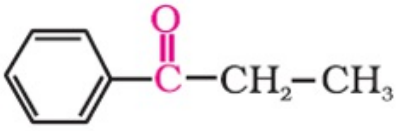
CBSE TEST PAPER-05

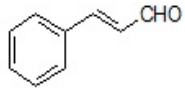
Class - 12 Chemistry (Aldehydes, Ketones and Carboxylic Acids)

1. Benzene reacts with CH_3COCl in the presence of $AlCl_3$ to give:
   a. $C_6H_5COCH_3$
   b. C_6H_5COCl
   c. $C_6H_5CH_3$
   d. C_6H_5Cl
2. $CH_3CH(OCH_3)CHO$ is called
   a. None of these
   b. alpha Methoxypropionaldehyde and 2 – Methoxypropanal
   c. Methoxypropionaldehyde
   d. 2 – Methoxypropanal
3. Which of the following has most acidic hydrogen?
   a. 2, 3 – Hexanedione
   b. 2, 5 – Hexanedione
   c. 2, 4 – Hexanedione
   d. 3 – Hexanone
4. Methyl ketones are usually characterized by:
   a. Benedict's reagent
   b. Iodoform test
   c. Schiff's test
   d. Tollen's reagent
5. Give IUPAC names of the following compound:



   a. None of these
   b. Phenylpropan - 1 - al
   c. 1 - Phenylpropan - 1 - one
   d. Phenylpropan - 1 - one

6. Write the IUPAC name of the following ketones and aldehyde. If possible, also give common name.



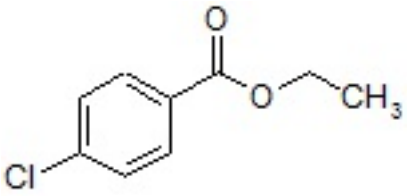
or Ph-CH=CH-CHO

7. Name the following compound according to IUPAC system of nomenclature.
$(CH_3)_3CCH_2COOH$

8. Name the following compound according to IUPAC system of nomenclature.
$CH_3COCH_2COCH_3$

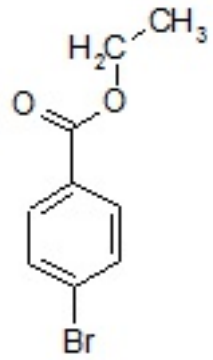
9. Draw the structural formula of hex-2-en-4-ynoic acid.

10. Write IUPAC name of

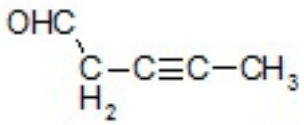


11. Write IUPAC names of the following:

i.



ii.



12. Show conversion of Toluene to Benzaldehyde.

13. An organic compound A, which has a characteristic odour, on treatment with con.NaOH forms two compounds B and C. Compound B has molecular formula C_7H_8O which on oxidation gives back A. Compound C is the sodium salt of an acid. C, when heated with soda lime yields an aromatic hydrocarbon D. Deduce the structures of A,

B, C and D.

14. How will you prepare:
    a. Acetic anhydride and
    b. Acetyl chloride from acetic acid?
    Write the reaction involved in each case.

15. Arrange the following compounds in increasing order of their boiling points:CH_3CHO, CH_3CH_2OH, CH_3OCH_3, $CH_3CH_2CH_3$

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Solutions

1. (a) $C_6H_5COCH_3$

   Explanation: $C_6H_6 + CH_3COCl \xrightarrow{AlCl_3} C_6H_5COCH_3$

   This is known as friedal craft acylation reaction. $AlCl_3$ act as a lewis acid and will generate CH_3CO^+ carbocation and this will attack benzene to give $C_6H_5COCH_3$

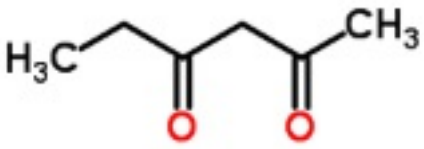
2. (b) alpha Methoxypropionaldehyde and 2 – Methoxypropanal

   Explanation: This is alpha Methoxypropionaldehyde(common name) and 2 – Methoxypropanal (IUPAC name)

3. (c) 2, 4 – Hexanedione

   Explanation: 2,4-hexanedione will have active methylene group.

