Exercise-1

ONLY ONE OPTION CORRECT TYPE

Section (A) : Preparation of Carbonyl Compounds

1. On heating calcium propionate, the product formed is
(1) 3-Pentanone (2) 2-Pentanone (3) 3-Methyl-2-butanone (4) Propanone

2. A mixed salt of calcium acetate formate on dry distillation gives
(1) ethanal (2) methanal (3) propanone (4) All the three above.

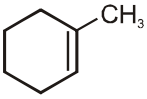
3. Acetic acid when heated (300ºC) with MnO_2 gives
(1) formaldehyde (2) acetaldehyde (3) acetone (4) butaone

4. In which of the following reaction ketone is formed :
(1) $CH_3–CH_2–OH \xrightarrow{KMnO_4/\overset{\oplus}{H}}$ (2) $CH_3–CH_2–OH \xrightarrow{Cu/\Delta}$
(3) $CH_3–\underset{\underset{CH_3}{|}}{CH}–OH \xrightarrow{Cu/\Delta}$ (4) $CH_3–\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}–OH \xrightarrow{Cu/\Delta}$

5. Ethylidene chloride on treatment with aq. KOH gives
(1) CH_3CHO (2) $CH_2OH.CH_2OH$ (3) HCHO (4) CHO. CHO

6. Benzene reacts with CH_3COCl in the presence of $AlCl_3$ to give
(1) C_6H_5COCl (2) C_6H_5Cl (3) $C_6H_5CH_3$ (4) $C_6H_5COCH_3$

7. Aldehydes can be prepared from acid chlorides by
(1) Clemmensen reduction (2) Wolff-kishner reduction
(3) Rosenmund's reduction (4) $LiAlH_4$ reduction.

8.  On reductive ozonolysis yields
(1) 6-oxoheptanal (2) 6-oxoheptanoic acid
(3) 6-hydroxyheptanal (4) 3-hydroxypentanal

Section (B) : Nucleophlic Addition Reactions

1. The typical reaction of aldehydes and ketones is
(1) Nucleophilic substitution (2) Nucleophilic addition
(3) Electrophilic substitution (4) Electrophilic addition

2. Ketones are less reactive than aldehydes because
(1) the + I-effect of the alkyl groups increases the electron deficiency of the carbonyl carbon
(2) the + I-effect of the alkyl groups decreases the electron deficiency of the carbonyl carbon
(3) of steric hindrance to the attacking nucleophile
(4) both (2) and (3) options are correct

3. Which gives nucleophilic addition most easily ?
(1) CH_3CHO (2) CH_3CH_2CHO (3) $CH_3–\underset{\underset{CH_3}{|}}{CH}CHO$ (4) HCHO

4. Which of the following is most reactive towards nucleophilic addition reactions ?
(1) CH_3COCH_3 (2) $CH_3CH_2COCH_2CH_3$ (3) $Ph–\overset{\overset{O}{\|}}{C}–CH_3$ (4) $Ph–\overset{\overset{O}{\|}}{C}–Ph$

5. $C_6H_5CHO \xrightarrow{HCN} X \xrightarrow{H^+/H_2O} Y$

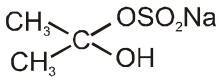
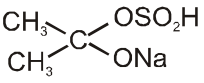
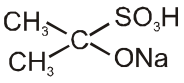
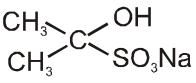
In the above sequence, Y is

(1) Lactic acid (2) Mandelic acid (3) Malic acid (4) Cinnamic acid

6. Which of the following forms a stable hydrate ?

(1) CH_3COCH_3 (2) CH_3CHO (3) Cl_3CCHO (4) HCHO

7. The structure of the addition product formed when acetone reacts with a concentrated aqueous solution of sodium bisulphite is :

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

8. Aldehydes react with alcohols in presence of dry HCl gas to form

(1) Aldols (2) Acetals (3) Ketals (4) None of these

9. Oximes are formed by the reaction of aldehydes and ketones with :

(1) NH_3 (2) NH_2NH_2 (3) NH_2OH (4) $NH_2CONHNH_2$

10. The compound which does not react with hydroxylamine is

(1) CH_3COOH (2) CH_3COCH_3 (3) CH_3CHO (4) HCHO.

