

+2

GRAND TEST - 6

TEST - 18

Oxygen Containing Organic Compound

Test Date: 22.10.2018 (Monday)

Time: 11:30 AM to 1:30 PM

Empowered By:

TEST SERIES

PCB
QUANTUM⁺
Plus

PCM
INTELLIQUEST



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INSTRUCTIONS

- **Test Duration: 11: 30 AM to 1:30 PM.**
- **This test consists of 2 Levels. Total Marks 426.**

Level – I

Time: 60 Minutes [11:30 AM to 12:30 PM]

45 Qs. \times 4 = 180 Marks

(Single Answer Type) [Negative Marking = – 1]

Level – II

Time: 60 Minutes [12:30 PM to 1:30 PM]

48 Qs = 246 Marks

- **Assertion & Reason [Negative Marking (-1)] = $8 \times 4 = 32$ Marks**
 - **Comprehension Type [Negative Marking (-1)] = $9 \times 4 = 36$ Marks**
 - **More than One Answer [No Negative Marking] = $6 \times 5 = 30$ Marks**
 - **Matrix Match Type [No Negative Marking] = $2 \times 8 = 16$ Marks**
 - **Integer Type [No Negative Marking] = $10 \times 5 = 50$ Marks**
- **Every candidate will get 2 OMR Sheets for answering Level – I and Level – II separately. The candidate will start with Level – I first and return Level I OMR sheet immediately at 12:30 pm after 60 minutes. So please ensure to fill up OMR on time.**
 - **OMR sheet for Level – II will be collected immediately after completion of test time at 1:30 pm.**
 - **Usage of Mobile is strictly prohibited in the examination hall. The mobile must be kept switched off during exam time. Anybody seen using or fiddling with mobile phone will get disqualified for the test.**
 - **Unfair means of any sort during exam will entail cancellation and disqualification of his/her paper.**
 - **Answer Key will be given only after completion of paper. Detailed solutions will be uploaded on website.**

“BEST OF LUCK”

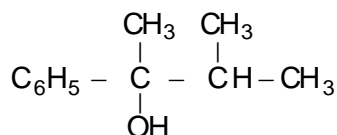
Topic: Oxygen Containing Organic Compound
Test Date: 22.10.2018 (Monday)

Level – 1

(Single Correct Choice Type) Negative Marking [-1]

This Section contains **45 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **Marks: 45 × 4 = 180**

1. Which set of the following reagents would you select to convert $C_6H_5COCH_3$ to the following alcohol



- a. $CH_3 \cdot (CH_2)_2 \cdot MgBr$ and acid hydrolysis
 b. $(CH_3)_2 \overset{\overset{Br}{|}}{CH}, AlCl_3$
 c. $(CH_3)_2CHMgBr$ and acid hydrolysis
 d. $(CH_3)_2CH(OH), Zn$
C
2. Which of the following is incorrect reagent used to distinguish the pair of compound

Column – I		Column II (Reagent)	
A.	$CH_3 - CH_2 - NH_2$ & $CH_3 - NH - CH_3$	a.	HNO_2
B.	$CH_3 - \overset{\overset{O}{ }}{C} - CH_3$ & CH_3CHO	b.	DNP
C.	CH_3COOH & $CH_3COOC_2H_5$	c.	$NaHCO_3$
D.	C_2H_5OH & CH_3OH	d.	Iodoform

B

Sol. Both will give DNP Test

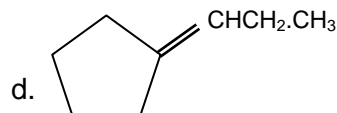
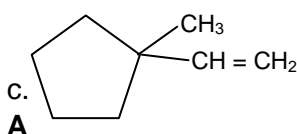
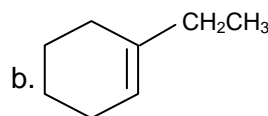
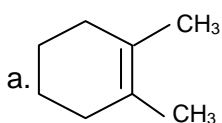
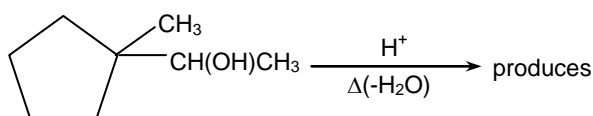
3. Which of the following alcohol on heating with Cu will give alkene

- a. $(CH_3)_3COH$ b. $(CH_3)_2CH - OH$ c. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH_2OH$ d. $CH_3 - CH_2OH$

A

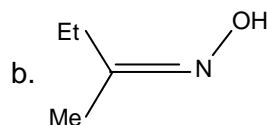
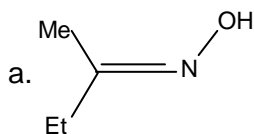
Sol. 3° substrate forms alkene

4. The dehydration reaction



A

5. A ketoxime on Beckmann rearrangement gives N-methyl propanamide. The configuration of ketoxime is

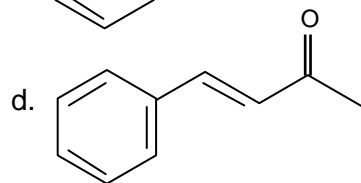
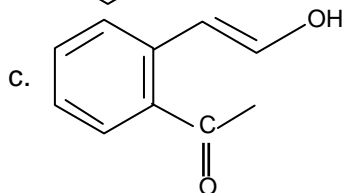
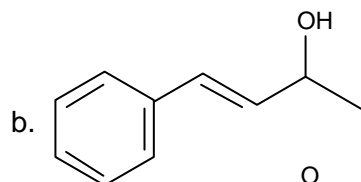
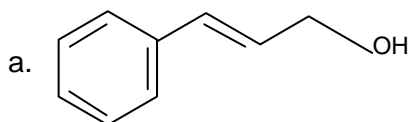


c. Both of these

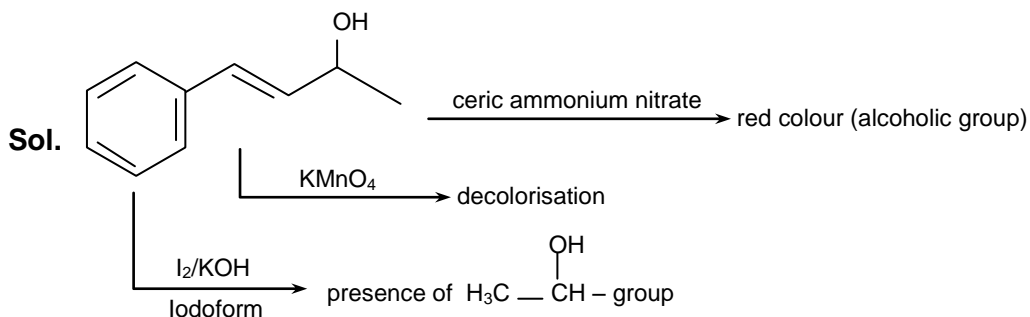
d. None of the above

B

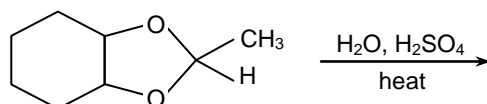
6. An organic compound containing one oxygen gives red colour with ceric ammonium nitrate solution decolourise alkaline potassium permanganate solution, responds to iodoform test and shows geometrical isomerism. The compound is



B



7. What are the products of the following reaction?



- a. Cyclohexanol and ethanol
c. Cyclohexanol and ethanal

- b. 1, 2-cyclohexanediol and ethanal
d. 1, 2-cyclohexanediol and ethanol

B

8. The compound which will not react with sodium is

- a. C_2H_5OH
c. $CH_3 - O - CH_3$

- b. $CH_3CHOH - CH_3$
d. $CH_3 - COOH$

C

9. Which of the following does not give brick red precipitate with Fehling's solution

- a. Acetaldehyde
c. D glucose

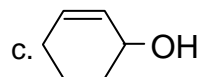
- b. Formalin
d. Acetone

D

10. Chromic anhydride in H_2SO_4 is turned blue by:

a. 1° alcohol

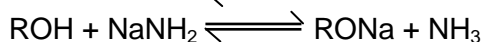
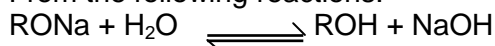
b. 2° alcohol



d. all

D

11. From the following reactions.



Predict which of the following orders regarding base strength is correct:

a. $\text{OH}^- < \text{NH}_2^- < \text{RO}^-$

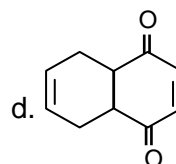
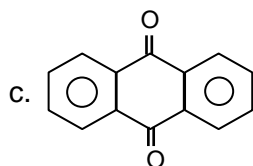
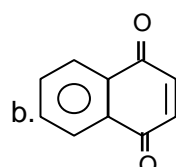
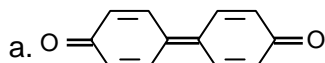
b. $\text{NH}_2^- < \text{OH}^- < \text{RO}^-$

c. $\text{OH}^- < \text{RO}^- < \text{NH}_2^-$

d. $\text{RO}^- < \text{NH}_2^- < \text{OH}^-$

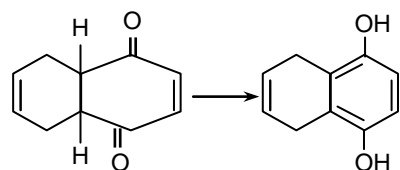
C

12. Which will show tautomerism:

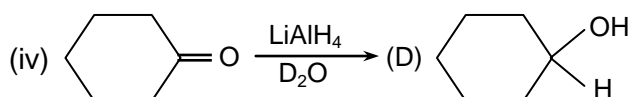
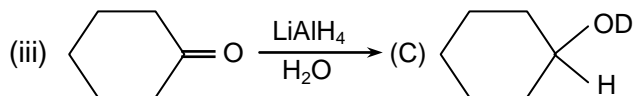
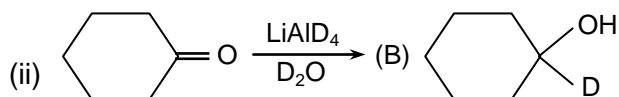
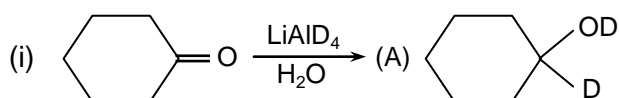