   The structure of 2,4-hexanedione is

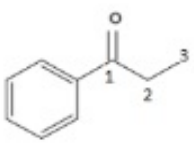
   -CH_2 group present between the two carbonyl group is active methylene group, these hydrogens are highly acidic as their conjugate base is highly stable.

4. (b) Iodoform test

   Explanation: $CH_3COR + I_2 + NaOH \rightarrow CHI_3 + RCOO^- Na^+$

   Iodoform test is characteristic test given by methyl ketones. CHI formed is yellow precipitate.

5. (c) 1 - Phenylpropan - 1 - one

   Explanation: 

   here functional group is ketone so numbering will start from functional group. at 1 position phenyl group is attached so, 1-phenyl will be subsituent name written first, followed by word root which is 'prop' and finally suffix 'one'

6. **IUPAC Name:** 3-Phenylprop-2-enal **Common Name:** β-Phenylacrolein

7. 3,3-Dimethylbutanoic acid

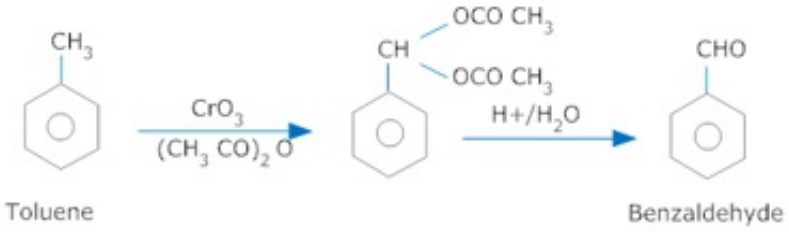
8. Pentane-2,4-dione

9. $CH_3 - C \equiv C - CH = CH - \overset{\overset{O}{\|}}{C} - OH$

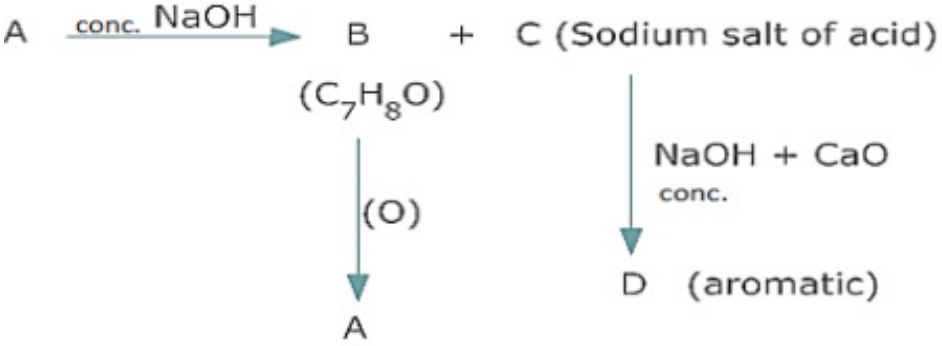
10. Ethyl-4-chlorobenzoate

11. i. Ethyl-4-bromobenzoate
    ii. Pent-3-yn-1-al

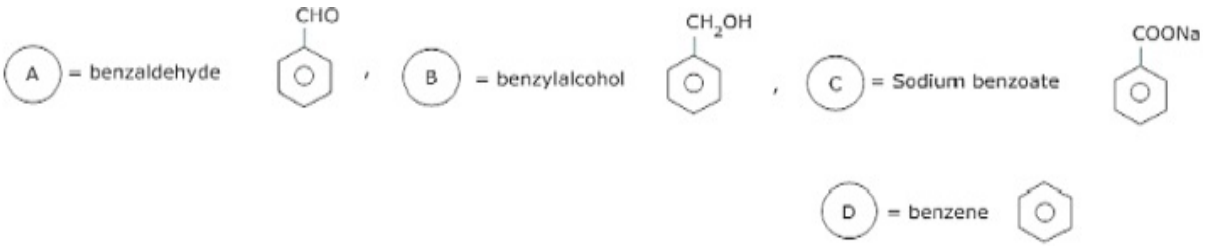
12. Controlled oxidation of Toluene with CrO_3 gives Benzaldehyde.