11. The structure for acetaldehyde semicarbazone is :

(1) $CH_3CH = NCONHNH_2$ (2) $CH_3CH = NNHCONH_2$

(3) $CH_3CH = NOH$ (4) $CH_3CH = NNH_2$

12. Which gives addition reaction with aldehyde and ketone :

(1) $NH_2–NH_2$ (2) $NH_2NHCONH_2$ (3) $C_6H_5NHNH_2$ (4) HCN

13. Aldehyde with $NH_2–NH_2$ forms :

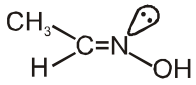
(1) hydrazones (2) aniline (3) nitrobenzene (4) none of these

14. Which functional group is formed by the reaction of primary amine with aldehyde:

(1) Amino (2) Imino (3) Nitro (4) Nitrito

15. Hydrolysis product which is formed by reaction between ketone and grignard reagent will be :

(1) $(CH_3)_3CHOH$ (2) C_2H_5OH (3) CH_3OH (4) None of these

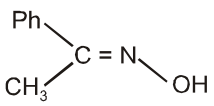
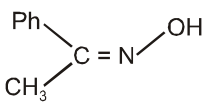
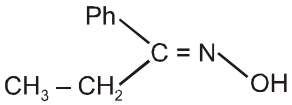
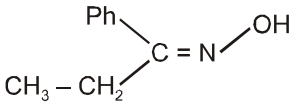
16.  $\xrightarrow{H_2SO_4} \xrightarrow{H_2O}$ (X) + (Y) Product (X) and (Y) are:

(1) NH_3 + HCOOH (2) CH_3NH_2 + CH_3COOH

(3) CH_3NH_2 + HCOOH (4) $CH_3CH_2NH_2$ + CH_3COOH

17. [X] $\xrightarrow{H_2SO_4} \xrightarrow[(ii)\ H^+]{(i)\ KOH}$ $Ph – NH_2$ + $CH_3 – \underset{\underset{O}{\|}}{C} – OH$

Identify the configuration of [X] compound :

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

18. Which of the following, on heating with ammonia gives urotropine ?

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

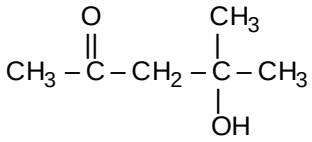
Section (C) : Condensation Reactions

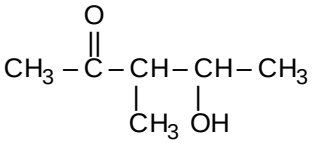
1. Aldol condensation is the characteristic reaction of
(1) all aldehydes and ketones.
(2) only those aldehydes and ketones which contain α-hydrogen atoms.
(3) only those aldehydes and ketones which do not contain α-hydrogen atoms.
(4) only aromatic aldehydes and ketones.

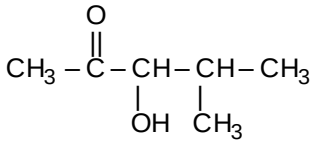
2. Which of the following compounds will undergo self aldol condensation in the presence of cold dilute alkali
(1) C_6H_5CHO (2) CH_3CHO (3) $HC\equiv C-CHO$ (4) $CH_2=CH-CHO$

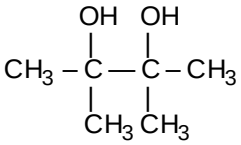
3. Base-catalysed aldol condensation will occur with
(1) Benzaldehyde (2) Propionaldehyde
(3) Formaldehyde (4) 2, 2-Dimethylpropionaldehyde.

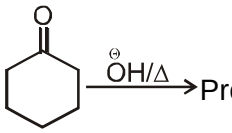
4. Which of the products is formed when acetone is reacted with barium hydroxide solution ?