D

Sol. Rest have no α - H



13. Match the list:



a. (i) - A, (ii) - B, (iii) - C, (iv) - D

b. (i) - B, (ii) - A, (iii) - D, (iv) - C

c. (i) - C, (ii) - B, (iii) - D, (iv) - A

d. (i) - C, (ii) - A, (iii) - D, (iv) - B

B

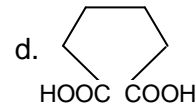
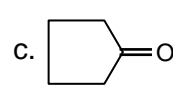
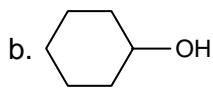
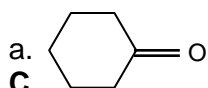
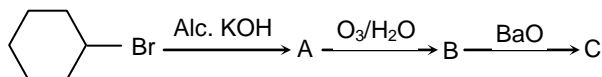
14. The IUPAC name of $\text{ClCH}_2\text{C}(\text{CH}_2\text{CH}_3)=\text{CHCH}_2\text{OH}$ is:

- a. 5-chloro-3-penten-3-carbinol
c. 4-chloro-2-ethyl-2-buten-1-ol

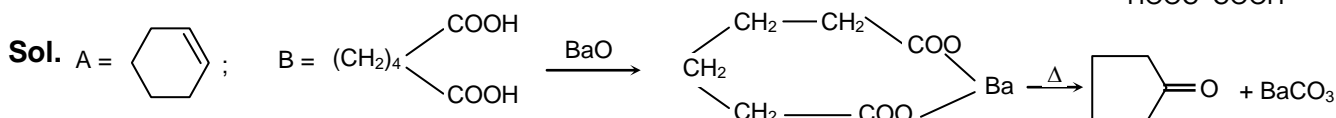
- b. 1-chloro-3-penten-3-carbinol
d. 1-chloro-3-ethyl-2-buten-4-ol

C

15. End products of following sequence of reaction:



C



16. Oxidation of benzyl chloride with $\text{Pb}(\text{NO}_3)_2$ gives

a. benzoic acid

b. benzene

c. benzaldehyde

d. none of these

C

17. The conversion $\text{CH}_3\text{CH}=\text{CHCHO} \rightarrow \text{CH}_3\text{CH}=\text{CHCH}_2\text{OH}$ can be effected with

a. Ni/H_2

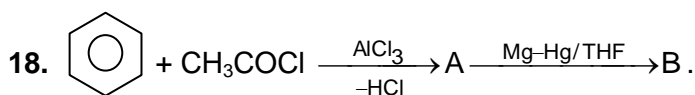
b. 9 BBN

c. $\text{Zn}/\text{Hg}/\text{HCl}$

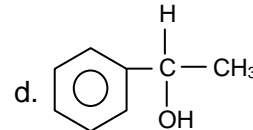
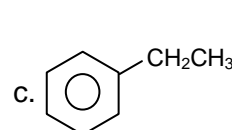
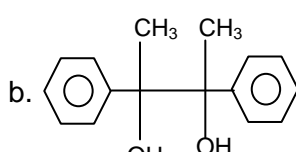
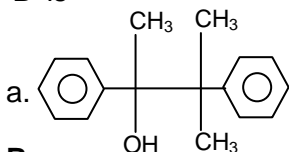
d. None of these

B

Sol. HCl will react with double bond.

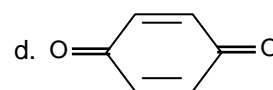
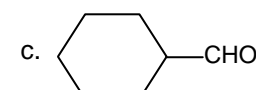
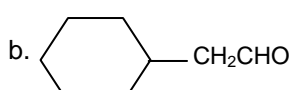
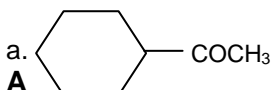
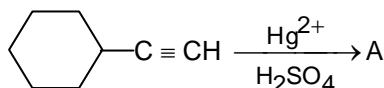


'B' is



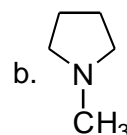
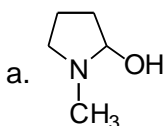
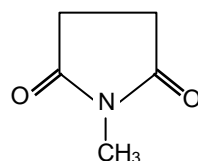
B

19. What is A in the following reaction?



A

20. The product formed in the reaction is



c. $\text{CH}_3\text{NH}(\text{CH}_2)_3\text{CHO}$

d. $\text{CH}_3\text{NH}(\text{CH}_2)_3\text{CH}_2\text{OH}$

B

21. Phenol is least reactive for aromatic nucleophilic substitution because:

- Carbon–oxygen bond has some double bond character due to resonance
- Oxygen is present on sp^2 – hybrid carbon which makes carbon – oxygen bond stronger
- Oxygen is highly electronegative which decreases bond length between carbon and oxygen
- All are correct

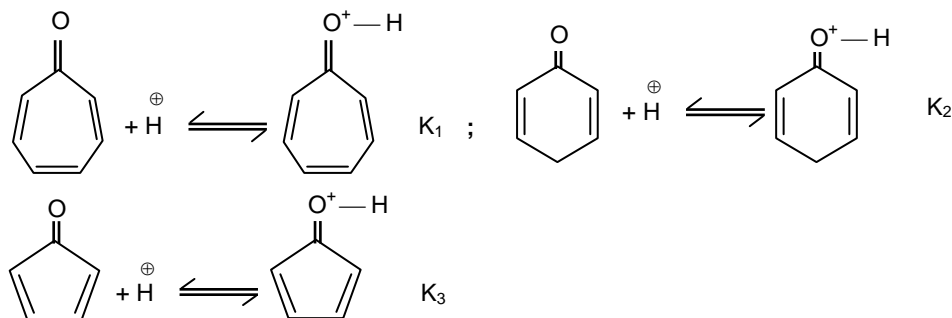
D

22. $(CH_3)_2C = CHCOCH_3$ can be oxidised to $(CH_3)_2C = CHCOOH$ by

- Chromic acid
- NaOI
- Cu at $300^\circ C$
- $KMnO_4$

B

23. In the following reactions



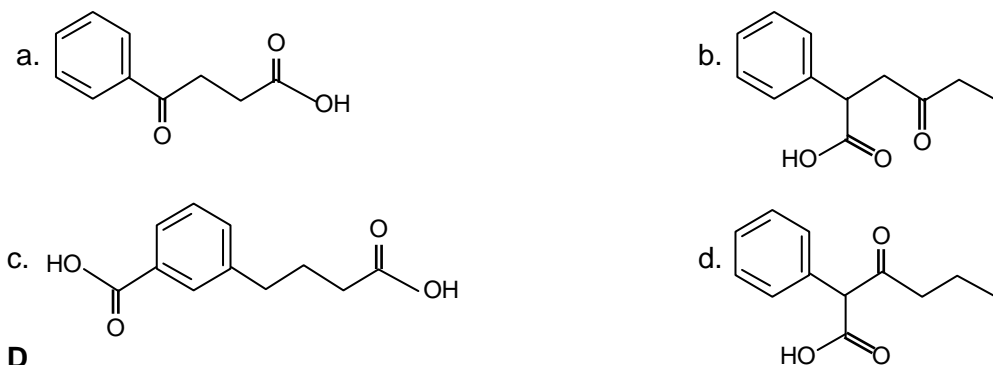
Which one is correct order?

- $K_1 > K_2 > K_3$
- $K_3 > K_2 > K_1$
- $K_1 > K_3 > K_2$
- $K_1 = K_2 = K_3$

A

Sol. 1st is Aromatic & III is antiaromatic

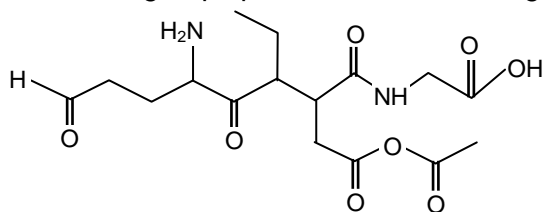
24. Which of the following undergoes decarboxylation most readily on being heated?



