)_2Ca$ and $(CH_3COO)_2Ca$ (D) $(C_6H_5COO)_2Ca$ and $(HCOO)_2Ca$

CL0004

Q.5 Gem dihalide on hydrolysis gives :

(A) Vic diol (B) Gem diol

(C) Carbonyl compound (D) Carboxylic acid

CL0005

Q.6 Acetal or ketal is:

(A) Vic dialkoxy compound (B) α, ω-dialkoxy compound

(C) α-alkoxy alcohol (D) Gem dialkoxy compound

CL0006

Q.7 Cross cannizzaro reaction is example of :

(A) Redox reaction (B) Disproportionation

(C) Both (A) and (B) (D) Only oxidation

CL0007

Q.8 Acetaldehyde can be converted into $HOCH_2-\underset{\displaystyle CH_2OH}{\overset{\displaystyle CH_2OH}{\overset{|}{\underset{|}{C}}}}-CH_2OH$ by which reagent ?

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

CL0008

Q.9 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 $(CH_3COO)_2Ca$

CL0009

Q.10 In the given reaction :

$$CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3 \xrightarrow[\text{Distillation}]{\text{Conc.}H_2SO_4} [X]$$

[X] will be :

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

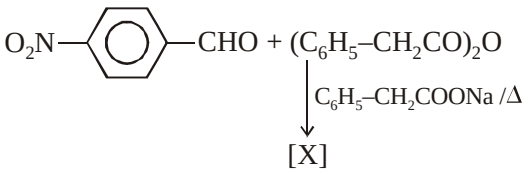
CL0010

Q.11 Grignard reagents can not give carbonyl compounds with :

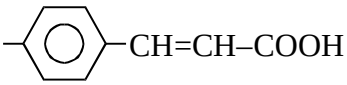
(A) CO_2
(B) RCOCl
(C) RCN
(D) RCOOR

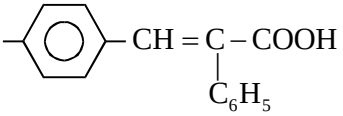
CL0011

Q.12 The product of the reaction :



will be :

(A) $C_6H_5–CH=CH–COOH$
(B) 

(C) $C_6H_5-CH=\underset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}-COOH$
(D) 

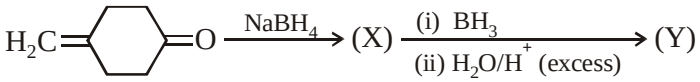
CL0012

Q.13 Cyanohydrin of which compound on hydrolysis will give lactic acid ?

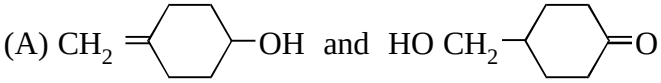
(A) C_6H_5CHO
(B) HCHO
(C) CH_3CHO
(D) $CH_3–CH_2–CHO$

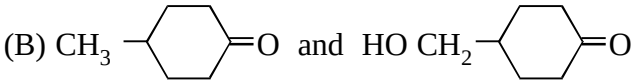
CL0013

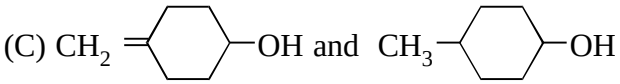
Q.14 In the given reaction :

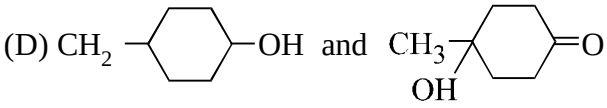


(X) and (Y) are :

(A) 

(B) 

(C) 

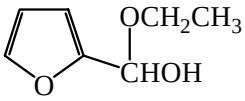
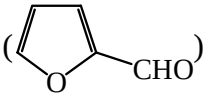
(D) 

CL0014

Q.15 Acetaldehyde cannot give :

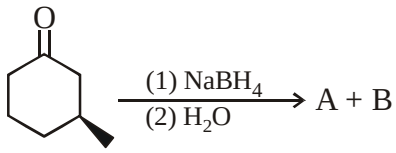
(A) Iodoform test (B) Lucas test (C) Benedict test (D) Tollens test

CL0015

Q.16 Compound  formed by the reaction of furfural () with ethanol is :

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

CL0016

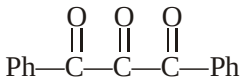
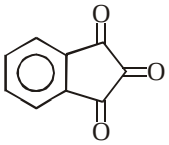
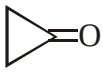
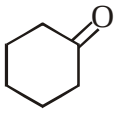
Q.17 

Identify relationship between A & B products ?

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

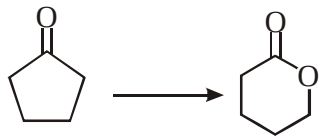
CL0017

Q.18 Which of the following does not form a stable hydrate by the addition of H_2O?

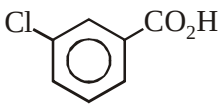
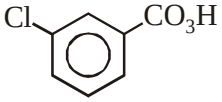
(A)  (B)  (C)  (D) 

CL0018

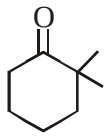
Q.19 The conversion



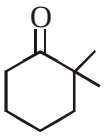
can be effected by using the reagent

(A) Tollen's reagent (B) O_3 (C)  (D) 

CL0019

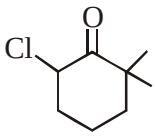
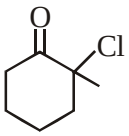
Q.20 (I)  + Cl_2 $\xrightarrow{NaOH}$ P

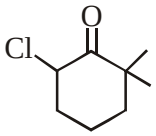
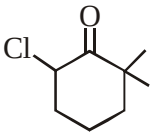
1 (mole) : 1 (mole)

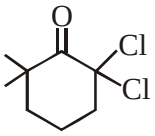
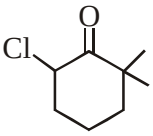
(II)  + Cl_2 $\xrightarrow{CH_3COOH}$ Q

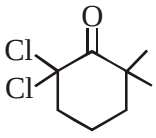
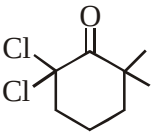
1 (mole) : 1 (mole)

Organic product P & Q are respectively -

(A)  , 

(B)  , 

(C)  , 

(D)  , 

CL0020

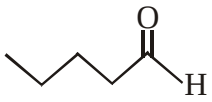
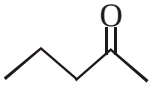
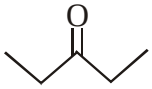
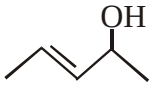
Q.21 Total number of stereoisomers of major product (Q) are :

$$CH_3–CHO + 4HCHO \xrightarrow[-HCOONa]{NaOH} (P) \xrightarrow[H^{\oplus}]{2CH_3–CHO} (Q)$$

(A) 0 (B) 4 (C) 8 (D) 2

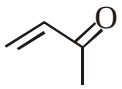
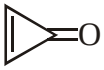
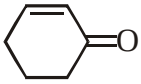
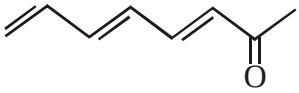
CL0021

Q.22 An organic compound (A), $C_5H_{10}O$, reacts with hydrazine to form a hydrazone derivative (B). The hydrazone (B) on being heated with KOH at about 180°C, gives n-pentane. The compound (A) does not respond positively to Tollen's reagent and to the iodoform test. The compound (A) is

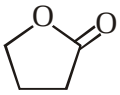
(A)  (B)  (C)  (D) 

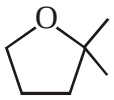
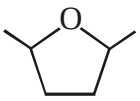
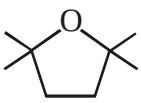
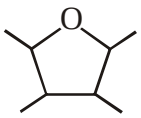
CL0022

Q.23 The compound having the highest dipole moment is :

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

CL0023

Q.24  $\xrightarrow[(2)\ H_2O]{(1)\ \text{Excess MeMgCl}}$ (A) $\xrightarrow[H_2SO_4]{\text{conc.}}$ 'B' Identify 'B' product ?

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

CL0024

Question No. 25 to 27 (3 questions)

An alkene (A) $C_{16}H_{16}$ on ozonolysis gives only product (B) C_8H_8O. (B) also can be obtained by hydrolysis of the product obtained by reaction between cyano benzene and CH_3MgBr. (A) can show geometrical isomerism and it can decolourise Br_2 water. (B) on treatment with SeO_2 produces (C)

Q.25 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 Witting reaction on acetophenone with $Ph_3P = C(CH_3)Ph$.

(D) On treatment with per acid followed by hydrolysis 'trans' form of A produces racemic mixture

CL0025

Q.26 Which is not correct about B ?

(A) It gives iodoform test

(B) On treatment with $LiAlH_4$, H_2O it produces a compound which also responds to iodoform test.

(C) It gives Tollen's test

(D) On treatment with NH_2NH_2 followed by alc. KOH at high temperature, it produces ethyl benzene

CL0026

Q.27 Which is not correct about C?

(A) On treatment with $NaBH_4$ it will produce a diol.

(B) On treatment with 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

CL0027

(Question No. 28 & 29)

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.28 **Assertion** : Benzaldehyde with HCN gives two isomeric compounds

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

CL0028

Q.29 **Assertion :** $Cl_3C-\overset{\overset{O}{\|}}{C}-H \xrightarrow{NaOH} Cl_3C—CH_2OH + Cl_3C—COONa$

Reason : There are no α–H in this compound, so it can't give aldol.

CL0029

EXERCISE # O-II

Q.1 Two isomeric ketones, 3-pentanone and 2-pentanone can be distinguished by :

(A) I_2 / NaOH (B)$NaSO_3H$ (C) NaCN / HCl (D) 2,4-DNP

CL0030

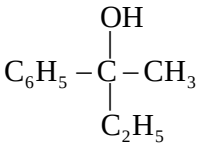
Q.2 An optically inactive alcohol (A) $C_6H_{12}O$ is oxidized by MnO_2 to produce optically inactive carbonyl compound while reduction of (A) by H_2/Ni produces optically active compound. Possible structure(s) of alcohol is/are

(A) Hex-2-ene-1- ol (B) Hex-3-ene-2- ol

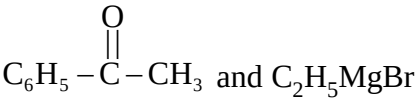
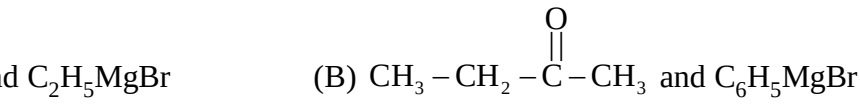
(C) 2-Methyl pent-2 - ene-1-ol (D) 3-Methyl pent-2 - ene-1-ol

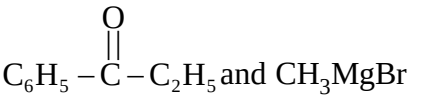
CL0031

Q.3 Consider the structure of given alcohol:



This alcohol can be prepared from:

(A)  and C_2H_5MgBr (B)  and C_6H_5MgBr

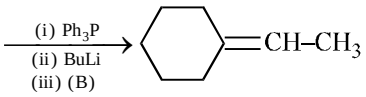
(C)  and CH_3MgBr (D)  and C_2H_5MgCl

CL0032

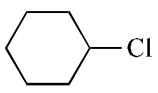
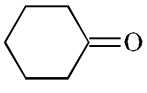
Q.4 Which of the following compounds will not give aldol condensation :

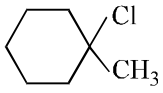
(A) Acetaldehyde (B) Formaldehyde (C) Pivaldehyde (D) Crotonaldehyde

CL0033

Q.5 (A) 

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

(A)  & CH_3CHO (B) CH_3CH_2Cl & 

(C)  & HCHO (D)  & CH_3CHO

CL0034

Q.6 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

CL0035

Q.7 Which of the following can be used for protection of carbonyl group

(A) $CH_2OH–CH_2OH$ / $H^{\oplus}$
(B) $CH_2OH–CH_2–CH_2OH$ / $H^{\oplus}$
(C) $HS–(CH_2)_3–SH$
(D) $CH_2OH–CH_2–CHO$