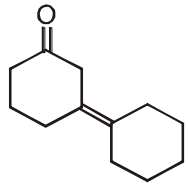
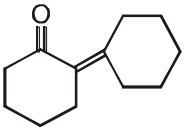
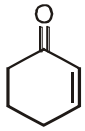
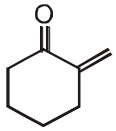
(1) 

(2) 

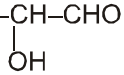
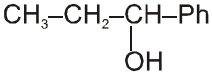
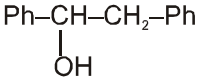
(3) 

(4) 

5.  Product is :

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

6. A $\xrightarrow{\overset{\ominus}{O}H/\Delta}$ $(CH_3)_2C=CHCOCH_3$ A is :
(1) Acetone (2) Acetaldehyde (3) Propionaldehyde (4) Formaldehyde

7. $Ph-CHO + CH_3-CHO \xrightarrow{\overset{\ominus}{O}H/\Delta}$ Product is:
(1) Ph –CH =CH– CHO (2)  (3)  (4) 

8. The reaction,
$C_6H_5CHO + (CH_3CO)_2O \xrightarrow[(ii)\ H^+/H_2O]{(i)\ CH_3COONa/453\ K} C_6H_5CH = CHCOOH + CH_3COOH$
is called
(1) Benzoin condensation (2) Aldol condensation
(3) Etard reaction (4) Perkin's reaction

Section (D) : Other Reactions

1. Cannizzaro's reaction is an example of
(1) Disproportionation reaction (2) Substitution reaction
(3) Elimination reaction (4) Addition reaction

2. Benzaldehyde, when heated with conc. KOH solution, gives
(1) $C_6H_5CH_2OH$ only (2) C_6H_5COOH only
(3) C_6H_5COOK only (4) a mixture of C_6H_5COOK and $C_6H_5CH_2OH$

3. The Cannizzaro's reaction is not given by :
(1) C_6H_5CHO (2) HCHO (3) CH_3CHO (4) $(CH_3)_3C–CHO$

4. Benzaldehyde is converted to benzyl alcohol by :
(1) Wurtz reaction (2) Cannizzaro reaction (3) Fittig reaction (4) Wurtz Fittig reaction

5. $OHC–CHO \xrightarrow{OH^-} HOH_2C–COOH$ The reaction is known as :
(1) Aldol condensation (2) Knovenagel reaction (3) Cannizzaro reaction (4) None of these

6. $Ph–CHO + HCHO \xrightarrow[\Delta]{KOH}$ (1) + (2) ; major products are :
(1) $Ph–CH_2OH + \overset{\ominus\ \oplus}{HCOOK}$ (2) $Ph–COOH + CH_3OH$
(3) $Ph–CH(OH)–CH_3 + \overset{\ominus\ \oplus}{HCOOK}$ (4) None of these

7. The only aldehyde which undergoes haloform reaction is
(1) Formaldehyde (2) Acetaldehyde (3) Benzaldehyde (4) Propionaldehyde

8. An optically active compound reacts with hydroxylamine to form an oxime and also gives a positive haloform test. What is the structure of the compound ?
(1) $CH_3CH_2CH(CH_3)COCH_3$ (2) $(CH_3)_2CHCH_2COCH_3$
(3) $CH_3CH_2CH_2COCH_2CH_3$ (4) $(CH_3)_2CHCOCH_2CH_3$

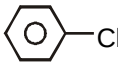
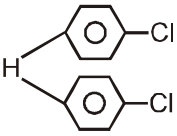
9. A compound with molecular formula, C_4H_8O gives a positive haloform test and a 2,4-DNP derivative. The compound is
(1) $CH_3CH_2CH_2CHO$ (2) $CH_3COCH_2CH_3$ (3) $(CH_3)_2CHCHO$ (4) All the above.

10. Which of the following compound does not give iodoform test .
(1) Pentanone -3 (2) Pentanone-2 (3) Propanone (4) Ethanol.

11. Acetaldehyde reacts with phosphorus pentachloride to form
(1) Acetyl chloride (2) Ethyl chloride (3) Ethylene chloride (4) Ethylidene chloride

12. Formalin is an aqueous solution of
(1) Fluorescein (2) Formic acid (3) Formaldehyde (4) Furfuraldehyde

13. Which of the following reactions represent incorrect major product.
(1) $CHCl_3 + CH_3COCH_3 \longrightarrow CH_3 - \underset{\displaystyle OH}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CCl_3$ (Chloretone – hypnotic)
(2) $Ph.NH_2 + CHCl_3 + KOH \longrightarrow PhN \rightrightarrows C$ (Bad Smell)
(3) $PhOH + CHCl_3 + NaOH \longrightarrow Ph – O – CH_3$