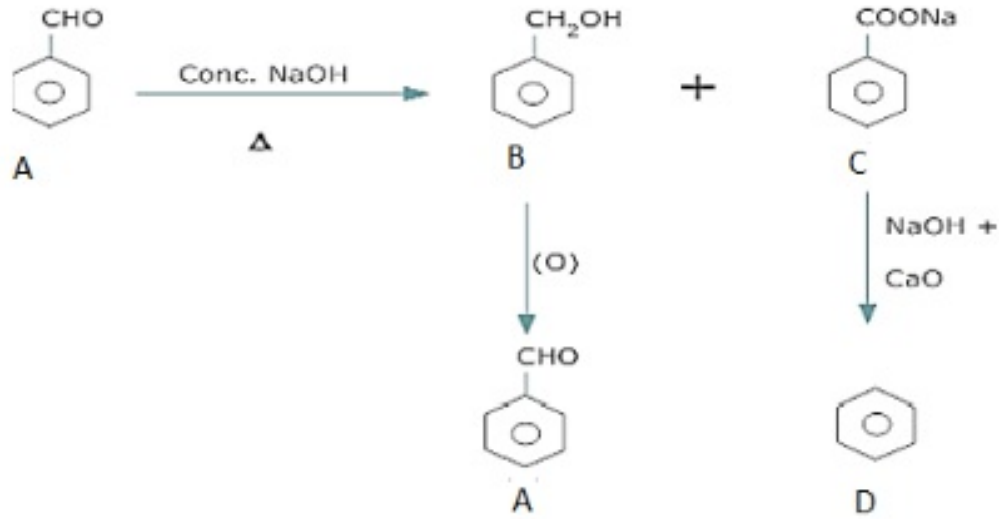
13. This is Cannizzaro Reaction



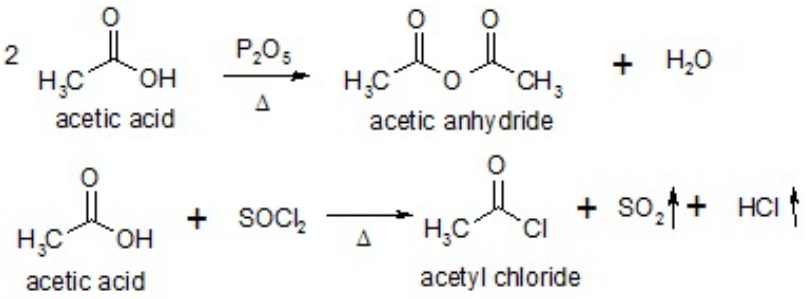
The molecular formula of (B) and characteristic odour of (A) suggests that (A) is an aromatic aldehyde, C_6H_5CHO and (B) is alcohol, $C_6H_5CH_2OH$. As (C) is a sodium salt of an acid & gives hydrocarbon (D) on heating with soda lime, (C) is sodium benzoate and (D) is benzene. In this reaction, Benzaldehyde undergoes self oxidation and reduction(disproportionation). Therefore:-



Reaction are:-



14.



15. The molecular masses of the given compounds are in the range 44 to 46. CH_3CH_2OH undergoes extensive intermolecular hydrogen-bonding resulting in the association of molecules; therefore, it has the highest boiling point. Whereas, $CH_3CH_2CH_3$ being an alkane will have the weak van der Waals force between its molecules, thus will have the lowest boiling point. CH_3CHO being an aldehyde will be more polar than the ketone CH_3COCH_3, and its molecule will have more strong dipole-dipole interaction as compared to those between CH_3COCH_3 molecules. As the forces of attraction vary in the order van der Waals< dipole-dipole interactions< hydrogen bonding, the boiling points too varies as $CH_3CH_2CH_3<CH_3COCH_3<CH_3CHO<CH_3CH_2OH$.