CL0036

Q.8 Which of the following(s) will form stable hemiketal :

(A) $Ph-\overset{\overset{O}{\|}}{C}-Ph$
(B) $HO-(CH_2)_3-\overset{\overset{O}{\|}}{C}-CH_3$
(C) $CH_2OH-\overset{\overset{O}{\|}}{C}-(CHOH)_3-CH_2-OH$
(D) $H_3C-O-CH_2-CH_2-CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

CL0037

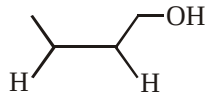
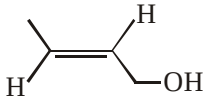
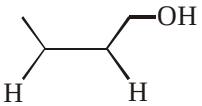
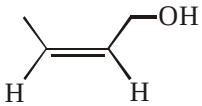
Q.9 Mixture of Ph–CHO & HCHO is treated with NaOH then Cannizzaro reaction involves:

(A) Oxidation of HCHO
(B) Reduction of HCHO
(C) Oxidation of Ph–CHO
(D) Reduction of Ph–CHO

CL0038

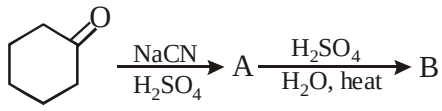
Q.10 Final product in the given reaction sequence is :

$CH_3–C\equiv CH \xrightarrow{PhMgBr}$  $+ [A] \xrightarrow[ii)\ H^{\oplus}]{i)\ H-\overset{\overset{O}{\|}}{C}-H} [B] \xrightarrow[Pd/BaSO_4]{H_2} [C]$

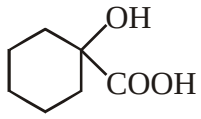
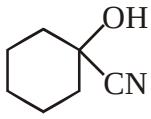
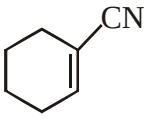
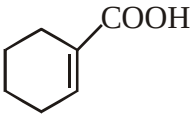
(A) 
(B) 
(C) 
(D) 

CL0039

Q.11 Consider the following sequence of reactions.



The major product (B) is :

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

CL0040

Q.12 In the reaction

$(CH_3)_2CHNO_2 + HCHO \xrightarrow{NaOH}$

the major product is

(A) $(CH_3)_2CHCH_2ONO_2$

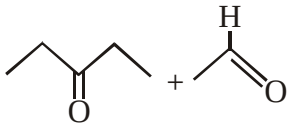
(B) $(CH_3)_2C(NO_2)(CH_2OH)$

(C) $(CH_3)_2CH—CHNO_2$ (O)

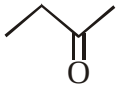
(D) $(CH_3)_2CH—CH—CH_2NO_2$ (O)

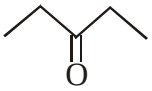
CL0041

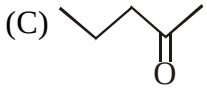
Q.13 Consider the following sequence of reactions.

Ketone A $\xrightarrow[2.\ H_2O]{1.\ C_2H_5MgBr}$ B $\xrightarrow[-H_2O]{H_2SO_4,\ heat}$ C $\xrightarrow[2.\ Zn,\ H_2O]{1.\ O_3}$  +

The ketone (A) is :

(A) 

(B) 

(C) 

(D) 

CL0042

Q.14 Which of the following reactions will give(s) 2° alcohol as a major product :

(A) $CH_3—CH_2—\underset{\underset{O}{\|}}{C}—NH_2 \xrightarrow[(ii)\ NaNO_2/HCl]{(i)\ LAH}$

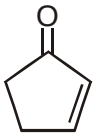
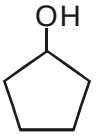
(B) $H—\underset{\underset{O}{\|}}{C}—OR \xrightarrow[(ii)\ H^+]{(i)\ CH_3MgX(excess)}$

(C) $H_3C—HC(O)—CH_2 \xrightarrow[(ii)\ H^+]{(i)\ RMgX}$

(D) $CH_3—\underset{\underset{O}{\|}}{C}—Cl \xrightarrow[H^+]{CH_3MgX\ (excess)}$

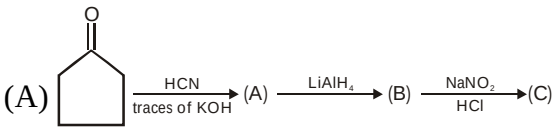
CL0043

Q.15 Match list-I with list-II :

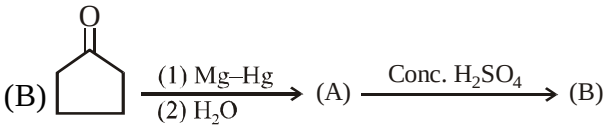
List - I	**List - II**
(A)  $\xrightarrow{NaBH_4}$	(P) Acetal
(B) $C_6H_5CHO + Ph–NH_2 \xrightarrow{H^\oplus}$	(Q) Schiff's base
(C) $C_6H_5COCH_3 + CH_3–CH_2–NH_2 \xrightarrow{H^\oplus}$	(R) 
(D) $RCHO + 2RCH_2OH \xrightarrow{H^\oplus}$	(S) Imine

EXERCISE # S-I

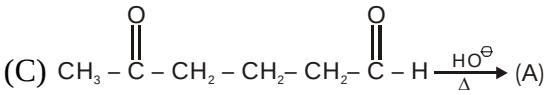
Q.1 **Column - I** **Column - II**

(A) 

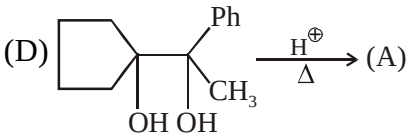
(P) Formation of six member ring takes place

(B) 

(Q) Final product is Ketone

(C) 

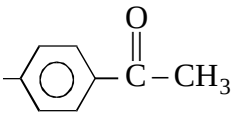
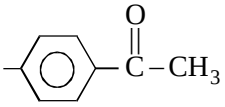
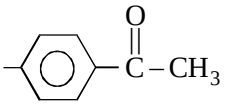
(R) Final product formed will give positive Idoform test

(D) 

(S) Final product formed will react with 2,4-DNP. (2,4-Di-nitrophenyl hydrazine)

CL0045

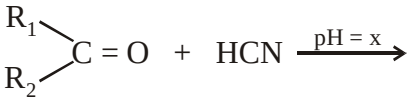
Q.2 Arrange the following compounds in decreasing order of $K_{eq.}$ for hydrate formation.

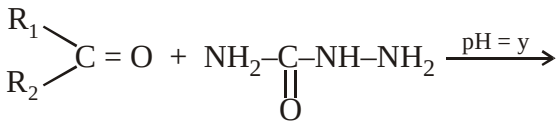
(1) $C_6H_5COCH_3$ (2)  (3)  (4) 

CL0046

Paragraph for Q. 03 to 04

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

Reaction - I : 

Reaction - II : 

Q.3 Value of x is :
(A) $x \leq 4.5$ (B) $x = 6$ (C) $x > 7$ (D) Can't decide

CL0047

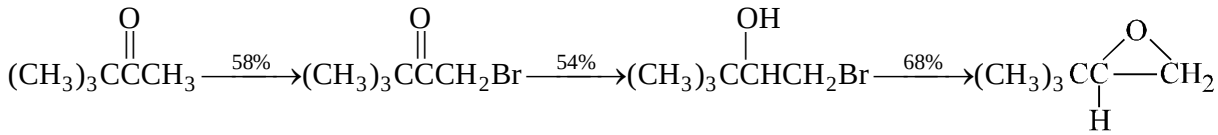
Q.4 Value of y is :
(A) $x = 4.5$ (B) $x = 1.5$ (C) $x = 7$ (D) $x = 9$

CL0047

Q.5 Some Grignard reagents react with ethyl orthoformate, followed by acidic hydrolysis, to give aldehydes. Propose mechanisms for the two steps in this synthesis.

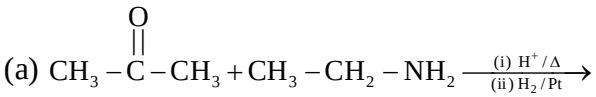
CL0048

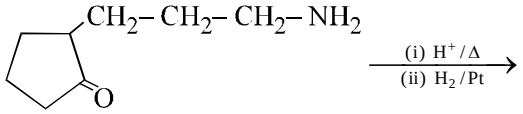
Q.6 A synthesis that begins with 3,3-dimethyl-2-butanone gives the epoxide shown. Suggest reagents appropriate for each step in the synthesis.

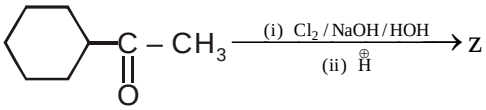


CL0049

Q.7 Predict the organic products :

(a) 

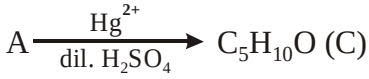
(b) 

(c) 

CL0050

Paragraph for Q.No.8 to 9

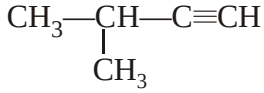
A(Hydrocarbon) (C ⇒ 88.24%) [Molecular weight of A = 68]

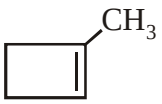


Q.8 'A' can be :

(A) $H_3C–H_2C–C\equiv C–CH_3$

(B) $CH_3–CH_2–CH_2–C\equiv C–H$

(C) 

(D) 

CL0051

Q.9 Correct statement reagarding C is.

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

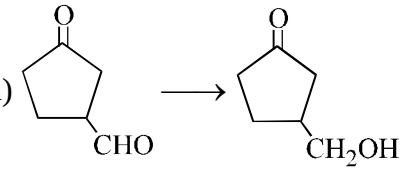
(B) C gives +ve iodoform test

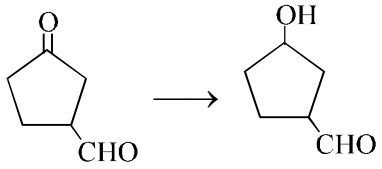
(C) C give –ve 2, 4, D.N.P test

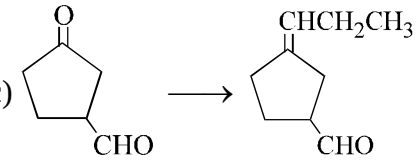
(D) C is aldehyde

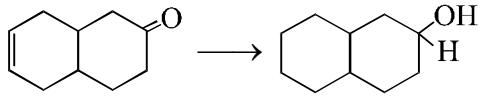
CL0051

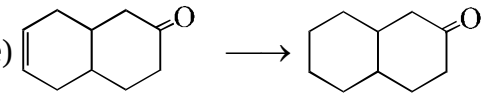
Q.10 Show how you would accomplish the following syntheses efficiently and in good yield. You may use any necessary reagents.