(4) $CCl_3–CH = O + 2$  $\xrightarrow{\text{Conc. } H_2SO_4}$ $CCl_3–CH$  (DDT)

14. When $C_6H_5COCH_3$ reacts with NaOH and bromine, it gives :
(1) $CHBr_3$ (2) C_6H_5CONa
(3) $C_6H_5COONa + CHBr_3$ (4) CH_3COONa

15. Which of the following reagents converts both acetaldehyde and acetone to alkanes ?
(1) Ni/H_2 (2) $LiAlH_4$ (3) I_2/NaOH (4) Zn–Hg/conc.HCl

Section (E) : Lab Test

1. Tollen's reagent is not reduced by
(1) Formic acid (2) Acetaldehyde (3) Benzaldehyde (4) Acetic acid.

2. Aldehydes can be oxidised by
(1) Tollen's reagent (2) Fehling solution (3) Benedict solution (4) All.

3. Crotonaldehyde ($CH_3CH=CHCHO$) can be easily oxidised to crotonic acid ($CH_3CH=CHCOOH$) by using
(1) Alkaline $KMnO_4$ (2) Acidic $K_2Cr_2O_7$ (3) Tollen's reagent (4) HNO_3

4. Oxidation of compound X gives a product which reacts with phenylhydrazine but does not give a silver mirror test. Possible structure for X is
(1) CH_3CHO (2) CH_3CH_2OH (3) $(CH_3)_2CHOH$ (4) $CH_3CH_2CH_2OH$

5. Fehiling's solution is
(1) Acidified $CuSO_4$ solution
(2) Ammonical $CuSO_4$ solution
(3) Copper sulphate + sodium hydroxide + Rochelle salt
(4) Copper acetate + sodium citrate.

6. Which does not react with Fehling solution ?
(1) Acetaldehyde (2) Benzaldehyde (3) Butanal (4) Formic acid

7. Schiff's reagent is :
(1) Magenta solution decolourised with sulphurous acid
(2) Magenta solution decolourised with chlorine
(3) Ammonical cobalt chloride solution
(4) Ammonical manganese sulphate solution.

8. Acetaldehyde cannot show :
(1) Iodoform test (2) Lucas test (3) Benedict's test (4) Tollen’s test

9. When $C_6H_5NH_2$ heated with C_6H_5CHO the product is :-
(1) Schiff’s base (2) Benzoin (3) Azoxy benzene (4) Unsaturated acid

10. A compound gives a yellow precipitate on warming with iodine and aq. solution of NaOH. Its vapour density is 29. the compound is :
(1) CH_3CH_2CHO (2) CH_3COCH_3 (3) $CH_3CHOHCH_3$ (4) $CH_3CH_2CH_2OH$

Section (F) : Prepartion of Carboxylic Acid (General)

1. Acetic acid is obtained when
(1) Methyl alcohol is oxidised with potassium permanganate
(2) Formaldehyde is oxidised with potassium dichromate and sulphuric acid
(3) Acetonitrile is hydrolysed with a dilute mineral acid
(4) Glycerol is heated with sulphuric acid.

2. In the following reaction sequence product Y is

$C_2H_5Br \xrightarrow{KCN} X \xrightarrow[\text{Boil}]{\text{Dil. } H_2SO_4} Y$

(1) Ethanol (2) Ethanal (3) Propanoic acid (4) Ethanenitrile

3. In the following reaction final product is :

$C_6H_5MgBr + CO_2 \xrightarrow{Ether} \xrightarrow{H^{\oplus}}$

(1) Benzoic acid (2) Benzaldehyde (3) Benzamide (4) Benzene

4. The acid D obtained through the following sequence of reactions is

$C_2H_5Br \xrightarrow{\text{Alc. KOH}} A \xrightarrow[CCl_4]{Br_2} B \xrightarrow[\text{(excess)}]{KCN} C \xrightarrow{H_3O^+} D$

(1) Succinic acid (2) Malonic acid (3) Maleic acid (4) Oxalic acid

5. Which of the following does not give benzoic acid on hydrolysis ?

(1) Phenyl cyanide (2) Benzoyl chloride (3) Benzyl chloride (4) Methyl benzoate

6. (Acetic anhydride) $\begin{matrix} CH_3—CO \\ \diagdown \quad O \\ CH_3—CO \end{matrix}$ on hydrolysis gives :