D

Sol. β -Keto Acid

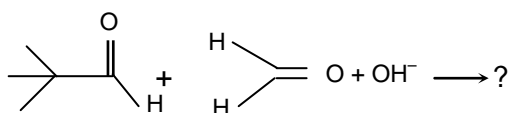
25. No. of functional groups present in the following compounds is:

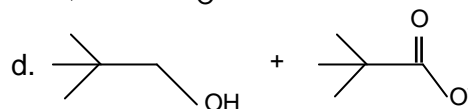
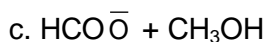
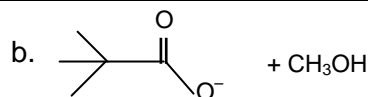
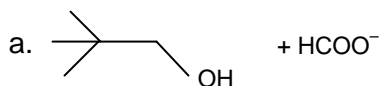


- 5
- 7
- 6
- 8

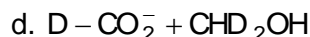
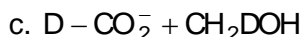
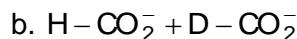
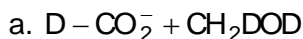
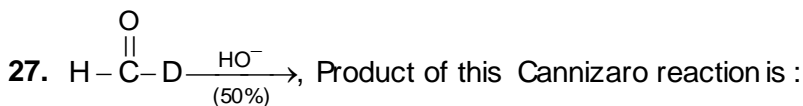
C

26. Which of the following is a product (s) of following reaction?

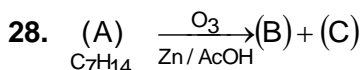




A

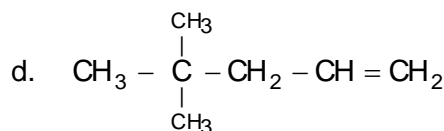
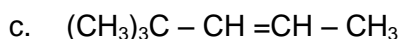
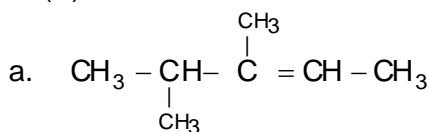


C

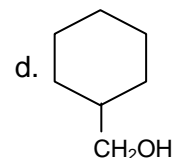
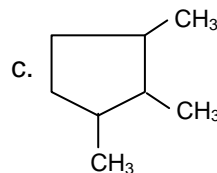
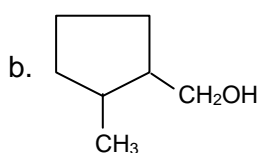
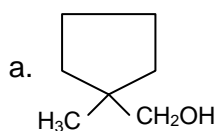
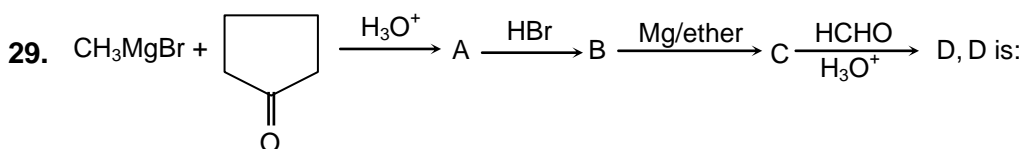
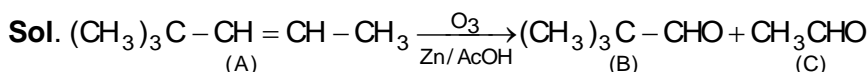


Compound (A) exist in Geometrical isomers and (B) gives Cannizaro reaction:

\therefore (A) will be:



C



A

30. Thiols are alcohol analogs in which the oxygen has been replaced by sulphur (e.g., CH_3SH). Given the fact that the S-H bond is less polar than the O-H bond, which of the following statements comparing thiols and alcohols is correct?

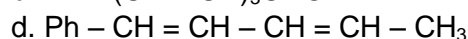
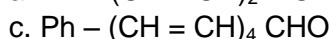
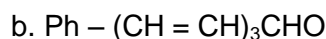
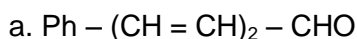
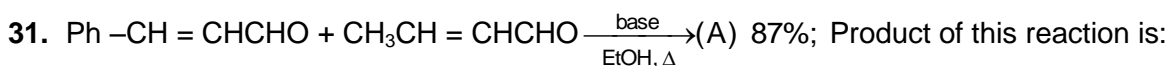
a. Hydrogen bonding is weaker in thiols

b. Hydrogen bonding is stronger in thiols

c. Hydrogen bonding would be the same in both

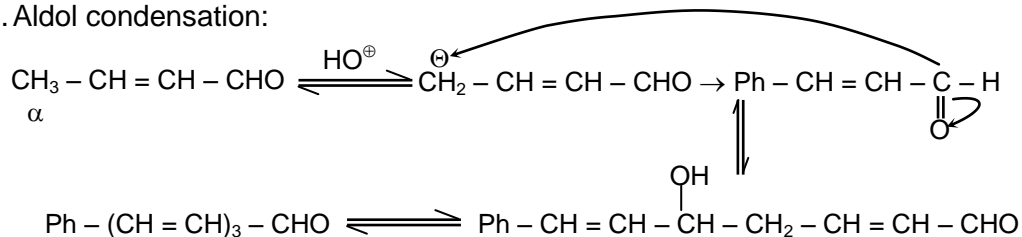
d. No comparison can be made without additional information

A

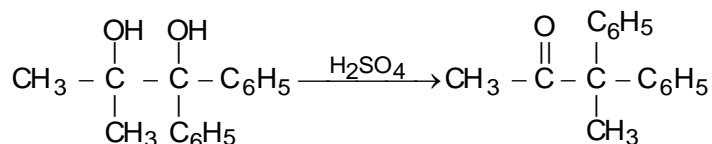


B

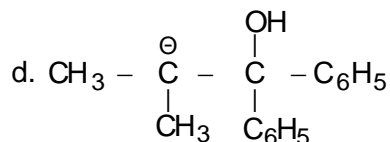
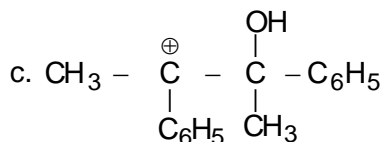
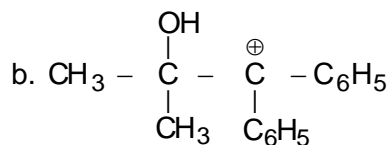
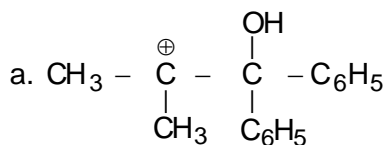
Sol. Aldol condensation:



32. In the given reaction

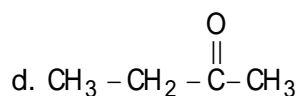
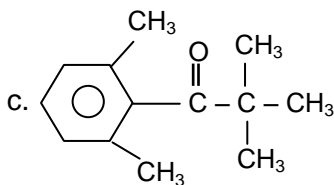
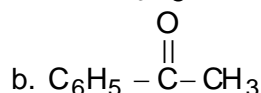
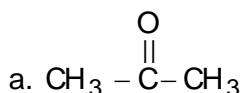


the reaction intermediate is :



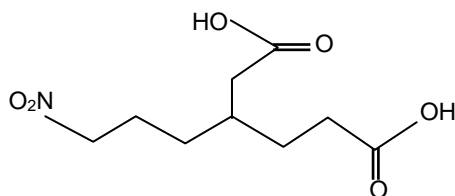
B

33. Which one of the following ketones does not react with CH_3MgX :



C

34. The correct IUPAC name of the following compound is:



a. 7-nitro-4(carboxymethyl) heptanoic acid

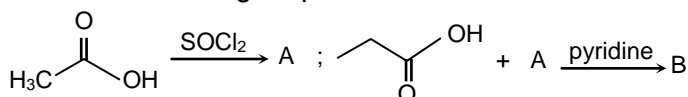
b. 6-nitro-3-(carboxy ethyl) hexanoic acid

c. 4-(3-nitropropyl)hexane-1, 6-dioic acid

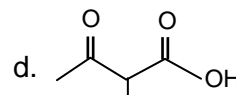
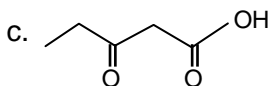
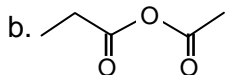
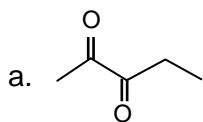
d. 3-(3-nitro propyl) hexane-1, 6-dioic acid

D

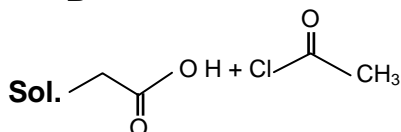
35. Consider the following sequence of reactions.



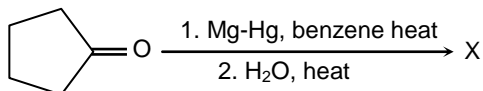
The final product (B) has the structure



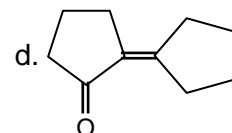
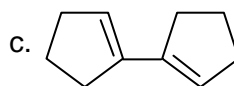
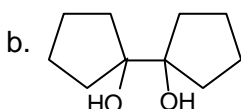
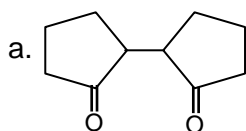
B



36. In the reaction

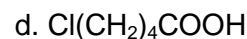
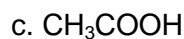
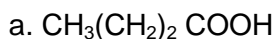


the product (X) is



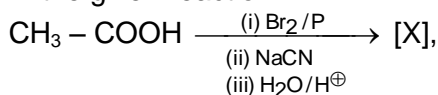
C

37. Rate of esterification is highest for the acid :

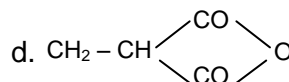
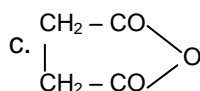
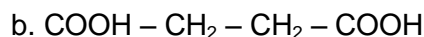
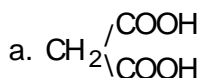


C

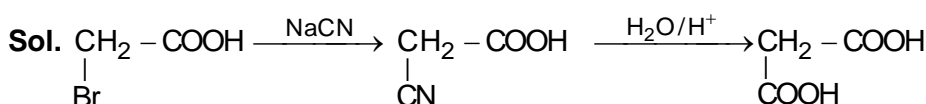
38. In the given reaction :