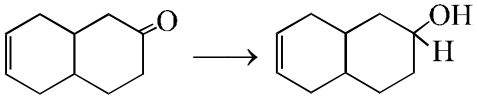
(a) 

(b) 

(c) 

(d) 

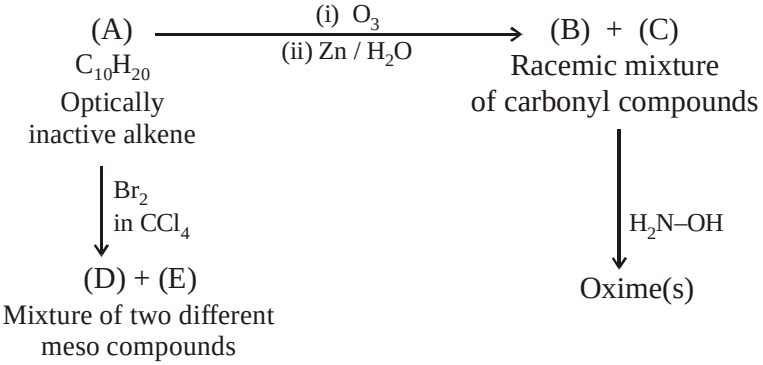
(e) 

(f) 

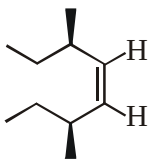
CL0052

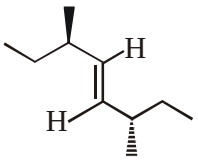
Paragraph for Q.No. 11 to 12

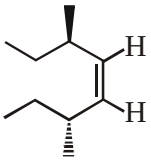
In given reaction sequence

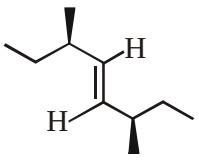


11. Alkene A is :

(A) 

(B) 

(C) 

(D) 

CL0053

12. How many total oxime(s) is/are obtained

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

CL0053

EXERCISE # (MAINS)

1. When $CH_2 = CH–COOH$ is reduced with $LiAlH_4$, the compound obtained will be -

(1) $CH_3–CH_2–CH_2OH$ (2) $CH_3–CH_2–CHO$ **[AIEEE-2003]**

(3) $CH_3–CH_2–COOH$ (4) $CH_2=CH–CH_2OH$

CL0054

2. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid ? **[AIEEE-2004]**

(1) Phenol (2) Benzaldehyde (3) Butanal (4) Benzoic acid

CL0055

3. Which one of the following is reduced with Zn-Hg/HCl to give the corresponding hydrocarbon **[AIEEE-2004]**

(1) Butan-2-one (2) Acetic acid (3) Acetamide (4) Ethyl acetate

CL0056

4. On mixing ethyl acetate with aqueous sodium chloride, the composition of the resultant solution is

(1) $CH_3COOC_2H_5 + NaCl$ (2) $CH_3COONa + C_2H_5OH$ **[AIEEE-2004]**

(3) $CH_3COCl + C_2H_5OH + NaOH$ (4) $CH_3Cl + C_2H_5COONa$

CL0057

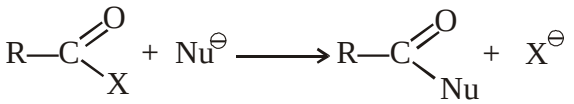
5. The best reagent to convert pent–3–en–2–ol into pent –3–en –2–one is - **[AIEEE-2005]**

(1) Acidic dichromate (2) Acidic permanganate

(3) Pyridinium chloro-chromate (4) Chromic anhydride in glacial acetic acid

CL0058

6. Rate of the reaction- **[AIEEE-2005]**



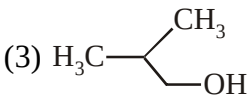
is fastest when X is -

(1) NH_2 (2) Cl (3) OCOR (4) OC_2H_5

CL0059

7. Among the following the one that gives positive iodoform test upon reaction with I_2 and NaOH is-

(1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$ **[AIEEE-2006]**

(3)  (4) $PhCHOHCH_3$

CL0060

8. In the following sequence of reactions

$CH_3CH_2OH \xrightarrow{P + I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$, then compound 'D' is - **[AIEEE-2007]**

(1) Butanal (2) n–Butyl alcohol

(3) n–Propyl alcohol (4) Propanal

CL0061

9. In the following sequence of reactions, the alkene affords the compound 'B' :- **[AIEEE-2008]**

$$CH_3CH = CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B.$$

The compound B is

(1) CH_3CH_2CHO (2) CH_3COCH_3 (3) $CH_3CH_2COCH_3$ (4) CH_3CHO

CL0062

10. Bakelite is obtained from phenol by reacting with **[AIEEE-2008]**

(1) $(CH_2OH)_2$ (2) CH_3CHO (3) CH_3COCH_3 (4) HCHO

CL0063

11. Which of the following on heating with aqueous KOH, produces acetaldehyde ? **[AIEEE-2009]**

(1) CH_2ClCH_2Cl (2) CH_3CHCl_2 (3) CH_3COCl (4) CH_3CH_2Cl

CL0064

12. In Cannizzaro reaction given below :- **[AIEEE-2009]**

$$2PhCHO \xrightarrow{:\overset{\ominus}{O}H} PhCH_2OH + PhCO_2^{\ominus}$$

the slowest step is :-

(1) The abstraction of proton from the carboxylic group

(2) The deprotonation of $PhCH_2OH$

(3) The attack of $:\overset{\ominus}{O}H$ at the carboxyl group

(4) The transfer of hydride to the carbonyl group

CL0065

13. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is :- **[AIEEE-2010]**

(1) Ethene (2) Propene (3) 1-Butene (4) 2-Butene

CL0066

14. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of :- **[AIEEE-2011]**

(1) An isopropyl group (2) An acetylenic triple bond

(3) Two ethylenic double bonds (4) A vinyl group

CL0067

15. Ozonolysis of an organic compound 'A' produces acetone and propionaldehyde in equimolar mixture. Identify 'A' from the following compounds : - **[AIEEE-2011]**

(1) 2-Methyl - 1- pentene (2) 1-Pentene

(3) 2-Pentene (4) 2-Methyl-2-pentene

CL0068

16. Trichloroacetaldehyde was subjected to assumed Cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate and another compound. The other compound is :- **[AIEEE-2011]**

(1) 2,2,2–Trichloropropanol (2) Chloroform

(3) 2,2,2–Trichloroethanol (4) Trichloromethanol

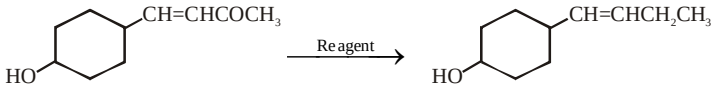
CL0069

17. Silver Mirror test is given by which one of the following compounds? **[AIEEE-2011]**

(1) Formaldehyde (2) Benzophenone (3) Acetaldehyde (4) Acetone

CL0070

18. In the given transformation, which of the following is the most appropriate reagent ? **[AIEEE-2012]**



(1) $NaBH_4$ (2) $NH_2\ NH_2,\ \overset{\ominus}{O}H$ (3) Zn – Hg / HCl (4) Na, Liq.NH_3

CL0071

19. Iodoform can be prepared from all except :- **[AIEEE-2012]**

(1) Isobutyl alcohol (2) Ethyl methyl ketone

(3) Isopropyl alcohol (4) 3-Methyl–2–butanone

CL0072

20. The major organic compound formed by the reaction of 1, 1, 1–trichloroethane with silver powder is :- **[JEE(Main)-2014]**

(1) 2-Butyne (2) 2-Butene (3) Acetylen (4) Ethene

CL0073

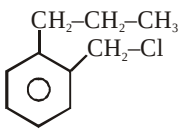
21. The most suitable reagent for the conversion of $R - CH_2 - OH \rightarrow R - CHO$ is :- **[JEE(Main)-2014]**

(1) CrO_3 (2) PCC (Pyridinium chlorochromate)

(3) $KMNO_4$ (4) $K_2Cr_2O_7$

CL0074

22. A compound A with molecular formula $C_{10}H_{13}Cl$ 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]**

(1) 

(2) $C_6H_5–CH_2–C(CH_3)(CH_3)(Cl)$

(3) $C_6H_5–CH_2–CH_2–CH_2–CH_2–Cl$

(4) $C_6H_5–CH_2–CH_2–CH(Cl)–CH_3$

CL0075

23. In the reaction sequence **[JEE(Main)-2015]**

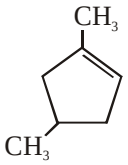
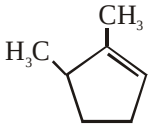
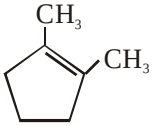
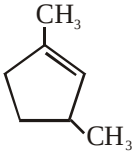
$2CH_3CHO \xrightarrow{OH^-} A \xrightarrow{\Delta} B$; the product B is:-

(1) $CH_3–CH=CH–CHO$ (2) $CH_3–CH_2–CH_2–CH_3$

(3) $CH_3–CH_2–CH_2–CH_2–OH$ (4) $CH_3–\overset{\overset{O}{\|}}{C}–CH_3$

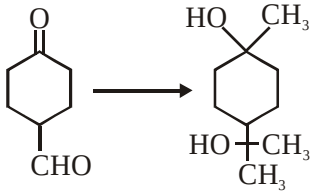
CL0076

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

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

CL0077

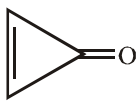
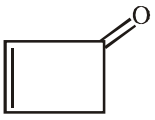
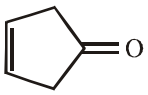
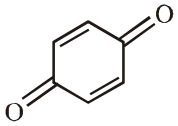
25. The correct sequence of reagents for the following conversion will be :- **[JEE(Main)-2017]**



(1) $[Ag(NH_3)_2]^+ OH^–$, H^+/CH_3OH, CH_3MgBr
(2) CH_3MgBr, H^+/CH_3OH, $[Ag(NH_3)_2]^+ OH^–$
(3) CH_3MgBr, $[Ag(NH_3)_2]^+ OH^–$, H^+/CH_3OH
(4) $[Ag(NH_3)_2]^+ OH^–$, CH_3MgBr, H^+/CH_3OH

CL0078

26. Which of the following compounds will show highest dipole moment ? **[JEE(Main-on-line)-2017]**

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

(1) (II) (2) (III) (3) (I) (4) (IV)

CL0079

27. Glucose on prolonged heating with HI gives : **[JEE(Main)-2018]**

(1) 1–Hexene (2) Hexanoic acid (3) 6-iodohexanal (4) n-Hexane

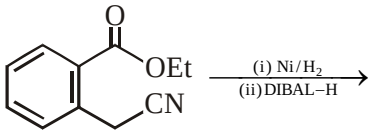
CL0080

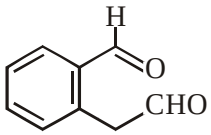
28. Which of the following compounds will most readily be dehydrated to give alkene under acidic condition? **[JEE(Main-on-line)-2018]**

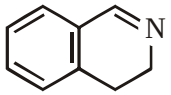
(1) 4-Hydroxypentan-2-one (2) 2-Hydroxycyclopentanone
(3) 3-Hydroxypentan-2-one (4) 1-Pentanol

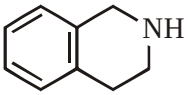
CL0081

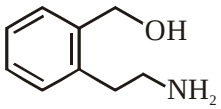
29. The major product of the following reaction is: **[JEE-Main(January)-2019]**



(1) 

(2) 

(3) 

(4) 

CL0082

30. In the following reaction **[JEE-Main(January)-2019]**

Aldehyde + Alcohol $\xrightarrow{HCl}$ Acetal

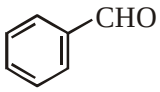
Aldehyde	Alcohol
HCHO	^tBuOH
CH_3CHO	MeOH

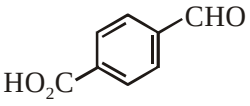
The best combinations is :

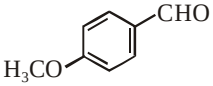
(1) HCHO and MeOH
(2) HCHO and ^tBuOH
(3) CH_3CHO and MeOH
(4) CH_3CHO and ^tBuOH

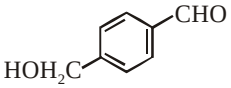
CL0083

31. The aldehydes which will not form Grignard product with one equivalent Grignard reagents are : **[JEE-Main(January)-2019]**

(A) 

(B) 

(C) 

(D) 

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

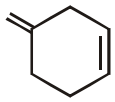
CL0084

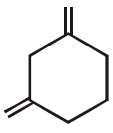
32. An unsaturated hydrocarbon X absorbs two hydrogen molecules on catalytic hydrogenattion, and also gives following reaction : **[JEE-Main(Jan)-2020]**

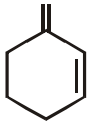
$X \xrightarrow[Zn/H_2O]{O_3} A \xrightarrow{[Ag(NH_3)_2]^+}$