(1) $CH_3COOC_2H_5$ (2) CH_3COOH (3) C_2H_5OH (4) none of these

7. In which of the following reaction the final product is neither an acid nor an acid salt.

(1) $Ph–CHO \xrightarrow{\text{Tollen's reagent}}$ (2) $CH_3–CH_2–OH \xrightarrow{KMnO_4/\bar{O}H}$

(3) $Ph–CHO \xrightarrow{\text{Fehling solution}}$ (4) $Ph–CH_2–OH \xrightarrow{K_2Cr_2O_7/H^+}$

Section (G) : Chemical reactions of Carboxylic Acid

1. When excess of chlorine is passed through acetic acid in presence of red phosphorus, it forms

(1) Acetic anhydride (2) Chloral (3) Trichloroacetic acid (4) Methyl chloride.

2. Which of the following will not undergo Hell-Volhard Zelinsky (HVZ) reaction ?

(1) HCOOH (2) CH_3COOH (3) CH_3CH_2COOH (4) $CH_3CHBrCOOH$.

3. Identify Z in the following reaction sequence

$CH_3I \xrightarrow[\text{Ether}]{Mg} X \xrightarrow[\text{(ii) } H_3O^+]{\text{(i) Dry ice}} Y \xrightarrow[\text{Red P}]{Cl_2} Z$

(1) CH_3COOH (2) CH_3MgI (3) CH_3COCl (4) $ClCH_2COOH$.

4. The reaction : $RCOOAg + Br_2 \xrightarrow{CCl_4, \text{Reflux}} R–Br + AgBr + CO_2$ is called

(1) Wurtz reaction (2) Hunsdiecker reaction

(3) Friedel-Crafts reaction (4) Kolbe's reaction

5. The reaction, $CH_3COOH + CH_3OH \xrightarrow{H^+} CH_3COOCH_3 + H_2O$ is called

(1) Acidification reaction (2) Dehydration reaction

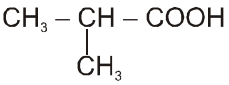
(3) Dehydrogenation reaction (4) Esterification reaction

6. It is difficult to esterify $R_3C–COOH$ because of

(1) Steric hindrance (2) Delocalization

(3) Inductive effect of the R group (4) Hyperconjugation of the alkyl groups

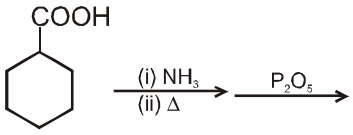
7. Which of the following is correct order of esterification of following acids with CH_3OH :

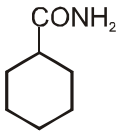
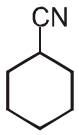
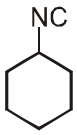
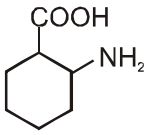
HCOOH , CH_3COOH , $CH_3 - CH_2 - COOH$, 

I II III IV

(1) I = II = III = IV (2) I > II > III > IV (3) I < II < III < IV (4) I > IV > III > II

8. The product of the following reaction is :



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

9. Which of the following method is not used for the conversion of carboxylic acids into acid halides ?

(1) $RCOOH + SOCl_2 \longrightarrow$ (2) $RCOOH + PCl_5 \longrightarrow$

(3) $RCOOH + Cl_2 \longrightarrow$ (4) $RCOOH + PCl_3 \longrightarrow$

Section (H) : Preparation of Acid derivatives (General)

1. A fruity smell is produced by the reaction of C_2H_5OH with :

(1) CH_3COCH_3 (2) CH_3COOH (3) PCl_5 (4) CH_3CHO

2. Benzoyl chloride on treatment with ammonia gives

(1) Benzamide (2) Acetamide (3) Benzylamine (4) Benzoic acid

3. Acetic anhydride is prepared in the laboratory by heating sodium acetate with

(1) ethyl chloride (2) acetyl chloride (3) conc. H_2SO_4 (4) zinc dust

4. Synthesis of an ester involves the reaction of alcohols with

(1) a ketone (2) an amide (3) CH_3MgBr (4) RCOCl

5. What product is formed when acetic acid reacts with P_2O_5 .

(1) Acetyl chloride (2) Trichloro acetic acid (3) Acetic anhydride (4) Di-chloro acetic acid