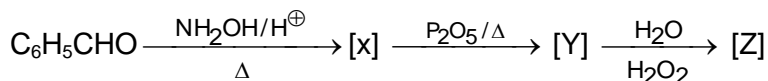
[X] will be



A



39. In the reaction sequence



[X], [Y] and [Z] respectively be

- a. $\text{C}_6\text{H}_5\text{CH} = \text{NOH}$, $\text{C}_6\text{H}_5\text{CN}$, $\text{C}_6\text{H}_5\text{COOH}$
 b. $\text{C}_6\text{H}_5\text{CH} = \text{NOH}$, $\text{C}_6\text{H}_5\text{CONH}_2$, $\text{C}_6\text{H}_5\text{COOH}$
 c. $\text{C}_6\text{H}_5 - \text{CH} = \text{NOH}$, $\text{C}_6\text{H}_5\text{COOH}$, $\text{C}_6\text{H}_5\text{CONH}_2$
 d. $\text{C}_6\text{H}_5 - \text{CH} = \text{NOH}$, $\text{C}_6\text{H}_5\text{CN}$, $\text{C}_6\text{H}_5\text{CONH}_2$

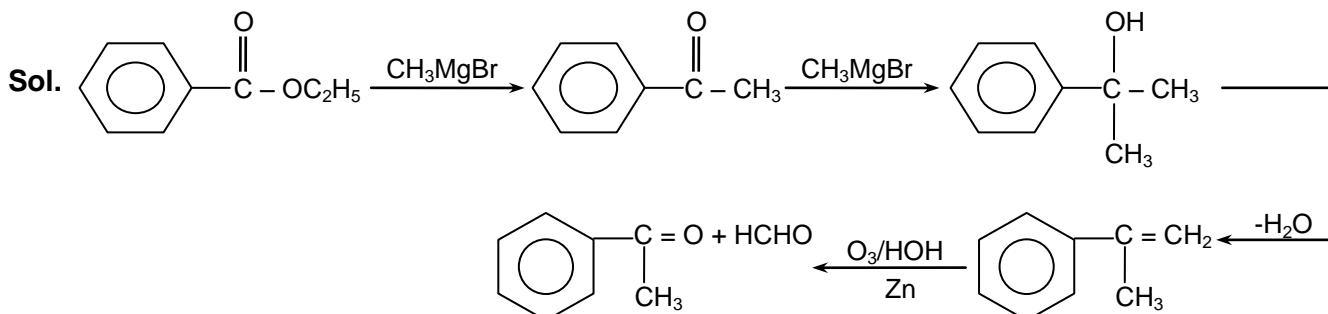
D

40. An ester (A) with molecular formula $\text{C}_9\text{H}_{10}\text{O}_2$ was treated with excess of CH_3MgBr and the compound so formed was treated with conc. H_2SO_4 to form olefin (B). Ozonolysis of B gave ketone with formula $\text{C}_8\text{H}_8\text{O}$ which shows iodoform test positive. The structure of A is:

- a. $\text{C}_6\text{H}_5\text{COOC}_2\text{H}_5$
c. $\text{CH}_3\text{CO} - \text{C}_6\text{H}_5 - \text{COCH}_3$

- b. $\text{CH}_3\text{OCH}_2\text{COC}_6\text{H}_5$
d. $\text{C}_6\text{H}_5\text{COOC}_6\text{H}_5$

A



Give iodoform

41. The refluxing of $(\text{CH}_3)_2\text{NCOCH}_3$ with H_3O^+ gives :

- a. $2\text{CH}_3\text{NH}_2 + \text{CH}_3\text{COOH}$
c. $(\text{CH}_3)_2\text{NH} + \text{CH}_3\text{COOH}$

- b. $2\text{CH}_3\text{OH} + \text{CH}_3\text{CONH}_2$
d. $(\text{CH}_3)_2\text{NCOOH} + \text{CH}_4$

C

Sol. Amide is hydrolysed to $(\text{CH}_3)_2\text{NH}$ & CH_3COOH

42. Which compound will be formed when ethylacetate and excess of ethyl magnesium bromide allowed to react and product is hydrolysed?

- a. 3-Ethyl-3-pentanol
c. hexan-3-ol

- b. 3-Methyl-3-pentanol
d. 2-Methyl-2-propanol

B

43. Silver acetate + $\text{I}_2 \xrightarrow{\text{CS}_2} \dots$. The main product formed in the reaction is:

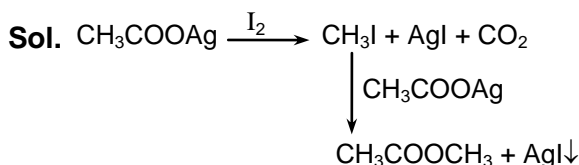
- a. CH_3I

- b. CHI_3

- c. CH_3COI

- d. $\text{CH}_3\text{COOCH}_3$

D



44. Which pair of reagent/name (or reaction) has been matched wrongly?

- a. Zn(Hg)/conc. HCl
b. $\text{N}_2\text{H}_4/\text{glycol, KOH}$
c. Na/ $\text{NH}_3(\ell)$

- Name
Clemmensen
Wolf Kischner
Birch reduction
Benedict Reagent tartarate

D

45. In the given reaction $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel} \text{C} - \overset{\text{OH}}{\text{CH}} - \text{C}_6\text{H}_5 \xrightarrow[\text{HCl}]{\text{Zn/Hg}} [\text{X}]$ X is :

- a. $\text{C}_6\text{H}_5 - \text{CH}_2 - \overset{\text{OH}}{\text{CH}} - \text{C}_6\text{H}_5$
c. $\text{C}_6\text{H}_5 - \text{CHCl} - \text{CH}_2 - \text{C}_6\text{H}_5$

- b. $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_2 - \text{C}_6\text{H}_5$
d. $\text{C}_6\text{H}_5 - \text{CHOH} - \text{CHOH} - \text{C}_6\text{H}_5$

C

LEVEL – 2**Section – A (Single Correct Choice Type) Negative Marking [-1]**

This Section contains **14 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **14 × 5 = 70 Marks**

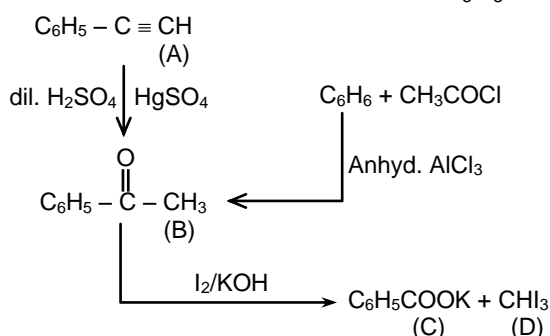
1. Reaction of 'A' with H_2SO_4 dil./ HgSO_4 Gives a compound (B), which can also be obtained from a reaction of Benzene with acid chloride in the presence of anhydrous AlCl_3 . The compound (B) when treated with iodine in aq. KOH , yields C and a yellow compound (D). A, B, D are respectively

- a. $\text{C}_6\text{H}_5 - \text{C} \equiv \text{CH}$, $\text{C}_6\text{H}_5 - \text{COOH}$, C_6H_6 b. $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$, $\text{C}_6\text{H}_5 - \text{C} \equiv \text{CH}$, $\text{C}_6\text{H}_5 - \text{COOK}$
 c. $\text{C}_6\text{H}_5\text{C} \equiv \text{CH}$, $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$, CHI_3 d. C_6H_6 , $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$, CHI_3

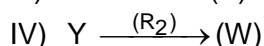
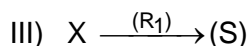
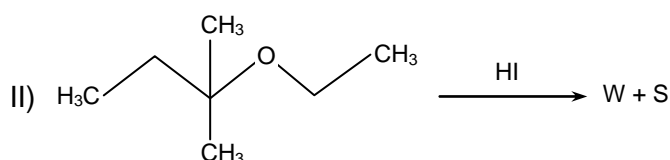
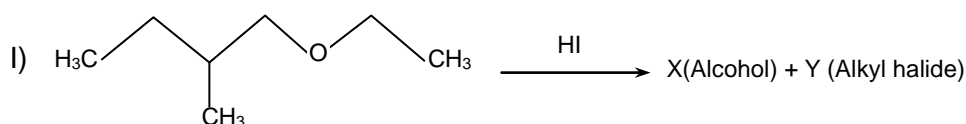
C

Sol. Formation of (B) from benzene and acid chloride in the presence of anhydrous AlCl_3 indicates that it is a ketone. Formation of yellow compound (D) by reaction of 'B' with I_2/KOH (Iodoform test) indicates

that 'B' is a methyl ketone. Hence 'B' is $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$. Reaction of 'A' with H_2SO_4 dil./ HgSO_4 to give ketone indicates that 'A' must be $\text{C}_6\text{H}_5 - \text{C} \equiv \text{CH}$.



2. Observe the following reactions



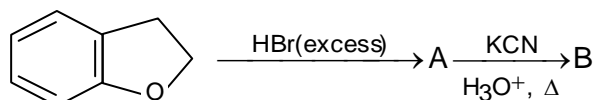
The reagents R_1 and R_2 can be respectively.