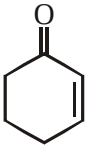
B(3 - oxo - hexanedicarboxylic acid)

X will be :-

(1) 

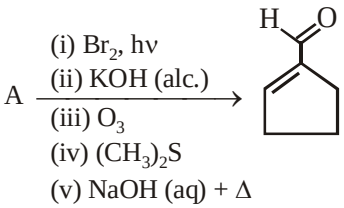
(2) 

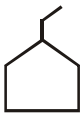
(3) 

(4) 

CL0085

33. In the following reaction A is : **[JEE-Main(Jan)-2020]**



(1) 
(2) 
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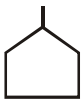
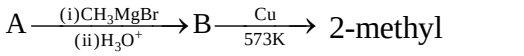
(4) 

CL0086

34. Consider the following reactions **[JEE-Main(Jan)-2020]**

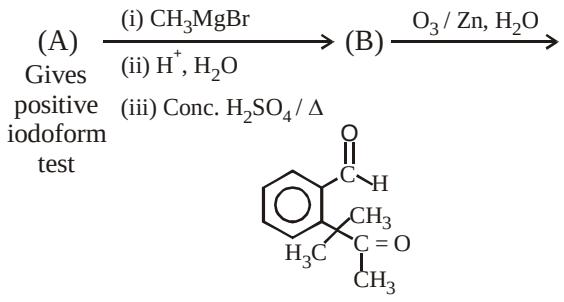


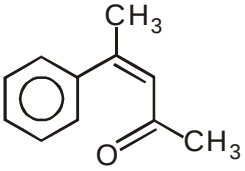
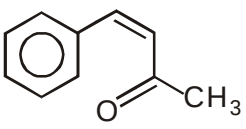
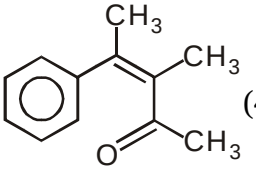
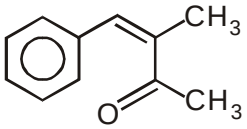
2-butene

The mass percentage of carbon in A is _____.

CL0087

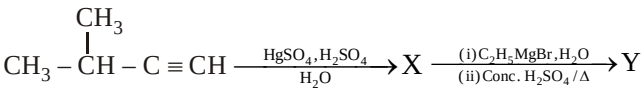
35. Identify (A) in the following reaction sequence : **[JEE-Main(Jan)-2020]**

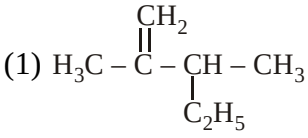
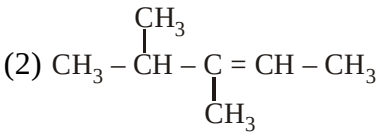
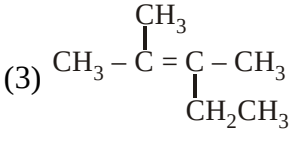
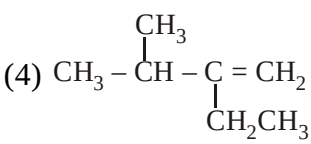


(1) 
(2) 
(3) 
(4) 

CL0088

36. The major product (Y) in the following reactions is : **[JEE-Main(Jan)-2020]**



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

CL0089

EXERCISE-(IIT QUESTIONS)

Q.1 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

CL0090

Q.2 A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives:

(A) benzyl alcohol and sodium formate

(B) sodium benzoate and methyl alcohol

(C) sodium benzoate and sodium formate

(D) benzyl alcohol and methyl alcohol **[IIT 2001]**

CL0091

Q.3 1-propanol & 2-propanol can be best distinguished by : **[IIT 2001]**

(A) Oxidation with alkaline $KMnO_4$ 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 H_2SO_4 followed by reaction with Fehling solution

CL0092

Q.4 Compound A (molecular formula C_3H_8O) is treated with acidified potassium dichromate to form a product B (molecular formula C_3H_6O). B forms a shining silver mirror on warming with ammonical silver nitrate. B when treated with an aqueous solution of $H_2NCONHNH_2$. HCl and sodium acetate gives a product C. Identify the structure of C. **[IIT 2002]**

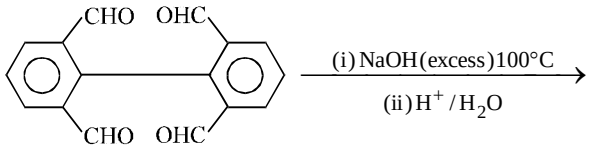
(A) $CH_3CH_2CH = NNHCONH_2$

(B) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=NNHCONH_2$

(C) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=NCONHNH_2$

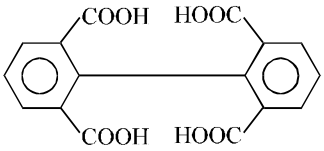
(D) $CH_3CH_2CH=NCONHNH_2$

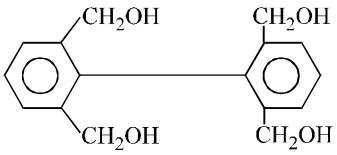
CL0093

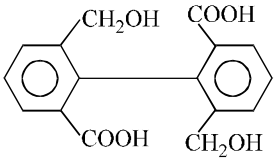
Q.5 

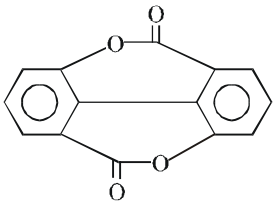
[IIT 2003]

any one of the products formed is :

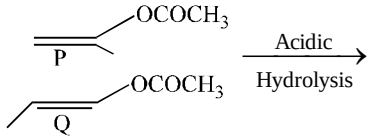
(A) 

(B) 

(C) 

(D) 

CL0094

Q.6 

Products formed by P & Q can be differentiated by: **[IIT 2003]**

(A) 2, 4 DNP

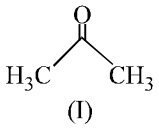
(B) Lucas reagent ($ZnCl_2$) conc. HCl

(C) $NaHSO_3$

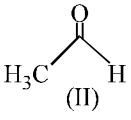
(D) Fehlings solution

CL0095

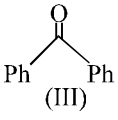
Q.7 The order of reactivity of phenyl Magnesium Bromide with the following compounds is **[IIT 2004]**



(I)



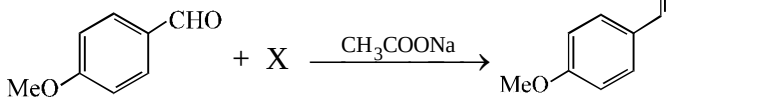
(II)



(III)

(A) II > III > I (B) I > III > II (C) II > I > III (D) All react with the same rate

CL0096

Q.8 

[IIT 2005]

What is X?

(A) CH_3COOH

(B) $BrCH_2$, COOH

(C) $(CH_3CO)_2O$

(D) CHO–COOH

CL0097

Q.9 The smallest ketone and its next homologue are reacted with NH_2OH to form oxime.

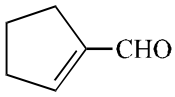
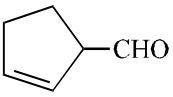
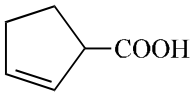
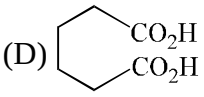
(A) Two different oximes are formed (B) Three different oximes are formed

(C) Two oximes are optically active (D) All oximes are optically active **[IIT 2006]**

CL0098

Q.10 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-JEE(ADV.)- 2007]

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

CL0099

Q.11 **Statement-1 :** Glucose gives a reddish-brown precipitate with Fehling's solution.

because

Statement-2 : Reaction of glucose with Fehling's solution gives CuO and gluconic acid.

(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. **[IIT-JEE(ADV.)- 2007]**

CL0100

Q.12 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 × 4 matrix given in the ORS.

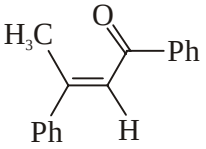
[IIT-JEE(ADV.)- 2007]

Column I	**Column II**
(A) C_6H_5CHO	(P) gives precipitate with 2,4-dinitrophenylhydrazine
(B) $CH_3C{\equiv}CH$	(Q) gives precipitate with $AgNO_3$
(C) CN^-	(R) is a nucleophile
(D) I^-	(S) is involved in cyanohydrin formation

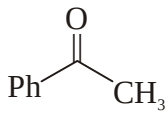
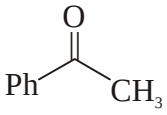
CL0101

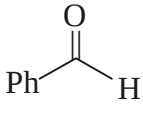
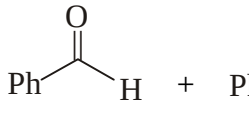
Paragraph for Question No. 13 to 15

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**.

M = 

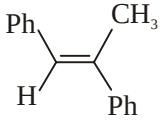
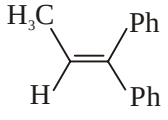
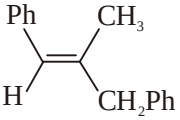
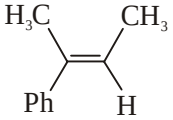
Q.13 Compound **H** is formed by the reaction of **[IIT-JEE(ADV.)- 2008]**

(A)  + PhMgBr (B)  + $PhCH_2MgBr$

(C)  + $PhCH_2MgBr$ (D) 

CL0102

Q.14 The structure of compound **I** is **[IIT-JEE(ADV.)- 2008]**

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

CL0102

Q.15 The structures of compounds **J**, **K** and **L**, respectively, are **[IIT-JEE(ADV.)- 2008]**

(A) $PhCOCH_3$, $PhCH_2COCH_3$ and $PhCH_2COO^-K^+$

(B) PhCHO, $PhCH_2CHO$ and $PhCOO^-K^+$

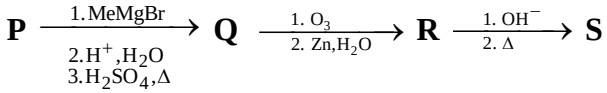
(C) $PhCOCH_3$, $PhCH_2CHO$ and $CH_3COO^-K^+$

(D) PhCHO, $PhCOCH_3$ and $PhCOO^-K^+$

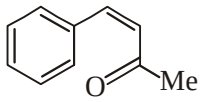
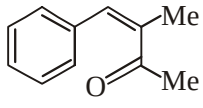
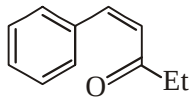
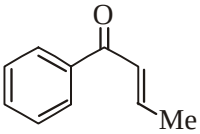
CL0102

Paragraph for Question Nos. 16 to 38

A carbonyl compound **P**, which gives positive iodoform test, undergoes reaction with 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**.