6. Fats and oils are mixture of

(1) Glycerides and saturated fatty acids

(2) Glycerides and unsaturated fatty acids

(3) Glycerides of saturated and unsaturated fatty acids

(4) Only saturated and unsaturated fatty acids

7. Which compound is known as oil of winter green

(1) Phenyl benzoate (2) Phenyl salicylate (3) Phenyl acetate (4) Methyl salicylate

8. Vinegar obtained from canesugar contains

(1) Citric acid (2) Lactic acid (3) Acetic acid (4) Palmitic acid

9. Number of oxygen atoms in a acetamide molecule is

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

10. Urea is :

(1) Monoacidic base (2) Diacidic base (3) Neutral (4) Amphoteric

11. Fats and oils are

(1) Acids (2) Alcohols (3) Esters (4) Hydrocarbons

Section (I) : Chemical reaction of Acid derivatives

1. The decreasing order of reactivity towards nucleophilic acyl substitution is
(i) CH_3COCl (ii) $CH_3COOC_2H_5$, (iii) CH_3CONH_2 (iv) $(CH_3CO)_2O$
(1) (i) > (iv) > (iii) > (ii) (2) (i) > (iv) > (ii) > (iii) (3) (iv) > (iii) > (i) > (ii) (4) (iii) > (i) > (iv) > (ii)

2. $CH_3CH_2CH_2CONH_2$ is boiled with aqueous NaOH, then the reaction mixture is acidified with HCl. The products obtained are
(1) $CH_3CH_2CH_2COO^- + NH_3$ (2) $CH_3CH_2CH_2COONa + NH_3$
(3) $CH_3CH_2CH_2COOH + NH_4Cl$ (4) $CH_3CH_2CH_2COO^- + NH_4Cl$.

3. A compound with molecular formula $C_4H_{10}O_4$ on acylation with acetic anhydride gives a compound with molecular formula $C_{12}H_{18}O_8$. How many hydroxyl groups are present in the compound ?
(1) one (2) Two (3) Three (4) Four

4. The product formed by the reaction of acetamide with Br_2 in presence of NaOH is :
(1) CH_3CN (2) CH_3CHO (3) CH_3CH_2OH (4) CH_3NH_2

5. $Ph - CO - NH_2 \xrightarrow[\Delta]{KOBr}$ Product is
(1) Ph–CH_3 (2) Ph–CHO (3) Ph–CH_2–NH_2 (4) Ph–NH_2

Exercise-2

ONLY ONE OPTION CORRECT TYPE

(A) Aldehydes and Ketones

1. Process by which formation of acetone take place :
(1) Pyrolysis of CH_3COOH (2) Oxidation of CH_3COOH
(3) Pyrolysis of calcium acetate (4) Oxidation of n-propyl alcohol

2. A dihaloalkane on alkaline hydrolysis produces a ketone with formula C_3H_6O. The dihaloalkane can be
(1) 2,2-Dichloropropane (2) 1,1-Dichloropropane
(3) 1,2-Dichloropropane (4) 1,3-Dichloropropane

3. Acetophenone can be prepared by Friedel crafts reaction between benzene and
(1) Benzoyl chloride (2) Benzyl chloride
(3) Ethanoyl chloride (4) Methanoyl chloride

4. The general order of reactivities of given carbonyl compounds towards nucleophilic addition reaction is :
(1) $H_2C=O > (CH_3)_2C=O > Ar_2C=O > CH_3CHO > ArCHO$.
(2) $H_2C=O > CH_3CHO > (CH_3)_2 C=O > ArCHO > Ar_2C=O$.
(3) $ArCHO > Ar_2C=O > CH_3CHO > (CH_3)_2 C=O > H_2C=O$.
(4) $Ar_2C=O > (CH_3)_2C=O > ArCHO > CH_3CHO > H_2C=O$.