- a. $\text{NaI}/\text{Acetone}$, aq. AgNO_3 b. aqueous KOH , HI
 c. aq. AgNO_3 , $\text{NaI}/\text{Acetone}$ d. HI , aqueous KOH

D

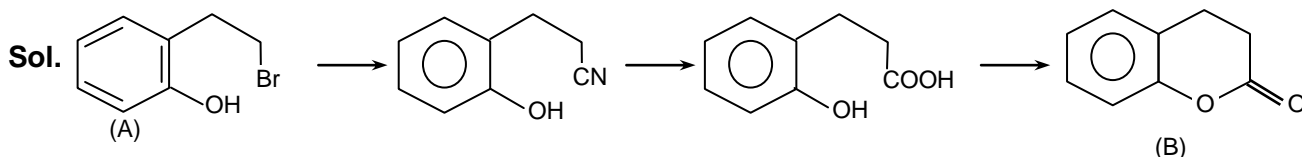
Sol. $X = \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ $Y = \text{CH}_3\text{CH}_2\text{I}$ $S = \text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ $W = \text{CH}_3\text{CH}_2\text{OH}$

3. What is the product of the following reaction?



- a. b. c. d.

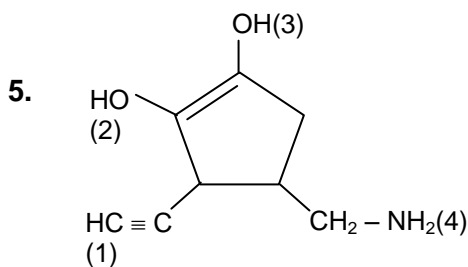
D



4. An optically active alcohol (P) $\text{C}_6\text{H}_{10}\text{O}$ upon catalytic hydrogenation absorbs two moles of hydrogen per mole of (P) and gives a product (Q). The compound (Q) is optically inactive and resistance to oxidation by CrO_3 . Structures of (P) and (Q) respectively are

- a. $\text{CH}=\text{CH}-\underset{\text{CH}_3}{\overset{\text{CH}=\text{CH}_2}{\text{C}}}-\text{OH}$, $\text{CH}_3\text{CH}_2\text{CH}_2-\underset{\text{CH}_3}{\overset{\text{CH}_2\text{CH}_3}{\text{C}}}-\text{OH}$
- b. $\text{HC}\equiv\text{C}-\underset{\text{CH}_3}{\overset{\text{C}_2\text{H}_5}{\text{C}}}-\text{OH}$, $\text{C}_2\text{H}_5-\underset{\text{CH}_3}{\overset{\text{C}_2\text{H}_5}{\text{C}}}-\text{OH}$
- c. $\text{CH}_3-\underset{\text{C}_2\text{H}_5}{\overset{\text{C}_2\text{H}_5}{\text{C}}}-\text{OH}$, $\text{CH}_3-\underset{\text{OH}}{\overset{\text{C}_2\text{H}_5}{\text{C}}}-\text{C}\equiv\text{CH}$
- d. $\text{C}_2\text{H}_5-\underset{\text{H}}{\overset{\text{CH}_2\text{OH}}{\text{C}}}-\text{C}\equiv\text{CH}$, $\text{CH}_3\text{CH}_2-\underset{\text{CH}_2\text{OH}}{\text{CH}}-\text{CH}_2\text{CH}_3$

B

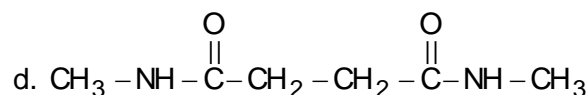
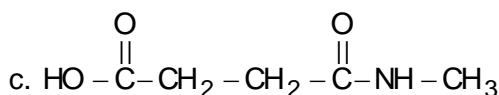
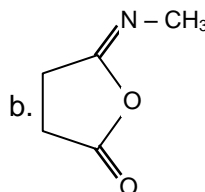
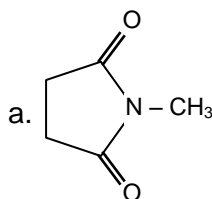
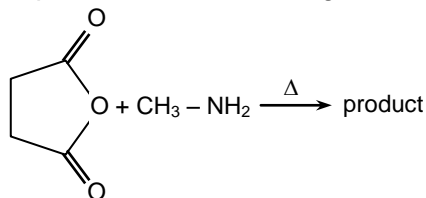


Arrange the hydrogens in the decreasing order of acidity.

- a. $1 > 2 > 3 > 4$ b. $4 > 3 > 2 > 1$ c. $2 > 3 > 1 > 4$ d. $2 > 3 > 4 > 1$

C

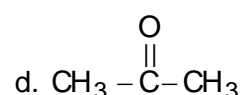
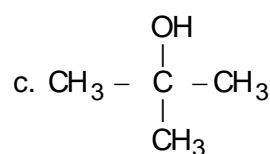
6. Which is the major product of the following reaction?



A

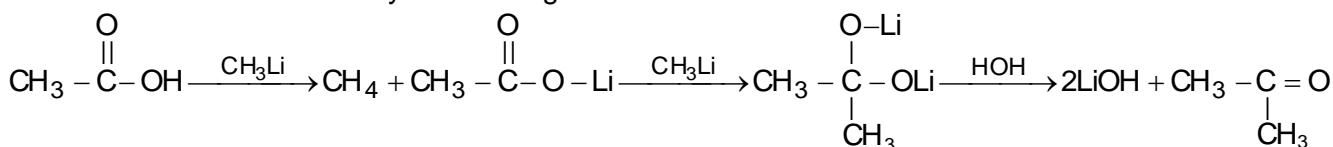
7. In the given reaction: $\text{CH}_3\text{COOH} \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) CH}_3\text{Li (excess)}} [\text{X}]$

[X] is:

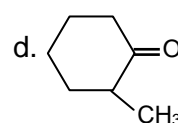
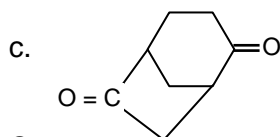
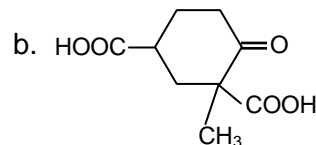
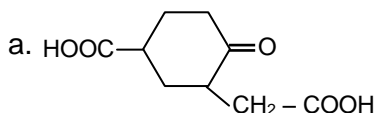
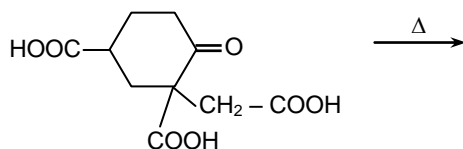


D

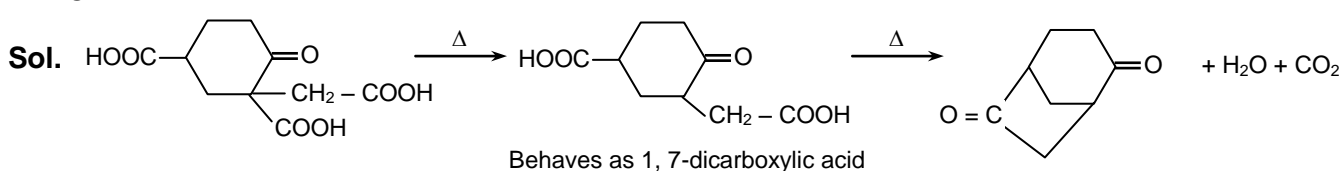
Sol. Acid reacts with excess of alkyl lithium to give ketone



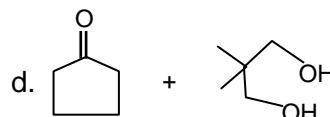
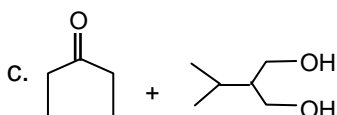
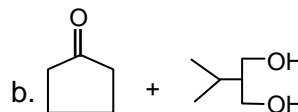
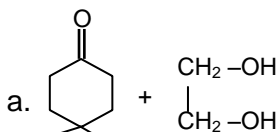
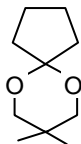
8. In the given reaction, the product is:



C

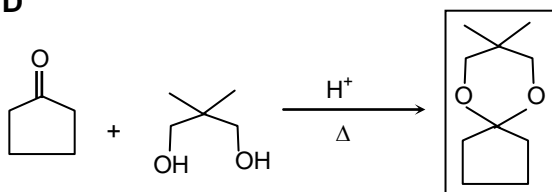


9. Which pair of reactants compounds may be used to make given acetal?



D

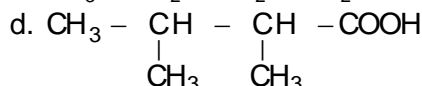
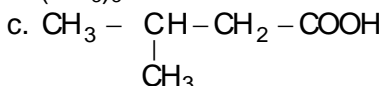
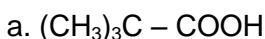
Sol.



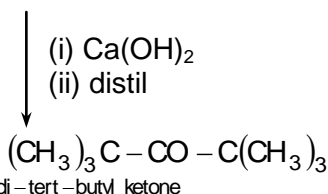
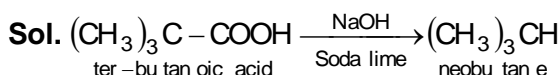
10. An organic compound of molecular formula $\text{C}_5\text{H}_{10}\text{O}_2$ gives the following properties.

- It evolves effervescence with NaHCO_3 solution
- Its sodium salt when fused with soda lime gives neobutane.
- Its calcium salt when distilled gives di-ter-butyl ketone.

The structure of the original compound is



A



Since the compound liberates CO_2 with NaHCO_3 solution, it is an acid. It forms only one monochloro product, shows that it contains only one type of alkyl group and it may be $(\text{CH}_3)_3\text{C}-\text{COOH}$. This is proved by its conversion to neobutane and di-ter-butyl ketone.

In each of the following questions three statements are given. Mark the correct answer as per following instructions

- All are correct
- If all are wrong
- If II and III is correct
- If I and II are correct

11. I. Hydrolysis of methylisocyanide produces formic acid.
 II. Oxidation of benzyl chloride with $\text{Pb}(\text{NO}_3)_2$ produces benzaldehyde
 III. Hydrogenation of Benzoyl chloride in the presence of $\text{Pd}-\text{BaSO}_4$ produces benzaldehyde.