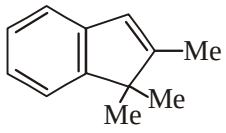
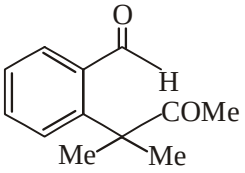


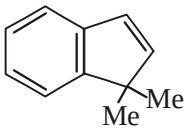
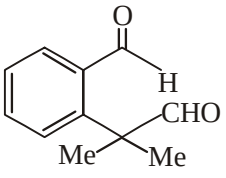
Q.16 The structure of the carbonyl compound **P** is **[IIT-JEE(ADV.)- 2009]**

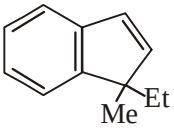
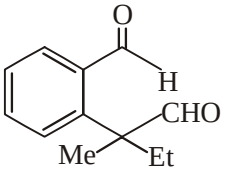
(A)  (B)  (C)  (D) 

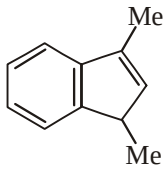
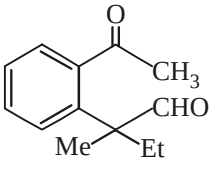
CL0103

Q.17 The structure of the products **Q** and **R**, respectively, are **[IIT-JEE(ADV.)- 2009]**

(A)  , 

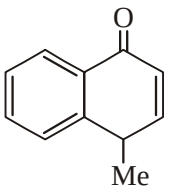
(B)  , 

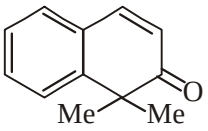
(C)  , 

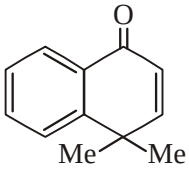
(D)  , 

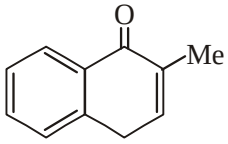
CL0103

Q.18 The structure of the product **S** is **[IIT-JEE(ADV.)- 2009]**

(A) 

(B) 

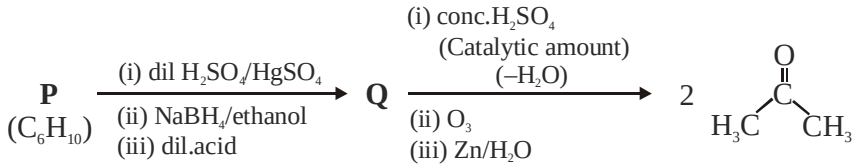
(C) 

(D) 

CL0103

Paragraph for Questions Nos. 19 to 20

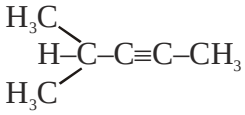
An acyclic hydrocarbon P, having molecular formula C_6H_{10}, gave acetone as the only organic product through the following sequence of reactions, in the which Q is an intermediate organic compound.

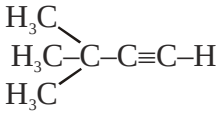


Q.19 The structure of compound P is - **[IIT-JEE(ADV.)- 2011]**

(A) $CH_3CH_2CH_2CH_2–C\equiv C–H$

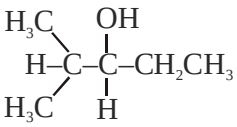
(B) $H_3CH_2C\equiv C–CH_2CH_3$

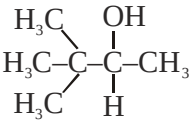
(C) 

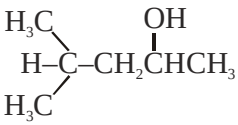
(D) 

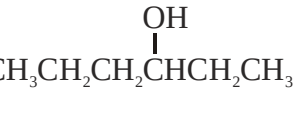
CL0104

Q.20 The structure of the compound Q is - **[IIT-JEE(ADV.)- 2011]**

(A) 

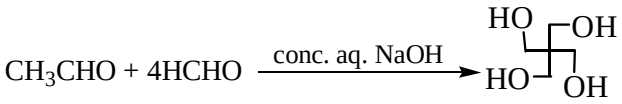
(B) 

(C) 

(D) 

CL0104

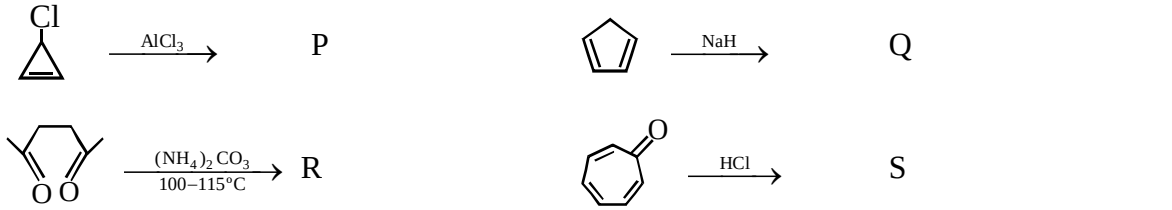
Q.21 The number of aldol reaction(s) that occurs in the given transformation is **[IIT-JEE(ADV.)- 2012]**



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

CL0105

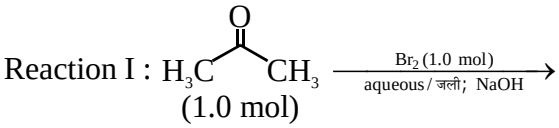
Q.22 Among P, Q, R and S, the aromatic compound(s) is / are : **[IIT-JEE(ADV.)- 2013]**



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

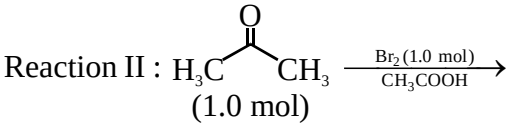
CL0106

Q.23 After completion of the reactions (I and II), the organic compound(s) in the reaction mixtures is(are)

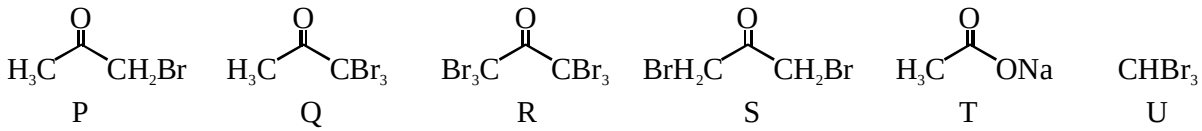
Reaction I : 

(1.0 mol)

[IIT-JEE(ADV.)- 2013]

Reaction II : 

(1.0 mol)



(A) Reaction I : P and Reaction II : P

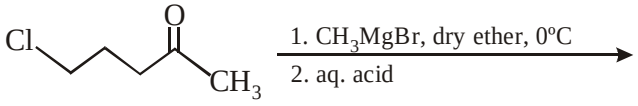
(B) Reaction I : U, acetone and Reaction II : Q acetone

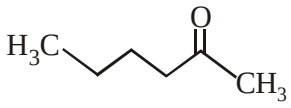
(C) Reaction I : T, U, acetone and Reaction II : P

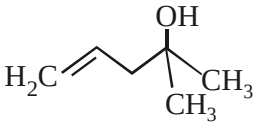
(D) Reaction I : R, acetone and Reaction II : S acetone

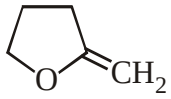
CL0107

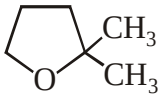
Q.24 The major product in the following reaction is **[IIT-JEE(ADV.)- 2014]**



(A) 

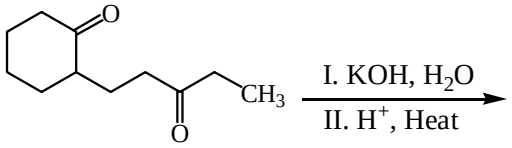
(B) 

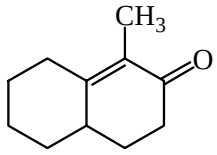
(C) 

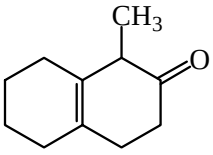
(D) 

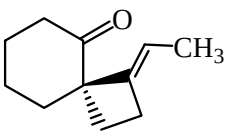
CL0108

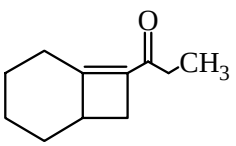
Q.25 The major product of the following reaction is - **[IIT-JEE(ADV.)- 2015]**



(A) 

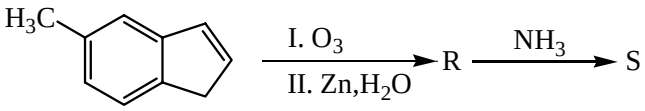
(B) 

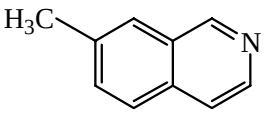
(C) 

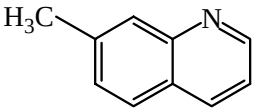
(D) 

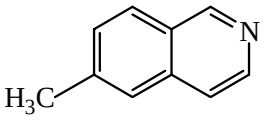
CL0109

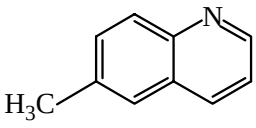
Q.26 In the following reactions, the product S is - **[IIT-JEE(ADV.)- 2015]**



(A) 

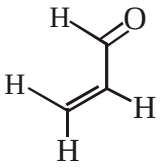
(B) 

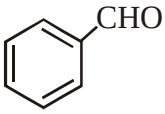
(C) 

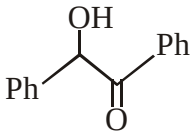
(D) 

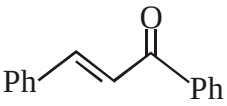
CL0110

Q.27 Positive Tollen's test is observed for : **[IIT-JEE(ADV.)- 2016]**

(A) 

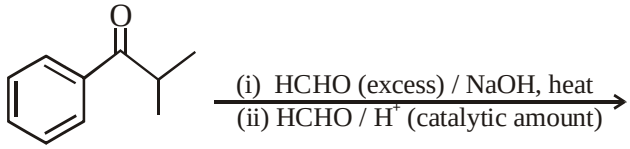
(B) 

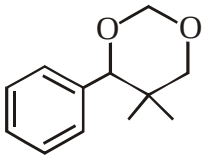
(C) 

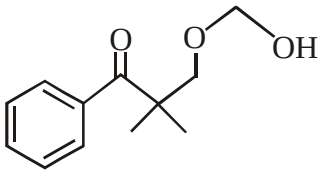
(D) 

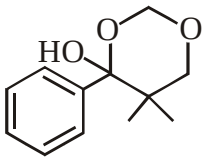
CL0111

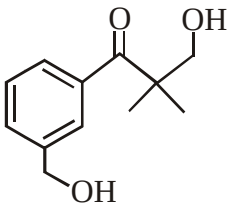
Q.28 The major product of the following reaction sequence is : **[IITJEE(ADV.)-2016]**



(A) 

(B) 

(C) 

(D) 

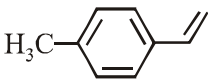
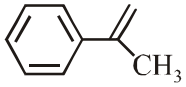
CL0112

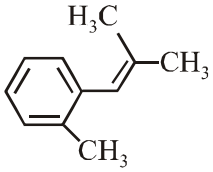
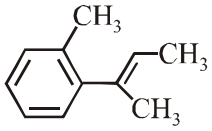
Q.29 Compound **P** and **R** upon ozonolysis produce **Q** and **S**, respectively. The molecular formula of **Q** and **S** is C_8H_8O. **Q** undergoes Cannizzaro reaction but not haloform reaction, whereas **S** undergoes haloform reaction but not Cannizzaro reaction : **[IIT-JEE(ADV.)- 2017]**

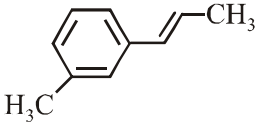
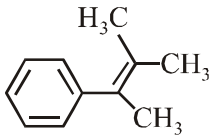
(i) P $\xrightarrow[\text{(ii) } Zn / H_2O]{\text{(i) } O_3 / CH_2Cl_2}$ Q (C_8H_8O)

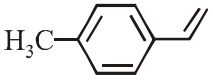
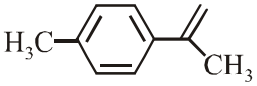
(ii) R $\xrightarrow[\text{(ii) } Zn / H_2O]{\text{(i) } O_3 / CH_2Cl_2}$ S (C_8H_8O)

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

(A)  and 

(B)  and 

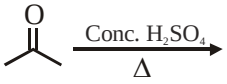
(C)  and 

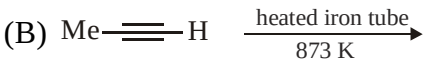
(D)  and 

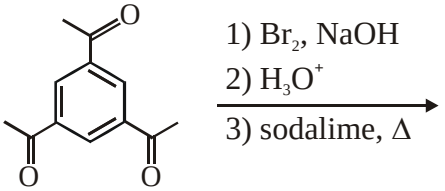
CL0113

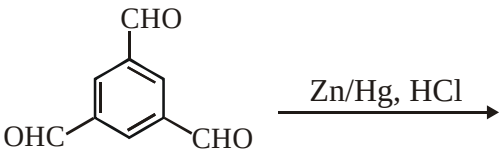
30. The reaction(s) leading to the formation of 1,3,5-trimethylbenzene is (are)

[IIT-JEE(ADV.)- 2018]

(A) 

(B) 

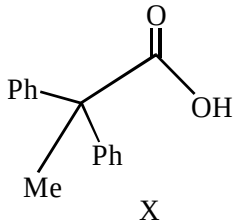
(C) 

(D) 

CL0114

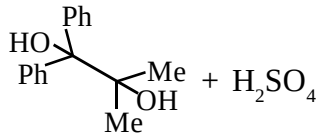
31. The desired product X can be prepared by reacting the major product of the reactions in LIST-I with one or more appropriate reagents in LIST-II. **[IIT-JEE(Adv.)-2018]**

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

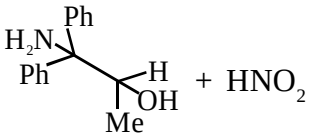


X

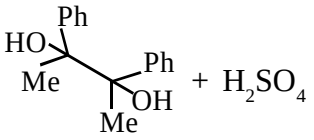
LIST-I **LIST-II**

P.  + H_2SO_4

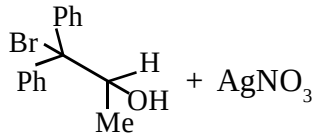
1. I_2, NaOH

Q.  + HNO_2

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

R.  + H_2SO_4

3. Fehling solution

S.  + $AgNO_3$

4. HCHO, NaOH

5. NaOBr

The correct option is

(A) P → 1; Q → 2,3; R → 1,4; S → 2,4

(B) P → 1,5; Q → 3,4; R → 4,5; S → 3

(C) P → 1,5; Q → 3,4; R → 5; S → 2,4

(D) P → 1,5; Q → 2,3; R → 1,5; S → 2,3

CL0115

ANSWER-KEY

EXERCISE # O-I

1	**Ans.** (A)	2	**Ans. (B)**	3	**Ans. (C)**	4	**Ans. (C)**
5	**Ans. (C)**	6	**Ans. (D)**	7	**Ans. (A)**	8	**Ans.** (C)
9	**Ans. (C)**	10	**Ans. (C)**	11	**Ans. (A)**	12	**Ans. (D)**
13	**Ans. (C)**	14	**Ans.** (C)	15	**Ans.** (B)	16	**Ans.** (D)
17	**Ans.** (A)	18	**Ans. (D)**	19	**Ans.** (D)	20	**Ans. (C)**
21	**Ans.** (D)	22	**Ans.** (C)	23	**Ans.** (B)	24	**Ans.** (A)
25	**Ans.** (D)	26	**Ans. (C)**	27	**Ans.** (D)	28	**Ans. (C)**
29	**Ans. (D)**						

EXERCISE # O-II

1	**Ans.** (A,B)	2	**Ans.** (C,D)	3	**Ans.** (A,B,C)	4	**Ans.** (B,C)
5	**Ans.** (A,B)	6	**Ans.** (A,B,C,D)	7	**Ans.** (A,B,C)	8	**Ans.** (B,C)
9	**Ans.** (A,D)	10	**Ans. (D)**	11	**Ans.** (D)	12	**Ans.** (B)
13	**Ans.** (B)	14	**Ans. (A,B,C)**	**15**	**Ans. (A)→R ; (B)→Q,S ; (C)→S ; (D)→P**		

EXERCISE # S-I

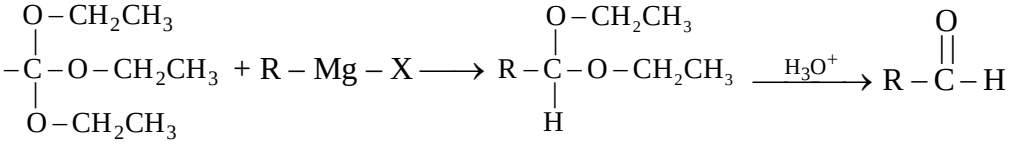
1. **Ans. (A) P,Q,S ; (B) P,Q,S ; (C) P,Q,S ; (D) P,Q,S**

2. **Ans. 3 > 2 > 1 > 4**

3. **Ans.** (C)

4. **Ans.** (A)

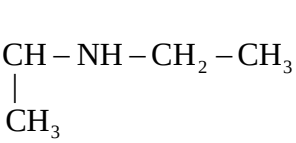
5. **Ans.**



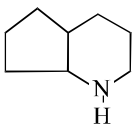
Ethyl orthoformate Acetal aldehyde

6. **Ans.** H^+/Br_2 ; H_2 / Ni ; NaOH

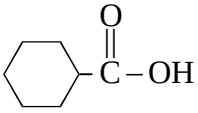
7. **Ans.** (a)



(b)



(c) $CHCl_3$ +



8. **Ans.** (B,C)

9. **Ans.** (B)

10. **Ans.**

(a) (i) $KMnO_4$, (ii) CH_2-OH / CH_2-OH , (iii) $LiAlH_4$, (iv) $H_3O^{\oplus}$

(b) (i) CH_2-OH / CH_2-OH , (ii) $NaBH_4$, (iii) H_3O^+, (c) (i) CH_2-OH / CH_2-OH , (ii) $Ph_3P{=}CH{-}Et$

(d) (i) H_2, Ni (e) NH_2NH_2/H_2O_2 (f) $NaBH_4$

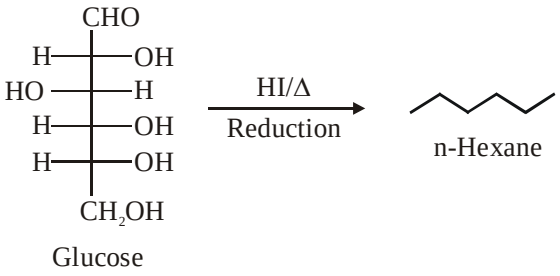
11. **Ans. (B)** **12.** **Ans. (D)**

EXERCISE # (MAINS)

1.	**Ans. (4)**	**2.**	**Ans. (2)**	**3.**	**Ans. (1)**	**4.**	**Ans.** (2)
5.	**Ans.** (4)	**6.**	**Ans.** (2)	**7.**	**Ans. (4)**	**8.**	**Ans.** (3)
9.	**Ans.** (4)	**10.**	**Ans.** (4)	**11.**	**Ans.** (2)	**12.**	**Ans.** (4)
13.	**Ans.** (4)	**14.**	**Ans.** (4)	**15.**	**Ans.** (4)	**16.**	**Ans.** (3)
17.	**Ans.** (1 , 3)	**18.**	**Ans.** (2)	**19.**	**Ans.** (1)	**20.**	**Ans.** (1)
21.	**Ans.** (2)	**22.**	**Ans.** (2)	**23.**	**Ans. (1)**	**24.**	**Ans. (4)**
25.	**Ans. (1)**	**26.**	**Ans. (3)**				

27. Ans. (4)

Sol.

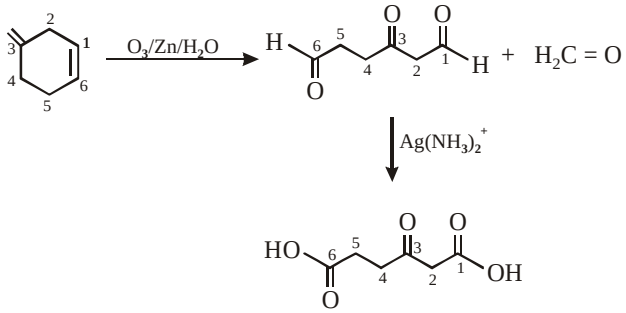


Glucose

28.	**Ans. (1)**	**29.**	**Ans. (2)**	**30.**	**Ans. (1)**	**31.**	**Ans. (2)**

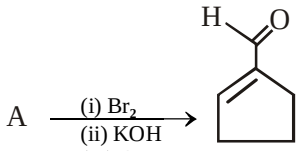
32. Ans. (1)

Sol.



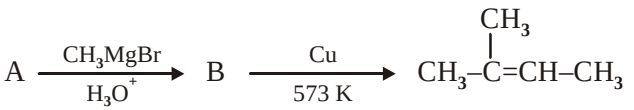
33. Ans. (3)

Sol.

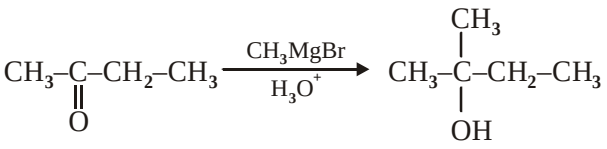


34. Ans. (66.65 to 66.70)

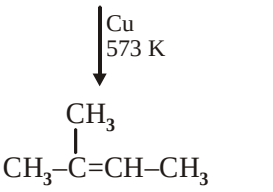
Sol.



(2-methyl-2-butene)



(A) **(B)**



(2-methyl-2-butene)

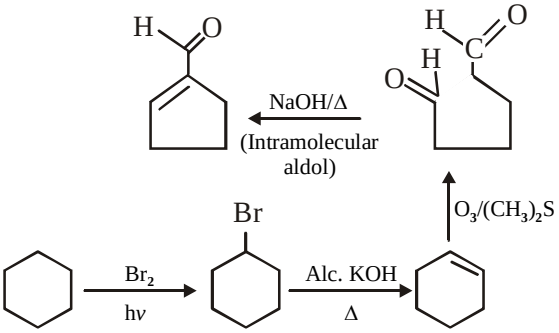
C ⇒ 12 × 4 = 48

H ⇒ 8 × 1 = 8

O ⇒ 16 × 1 = 16

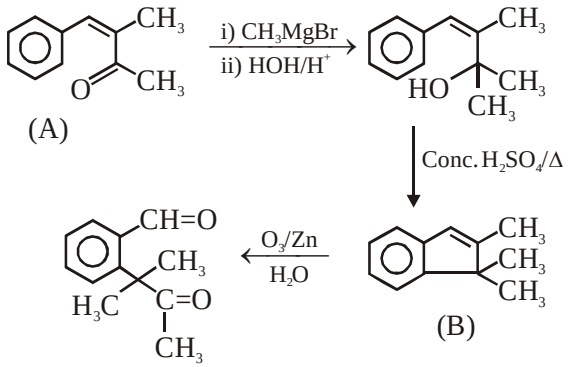
Total 72

$$\% \text{ of C} = \frac{48}{72} \times 100 = 66.66\%$$



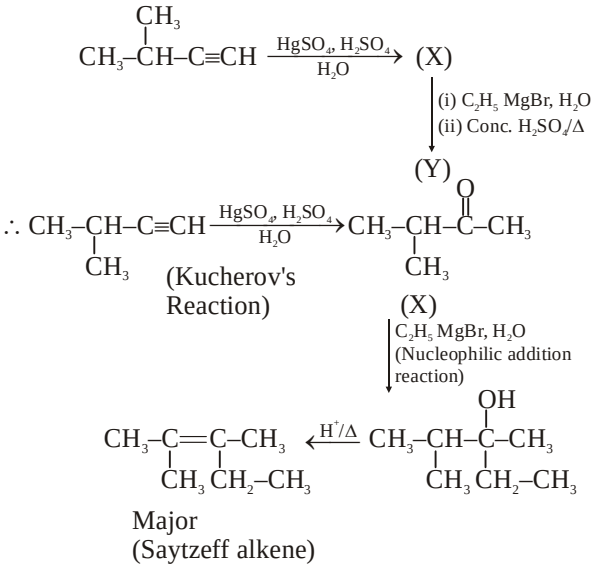
35. Ans. (4)

Sol.



36. Ans. (3)

Sol.