- (a)
- (b)
- (c)
- (d)

A

12. I. Acetone gives tertiary butyl alcohol on reduction.
II. Acetone gives acetic acid on drastic oxidation.
III. Acetone undergoes bimolecular reduction with $\text{Mg-Hg/H}_2\text{O}$.

a. (a) b. (b) c. (c) d. (d)

C

13. I. $\text{HO}-\text{C} \begin{array}{l} \nearrow \text{NH} \\ \searrow \text{NH}_2 \end{array}$ is imide form of urea.

II. Conc. H_2SO_4 and formic acid react to form carbon monoxides gas
III. pK_a of chloroacetic acid is higher than that of benzoic acid.

a. (a) b. (b) c. (c) d. (d)

D

14. I. Tartaric acid does not contain $-\text{COOH}$ group at all
II. Crotonic acid does not decolourise bromine dissolved in CS_2 .
III. Alkane with same number of C atoms cannot be produced from carboxylic acid.

a. (a) b. (b) c. (c) d. (d)

B

SECTION – B (ASSERTION & REASON)

This Section contains **10 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **(10 × 5 = 50 Marks)**

- (a) Mark **A** if both **A** and **R** are correct and **R** is the correct reason of **A**.
(b) Mark **B** if both **A** and **R** are correct and **R** is not the correct reason of **A**.
(c) Mark **C** if **A** is correct and **R** is wrong.
(d) Mark **D** if **A** is wrong and **R** is correct.

1. **Assertion** : Boiling points of esters are higher than corresponding isomeric carboxylic acid .
Reason : Acid molecule dimerise in non-aqueous solutions.

a. (A) b. (B) c. (C) d. (D)

D

2. **Assertion**: Relative reactivity of acid derivatives to nucleophilic acyl substitution is :
acid chloride > anhydride > amide > ester
Reason: Weaker the conjugate base, better the leaving group, more the reactive it is.

a. (A) b. (B) c. (C) d. (D)

D

3. **Assertion**: Iodoform is obtained by the reaction of acetone with hypoiodite and not with iodide.
Reason: OI^- is an oxidizing agent as well as an iodinating agent.

a. (A) b. (B) c. (C) d. (D)

B

4. **Statement – 1**: Cyclopentane-1,2-dione has more stable keto form than butane-2,3-dione.
Statement – 2: In butane-2,3-dione keto form have two keto groups at anti position

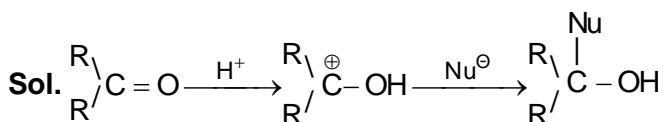
a. (A) b. (B) c. (C) d. (D)

D

5. **Assertion**: Diisopropyl ketone is more reactive than acetone.
Reason: Acidic medium makes the carbonyl group more susceptible to nucleophilic attack.

a. (A) b. (B) c. (C) d. (D)

D



6. **Assertion:** Hydroxy ketones are not directly used in Grignard reaction.]

Reason: Grignard reagents react with hydroxyl group.

- a. (A) b. (B) c. (C) d. (D)

A

7. **Assertion:** Fumaric acid and maleic acid both have two — COOH groups, one $\diagup C = C \diagdown$ yet their acidic strength is different.

Reason: Maleic acid after the loss of H^+ is stabilized due to intramolecular H-bonding, so ease of release of H^+ is easier in maleic acid as compare to fumaric acid.

- a. (A) b. (B) c. (C) d. (D)

A

8. **Assertion:** β -keto butyric acid is esterified faster than butyric acid.

Reason: Groups increasing the intensity of +ve charge on acidic C-atom to increase the reactivity towards esterification $\diagup C = O$ group being e^- withdrawing increases +ve charge so esterified faster than butyric acid.

- a. (A) b. (B) c. (C) d. (D)

A

9. **Assertion:** Group like $-NO_2$, $-CN$, $\begin{array}{c} -C- \\ || \\ O \end{array}$

attached at α - C-atom to $-COOH$ group makes decarboxylation faster.

Reason: Strong e^- withdrawing group at α - C-atom facilitates the decarboxylation due to stable carbocation.

- a. (A) b. (B) c. (C) d. (D)

C

10. **Assertion :** m-Nitrobenzoic acid is less stronger acid as compared to p-nitrobenzoic acid.

Reason : Acetic acid is stronger acid than benzoic acid but formic acid is still stronger than both.

- a. (A) b. (B) c. (C) d. (D)

C

SECTION – C (Paragraph Type)

This Section contains **2 paragraph**. Each of these questions has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **6 × 5 = 30 Marks**

Passage – 1

Aldehydes and ketones have sp^2 hybridised carbon and they undergo nucleophilic addition reactions. Aldehydes are more reactive than ketones. Aldehydes and ketones having at least one α -hydrogen undergo aldol condensation, while aldehydes with no α -hydrogen undergo Cannizzaro reaction. Ketones do not undergo Cannizzaro reaction

1. The products of the action of concentrated alkali on a mixture of formaldehyde and benzaldehyde are

- a. sodium benzoate, methanol b. benzylalcohol, sodium formate
c. sodium benzoate, sodium formate d. benzylalcohol, methanol

B

2. The product of reaction between benzaldehyde and malonic ester $\left(\text{CH}_2 \begin{matrix} \nearrow \text{COOC}_2\text{H}_5 \\ \searrow \text{COOC}_2\text{H}_5 \end{matrix} \right)$ in presence of pyridine followed by acid hydrolysis and heating is

- a. $\text{C}_6\text{H}_5 - \text{CH}(\text{OH}) - \text{CH}_2 - \text{COOH}$ b. $\text{C}_6\text{H}_5 - \text{CH} = \text{CH} - \text{COOH}$
 c. $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$ d. $\text{C}_6\text{H}_5 - \text{CH} = \text{CH} - \text{C}_6\text{H}_5$

B

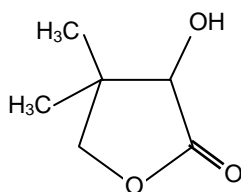
3. The product/s of reaction in alkaline medium between acetophenone and benzaldehyde is/are

- a. $\text{C}_6\text{H}_5\text{COOH}$ and $\text{C}_6\text{H}_5\text{CHOCH}_3$ b. $\text{C}_6\text{H}_5 - \text{CH} = \text{CH} - \text{CO} - \text{C}_6\text{H}_5$
 c. $\text{C}_6\text{H}_5 - \text{CO} - \text{CH}_2 - \text{CH}_2 - \text{C}_6\text{H}_5$ d. $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ and $\text{C}_6\text{H}_5 - \text{CHOH} - \text{CH}_3$

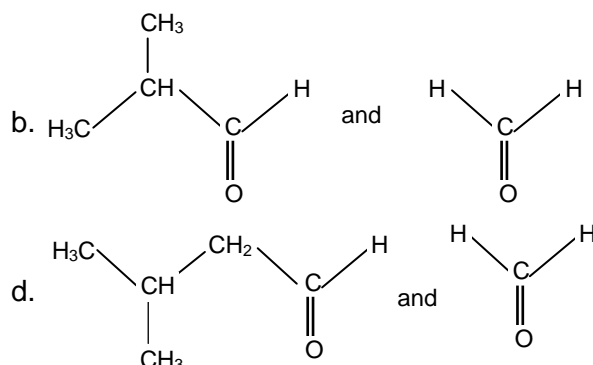
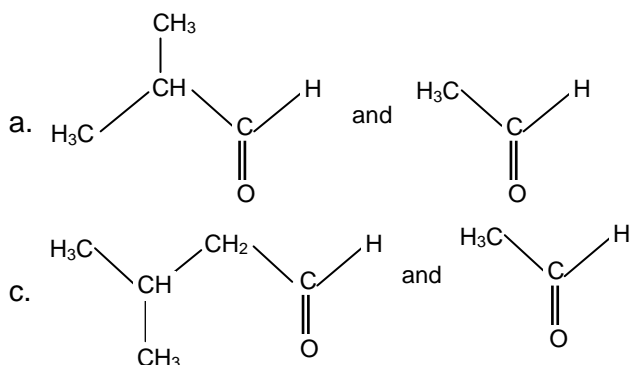
B

Passage -2

Two aliphatic aldehydes P and Q react in the presence of aqueous K_2CO_3 to give compound R, which upon treatment with HCN provides compounds S. On acidification and heating, S gives the product shown below:

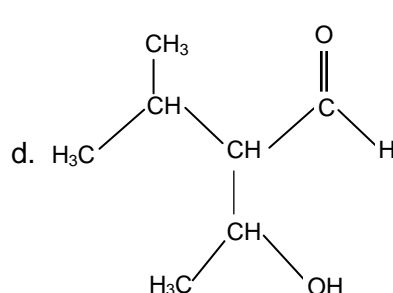
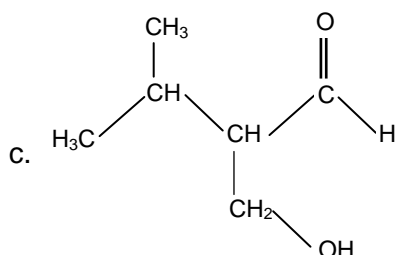
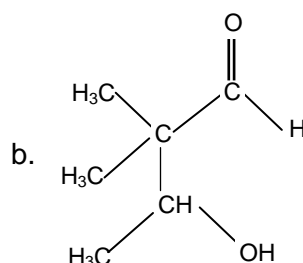
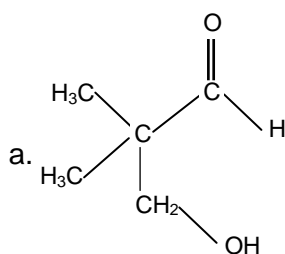


4. The compounds P and Q respectively are



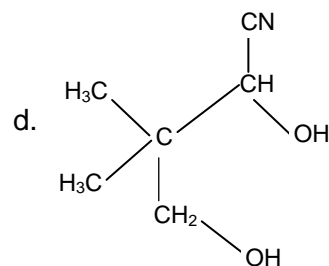
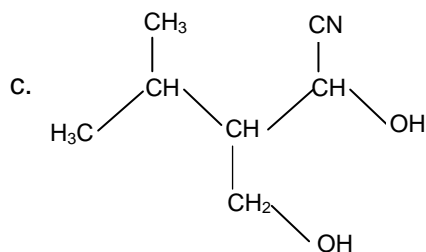
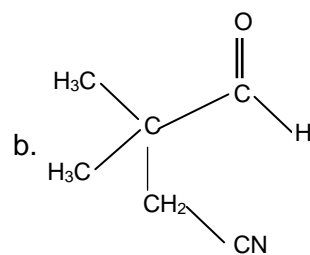
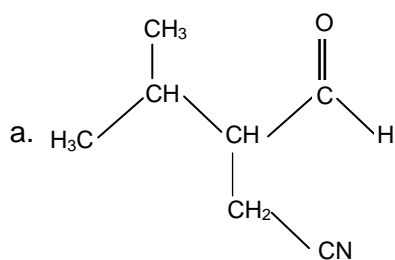
B

5. The compound R is

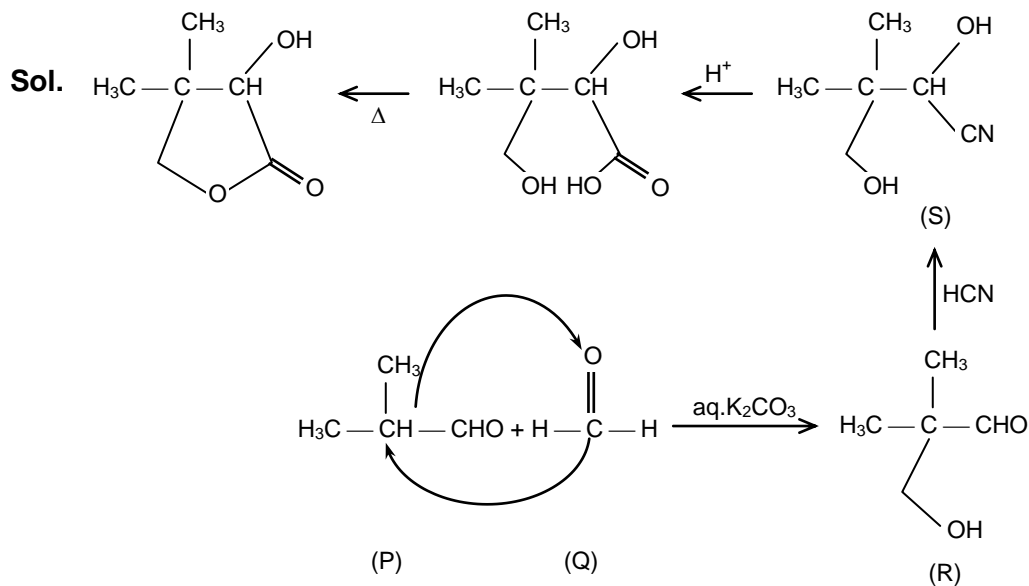


A

6. The compound S is

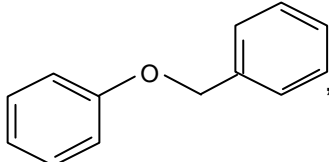


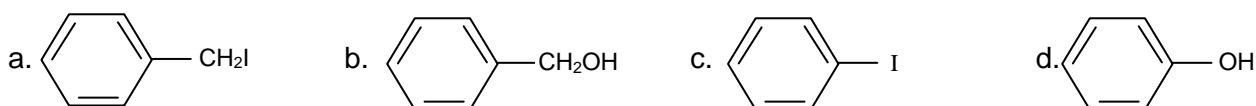
D



SECTION – D (More than One Answer Type) No Negative Marking

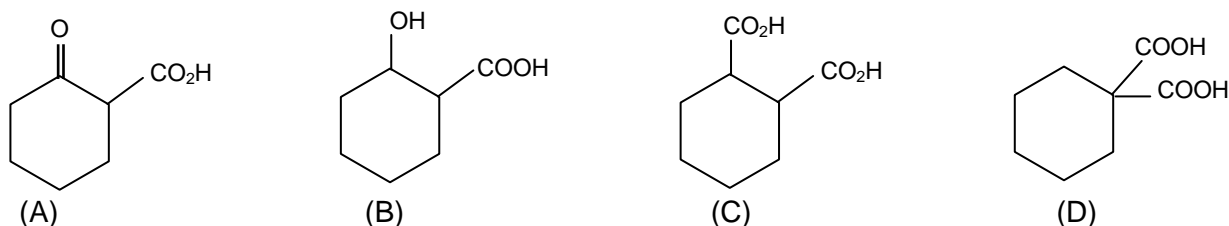
This Section contains **5 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **One or More than one answer** may be correct. **8 × 5 = 40 Marks**

1. The ether , when treated with HI produces



A, D

2. Which of the following undergo decarboxylation upon heating?



- a. A b. B c. C d. D

A, D

3. Which of the following process is involved in Reimer Tiemann's reaction

- a. Nucleophilic substitution b. Carbene intermediate
c. Rearrangement d. Electrophilic substitution

A, B, C, D

4. Formic acid and acetic acid can be distinguished by the action of

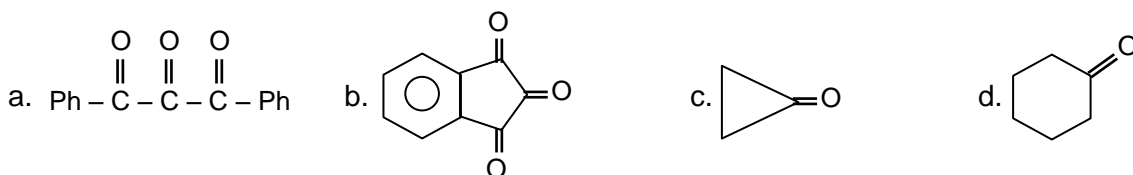
- a. conc. H_2SO_4 b. Tollen's reagent
c. Fehling's solution d. NaHCO_3

A, B, C

Sol. Both give CO_2 with NaHCO_3

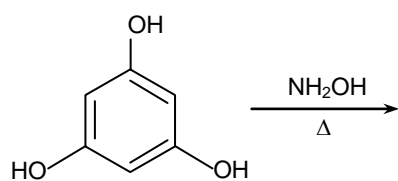
	Formic acid	Acetic acid
Conc. H_2SO_4	$\text{HCOOH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{conc.}} \text{CO} + \text{H}_2\text{O}$	No effect
Tollen's Reagent	$\text{HCOOH} + \text{Ag}_2\text{O} \longrightarrow 2\text{Ag} + \text{CO}_2 + \text{H}_2\text{O}$ Black ppt.	No effect
Fehling's solution	$\text{HCOOH} + 2\text{CuO} \longrightarrow \text{Cu}_2\text{O} + \text{CO}_2 + \text{H}_2\text{O}$ Red ppt.	No effect

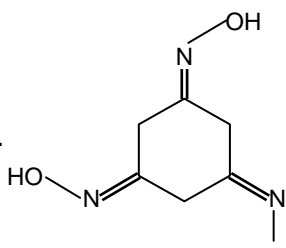
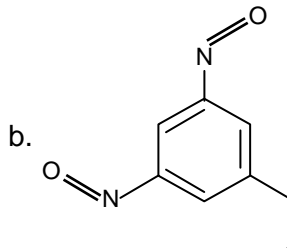
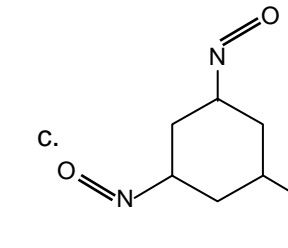
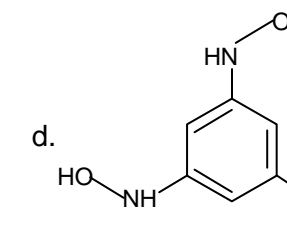
5. Which of the following does form a stable hydrate by the addition of H_2O ?