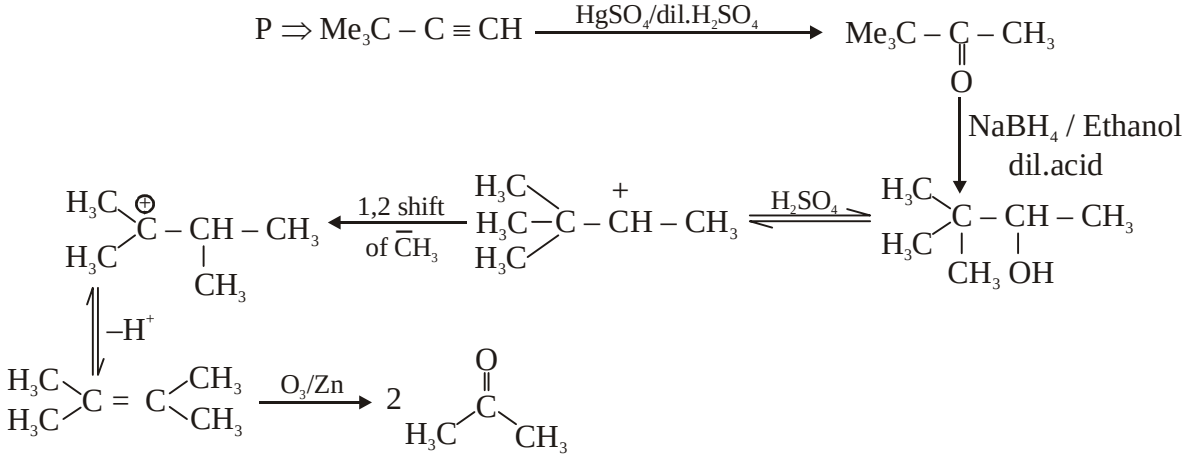


EXERCISE-#(IIT QUESTIONS)

1.	**Ans.** (B)	**2.**	**Ans.** (A)	**3.**	**Ans.** (C)	**4.**	**Ans. (A)**
5.	**Ans.** (C)	**6.**	**Ans.** (D)	**7.**	**Ans.** (C)	**8.**	**Ans.** (C)
9.	**Ans.** (B)	**10.**	**Ans. (A)**	**11.**	**Ans.** (C)		
12.	**Ans.** (A) P,S; (B) Q; (C) Q,R,S; (D) Q,R			**13.**	**Ans. (B)**	**14.**	**Ans. (A)**
15.	**Ans.** (D)	**16.**	**Ans.** (B)	**17.**	**Ans. (A)**	**18.**	**Ans.** (B)

19. Ans. (D)

20. Ans.(B)



21. Ans. (C)

Sol. $CH_3CH=O + \bar{O}H \rightleftharpoons \bar{C}H_2-CH=O \xrightleftharpoons{H-\overset{O}{\overset{\|}{C}}-H} H_2C-CH(CH_2OH)-CH=O$

(1 time aldol)

$\xrightleftharpoons{\bar{O}H} CH_2(CH_2OH)-CH=O \xrightleftharpoons{H-\overset{O}{\overset{\|}{C}}-H} HOH_2C-CH(CH_2OH)-CH=O$

(2 time aldol)

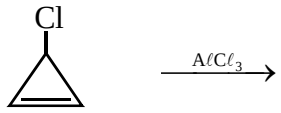
$\xrightleftharpoons{\bar{O}H} HOH_2C-C(CH_2OH)_2-CH=O \xrightleftharpoons{H-\overset{O}{\overset{\|}{C}}-H} HOCH_2-C(CH_2OH)_2-CH=O$

(3 times aldol)

$H-\overset{O}{\overset{\|}{C}}-H + \overset{\ominus}{O}H \rightleftharpoons HOH_2C-C(CH_2OH)_2-CH_2OH + H-\overset{O}{\overset{\|}{C}}-O^{\ominus}$

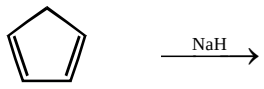
(crossed cannizaro product)

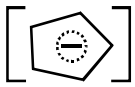
22. Ans. (A,B,C,D)

Sol. 

(P)

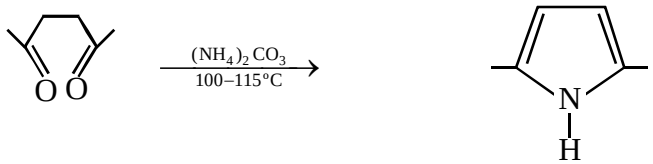
2π electron (delocalised)
(Aromatic Nature)





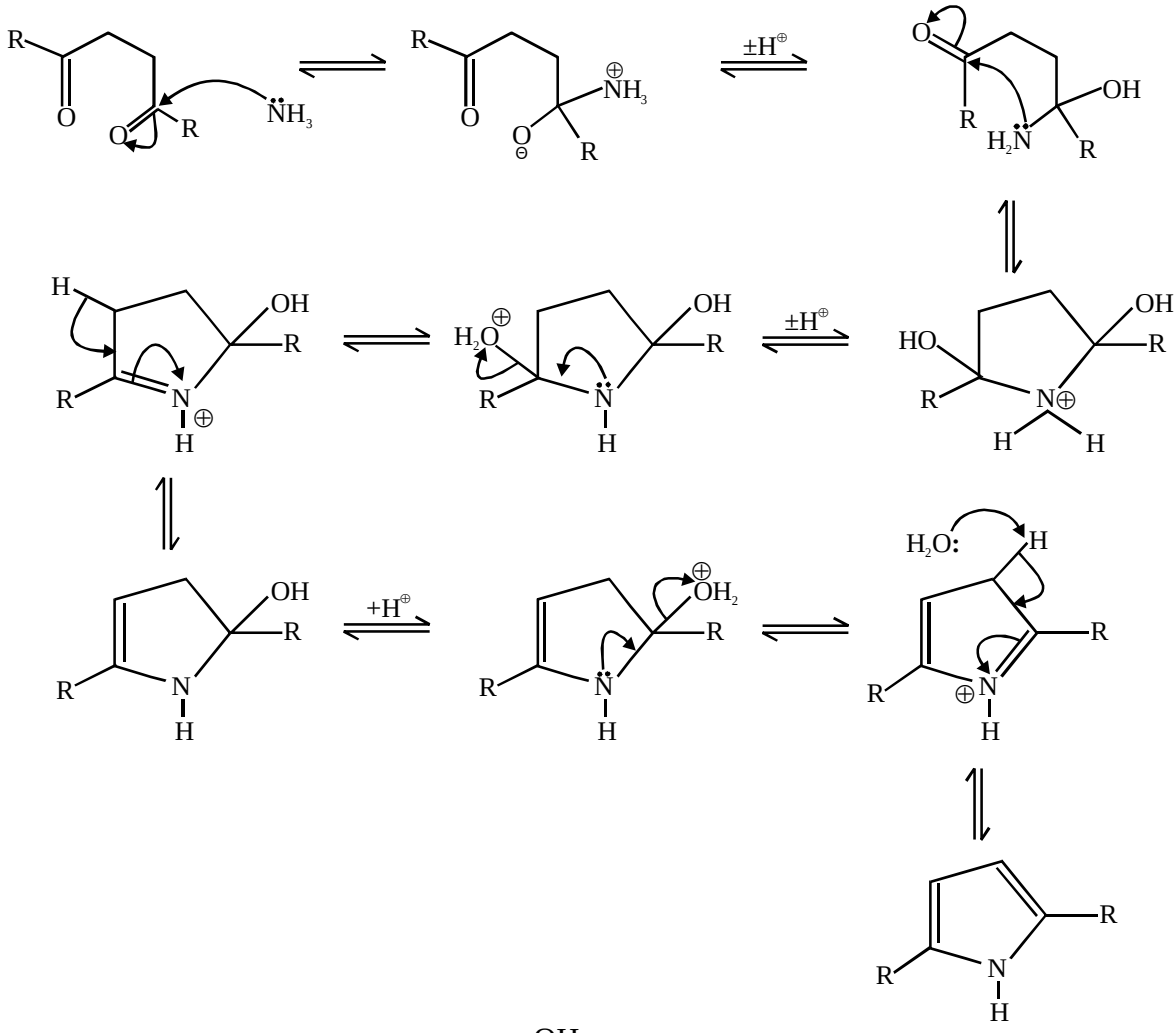
(Q)

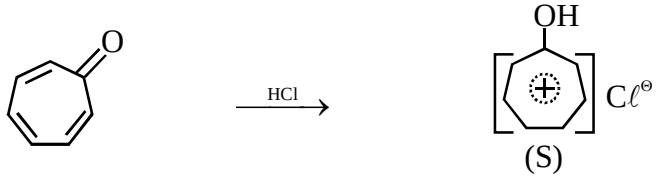
6π electron (delocalised)
(Aromatic Nature)



(R) 6π-electron (delocalised)
(Aromatic nature)

Mechanism :

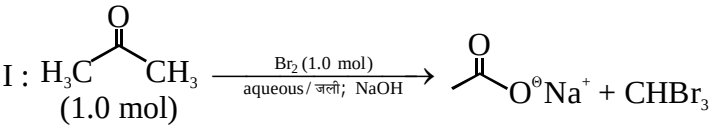




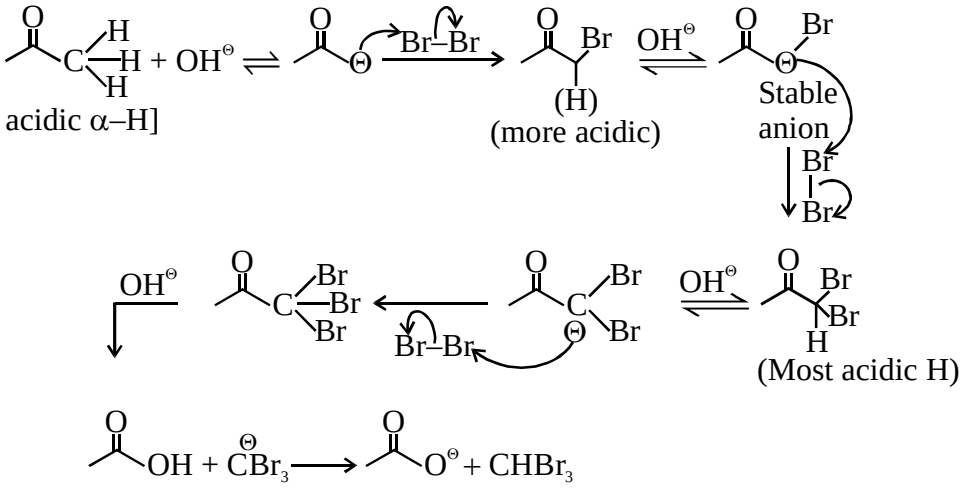
(S)

6π electron (delocalised)
(Aromatic Nature)

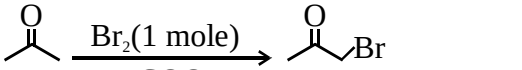
23. Ans. (C)

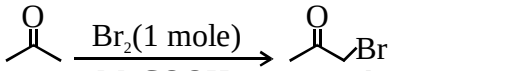
Sol. Reaction I : 
(1.0 mol)

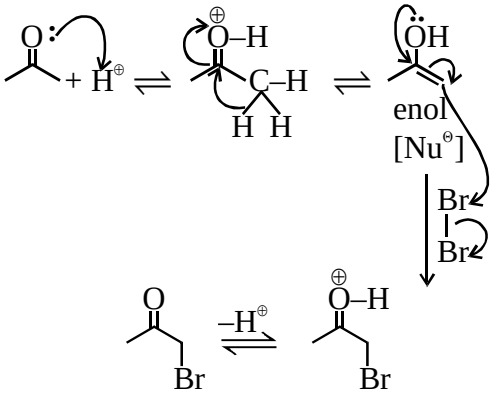
Mechanism



In basic medium halogenation dose not stop with replacement of just one hydrogen and poly halogenation takes place because α-haloketones are more reactive towards base and haloform reaction takes place In above reaction Br_2 is limiting agents.

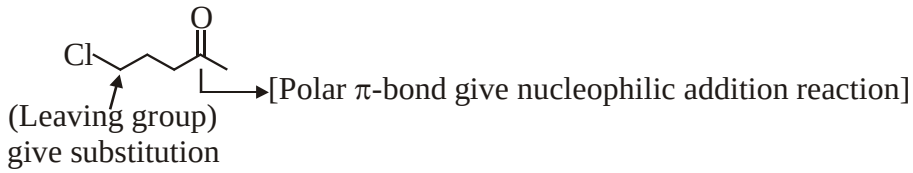
Reaction II : 

Mechanism : 



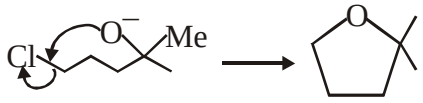
Further bromination is less favourable because of less amount of Br_2

24. **Ans.** (D)

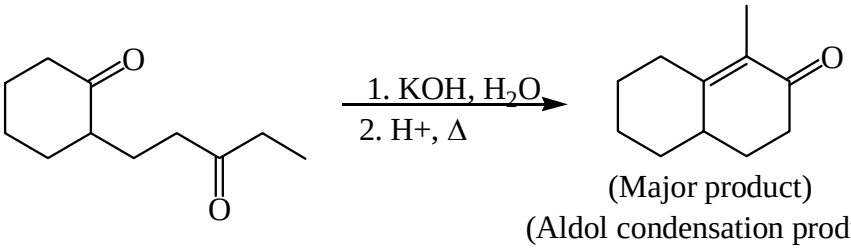


(i) Grignard prefer to give nucleophilic addition on polar π-bond and form anion intermediate.

(ii) In next step anion give intramolecular nucleophilic substitution reaction & form 5 membered ring.

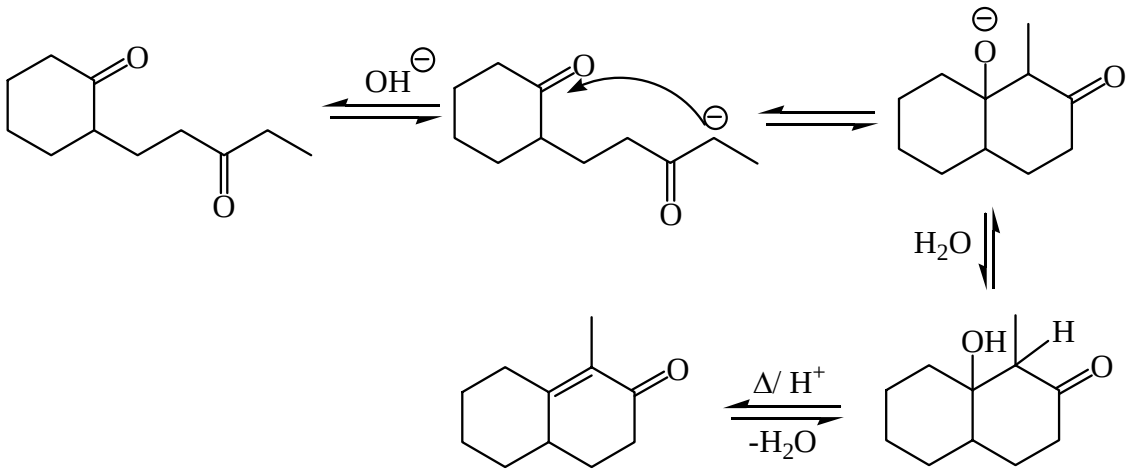


25. Ans. (A)



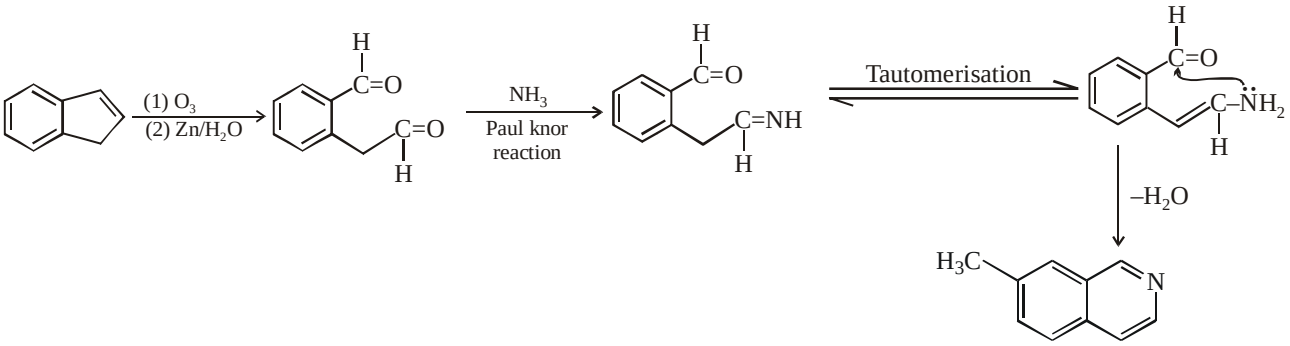
(Major product)
(Aldol condensation product)

Mechanism :



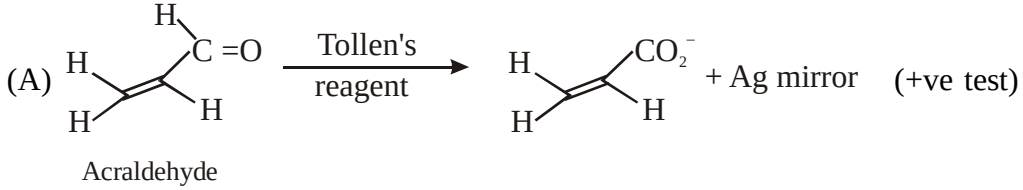
26. Ans.(A)

Sol.

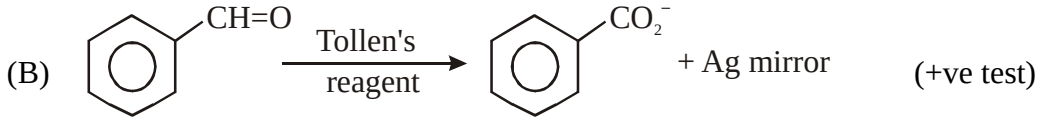


27. Ans. (A,B,C)

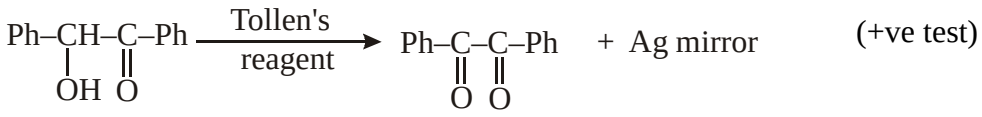
Sol. Tollens's test is given by compounds having aldehyde group. Also α-hydroxy carbonyl gives positive tollen's test.

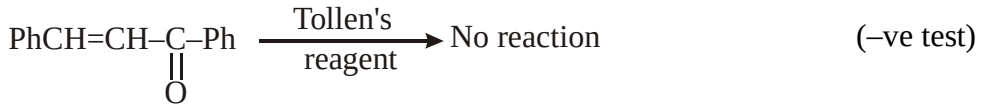


Acraldehyde



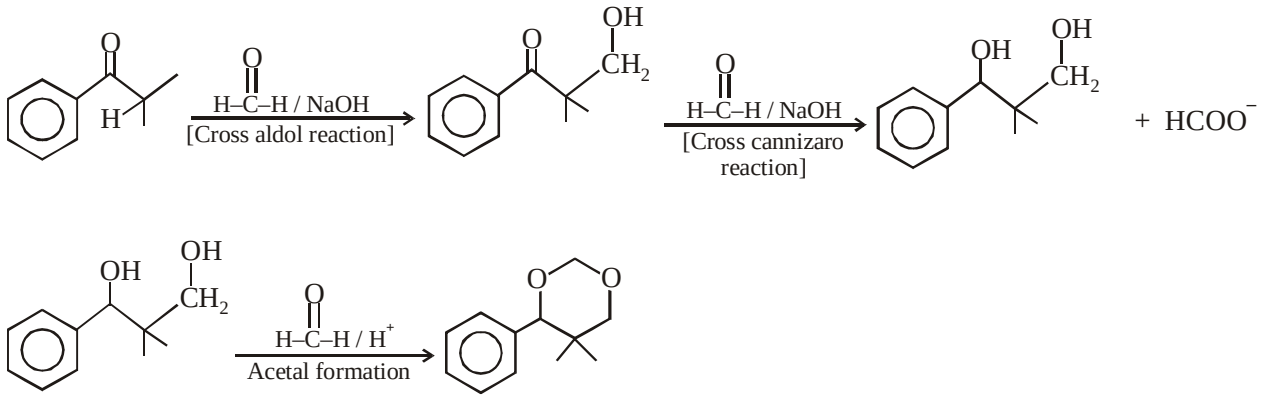
Benzaldehyde

(C) 

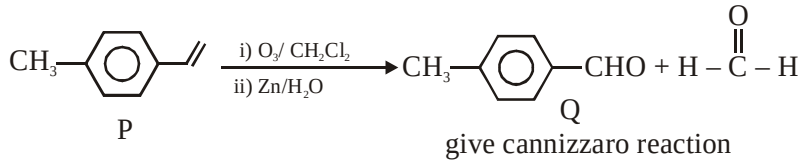
(D) 

28. Ans. (A)

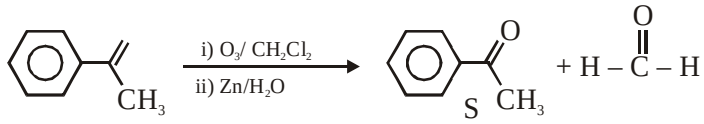
Sol.



29. Ans. (A,C)

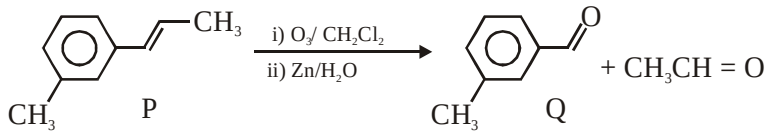
Sol. **(A)** 

give cannizzaro reaction
but no haloform

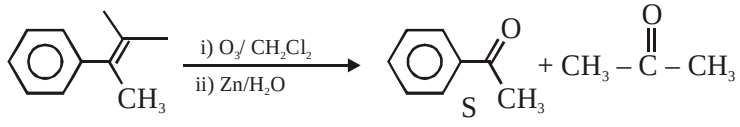


no cannizzaro
but give haloform

(B) Product of ozonolysis of R is having 9 carbon.

(C) 

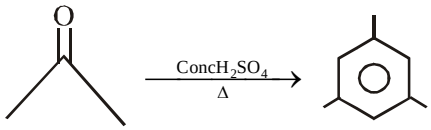
give cannizzaro reaction
but no haloform

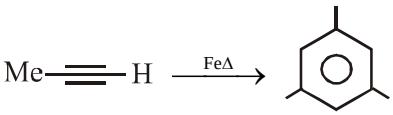


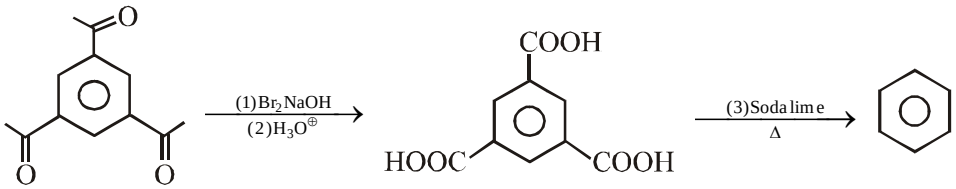
no cannizzaro
but give haloform

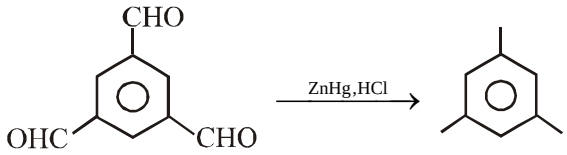
(D) Product of ozonolysis of R is having 9 carbon.

30. Ans. (A,B,D)

Sol. (A) 

(B) 

(C) 

(D) 

31. Ans. (D)