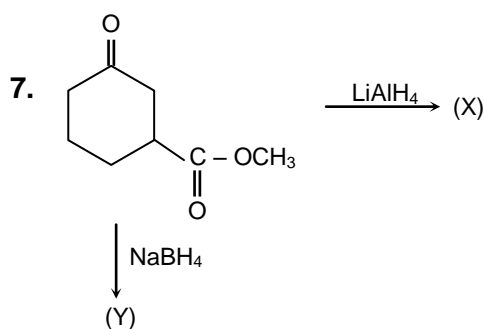
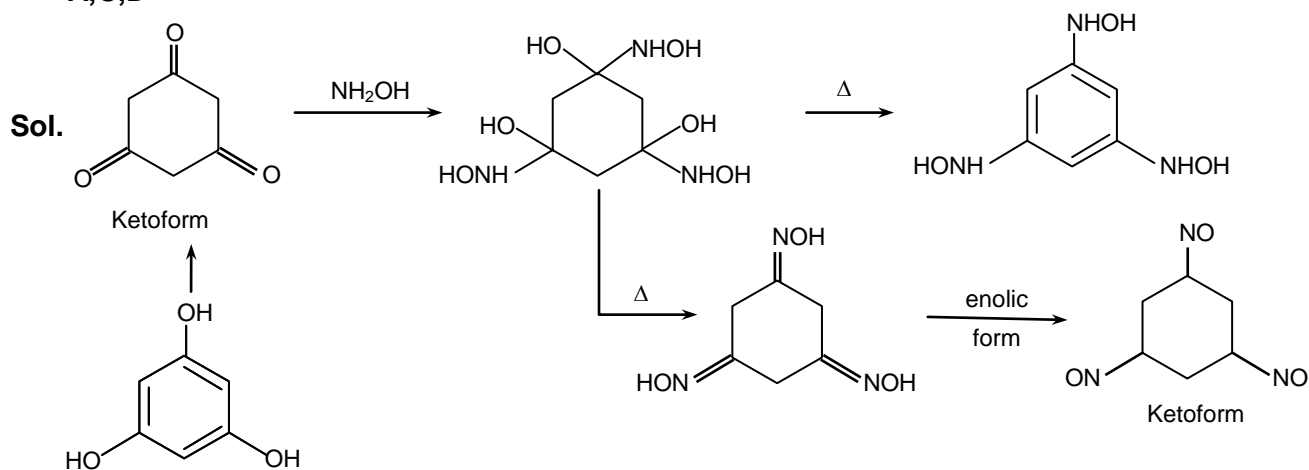
A, B, C

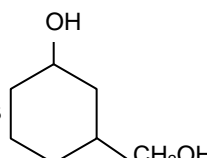
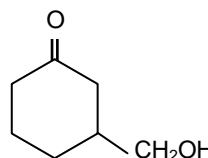
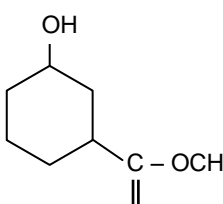
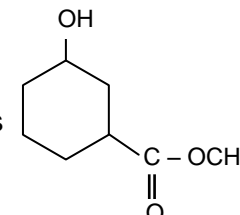
6. Which of the following can be the product of following reaction



- a. 
 b. 
 c. 
 d. 

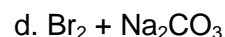
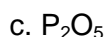
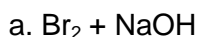
A,C,D



- a. (X) is 
 b. (Y) is 
- c. (X) is 
 d. (Y) is 

A, D

8. Which of the following reagent(s) can be used to convert amide into a primary amine with one carbon atom less than amide?



A, B, D

SECTION – E (Matrix Type) No Negative Marking

This Section contains 2 question. Each question has four choices (A, B, C and D) given in **Column I** and five statements (p, q, r, and s) in **Column II**. Any given statement in **Column I** can have correct matching with one or more statement(s) given in **Column II**. **8 × 2 = 16 Marks**

1. Match each of the compounds in Column I with its characteristic reaction(s) in Column II. (One or More than One Match)

Column I		Column II	
(a)	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CN}$	(p)	Reduction with $\text{Pd-C}/\text{H}_2$
(b)	$\text{CH}_3\text{CH}_2\text{OCOCH}_3$	(q)	Reduction with SnCl_2/HCl
(c)	$\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_2\text{OH}$	(r)	Development of foul smell on treatment with chloroform and alcoholic KOH
(d)	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$	(s)	Reduction with diisobutyl aluminium hydride (DIBAL-H)
		(t)	Alkaline hydrolysis

Sol. A → p, q, s, t; B → s, t; C → p; D → r

2. Match compounds in Column I with their characteristic test(s)/reaction(s) given in Column II. (One or More than One Match).

Column – I		Column– II	
(A)	$\text{H}_2\text{N}^+ - \text{NH}_3^+ \text{Cl}^-$	(p)	Compound give effervescence with NaHCO_3
(B)		(q)	gives positive FeCl_3 test
(C)		(r)	gives white precipitate with AgNO_3
(D)		(s)	reacts with aldehydes to form the corresponding hydrazone derivative

Sol. A – r, s; B – p, q; C – q, r; D – s

SECTION – F (Integer Type) No Negative Marking

This Section contains 8 questions. The answer to each question is a **single digit integer** ranging from 0 to 9. **(8 × 5 = 40 Marks)**

1. $\text{C}_2\text{H}_5\text{MgBr} \xrightarrow[\text{(ii)H}_2\text{O}]{\text{(i)CO}_2} \text{C}_n\text{H}_{2n+1}\text{COOH}$. The value of n is

Sol. 2

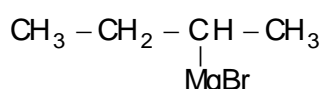
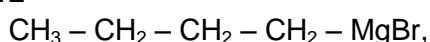


2. The number of moles of ethanoyl chloride which produces 10.2 g of ethanoic anhydride on reaction with sodium acetate is 10^{-x} , X is:

Sol. 1

3. How many different Grignard reagents having single Bromine can give n-butane as product (excluding stereoisomer), when react with $\text{C}_2\text{H}_5\text{OH}$

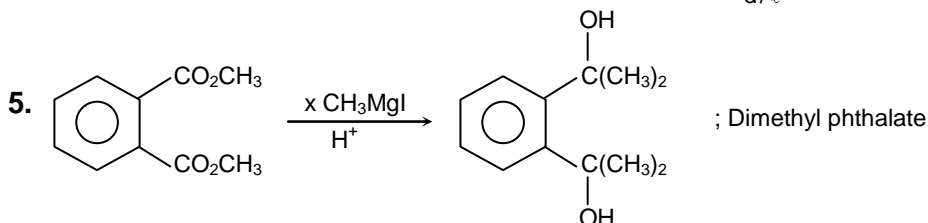
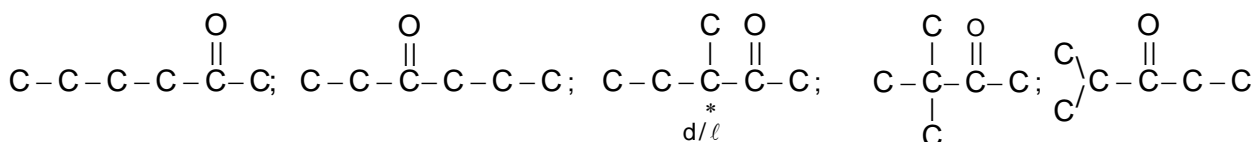
Sol. 2



Above Grignard reagent when reacts with ethanol, normal butane as a product.

4. How many isomeric ketones can be formulated by $C_6H_{12}O$?

Sol.7



Number of moles (x) of Grignard reagent consumed in the above reaction is:

Sol. 4

6. An organic compound 'A' having molecular formula $C_5H_{10}O_6$ on acetylation forms a compound having molecular weight 334. Number of hydroxy groups (-OH) in compound 'A' is:

Sol.4

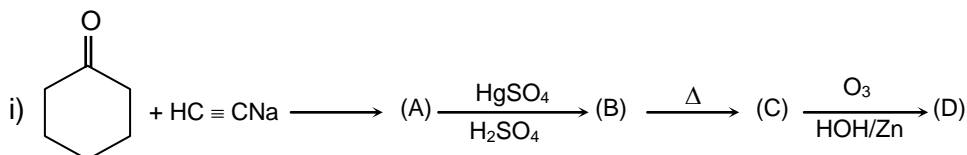
On acetylation, 'OH' group get changed into $-OCOCH_3$ means per 'OH' group molecular weight increases by '42'.

Molecular wt. of 'A' $\Rightarrow C_5H_{10}O_6 \Rightarrow 166$.

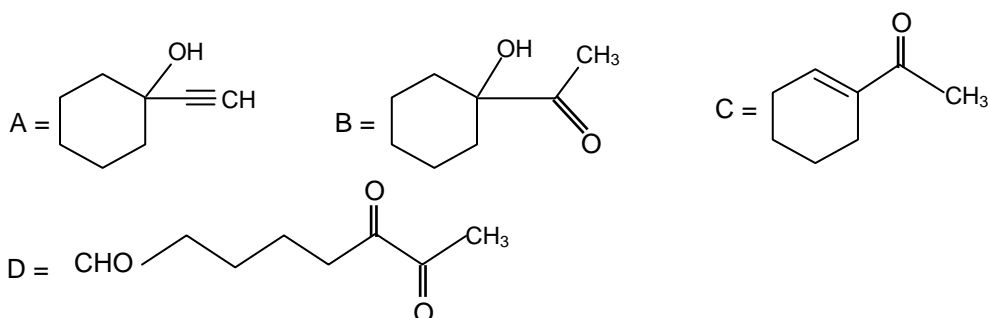
Molecular wt. after acetylation = 334 increases in molecular wt. = $334 - 166 = 168$.

Number of 'OH' groups = $\frac{168}{42} = 4$

7. Complete the following reactions and find out number of oxygen atom present in compound (D)D



Sol.3



8. An organic compound 'A' on treatment with ethyl alcohol gives a carboxylic acid 'B' and compound 'C'. Hydrolysis of 'C' under acidic conditions gives 'B' and 'D'. Oxidation of 'D' with $KMnO_4$ also gives 'B'. 'B' on heating with $Ca(OH)_2$ gives 'E'. E does not give Tollen's test and does not reduce Fehling's solution but form a 2,4-dinitrophenyl hydrazone. How many carbon are present in product (E).

Sol.3