5. The correct order of reactivity of PhMgBr with given compound is
(i) $(C_6H_5)_2CO$ (ii) $CH_3 - CH = O$ (iii) $(CH_3)_2 C = O$
(1) i > ii > iii (2) ii > iii > i (3) iii > ii > i (4) i > iii > ii

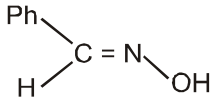
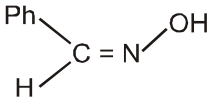
6. The cyanohydrin of a carbonyl compound on hydrolysis gives lactic acid. The carbonyl compound is
(1) HCHO (2) CH_3CHO (3) CH_3COCH_3 (4) $CH_3COCH_2CH_3$

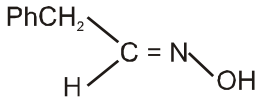
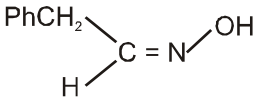
7. Reaction of acetaldehyde with HCN followed by hydrolysis gives a compound which shows.
(1) Optical isomerism (2) Geometrical isomerism
(3) Metamerism (4) Tautomerism

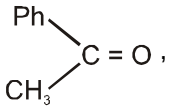
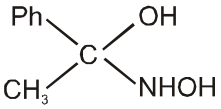
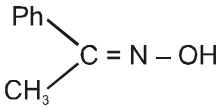
8. Consider the following sequence of reactions-.

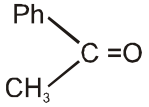
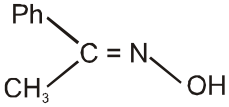
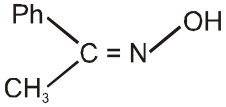
$$PhC \equiv CH \xrightarrow[dil.H_2SO_4]{HgSO_4} A \xrightarrow{NH_2OH} B + C.$$

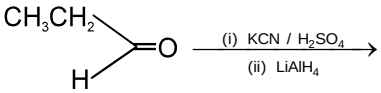
The products (A), (B) and (C) are respectively,

(1) PhCHO,  and 

(2) $PhCH_2CHO$,  and 

(3)  ,  and 

(4)  ,  and 

9.  Product is

(1) $CH_3CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2NH_2$ (2) $CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-CH_3$

(3) $CH_3CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CN$ (4) $CH_3CH_2-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-NH_2$

10. The major product formed in the reaction is .

$$C_6H_5CHO + CH_3NO_2 \xrightarrow[heat]{NaOH} (X)$$

(1) $C_6H_5-\underset{\displaystyle O}{\underset{\diagdown\ \diagup}{CH}}-CH-NO_2$ (2) $C_6H_5\underset{\displaystyle OH}{\underset{|}{CH}}CH_2NO_2$

(3) $C_6H_5CH=CH-NO_2$ (4) $C_6H_5CH\begin{matrix}\diagup\ CH_2NO_2\\ \diagdown\ CH_2NO_2\end{matrix}$

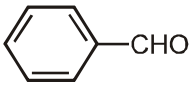
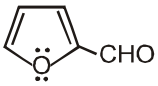
11. $PhCHO + (CH_3CO)_2O \xrightarrow[\Delta]{(1)\ CH_3COONa} A \xrightarrow{HBr} B$

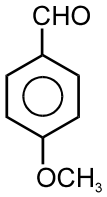
The product B is :

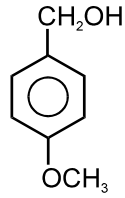
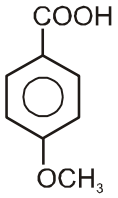
(1) $PhCH=CHCH_2Br$ (2) $PhCH-CH_2-COOH$ (Br on CH)

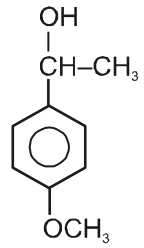
(3) $PhCH_2\ CH(Br)\ COOH$ (4) $PhCH=CH-COBr$

12. Cannizzaro reaction does not take place with

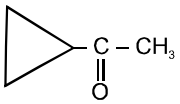
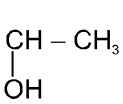
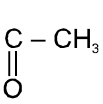
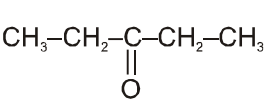
(1) $(CH_3)_3CCHO$. (2)  (3)  (4) CH_3CHO.

13.  + HCHO $\xrightarrow{KOH}$ (A) + (B)

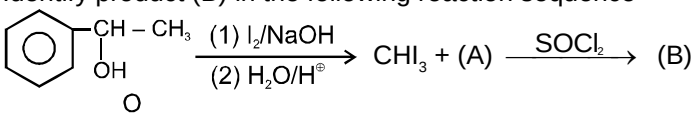
(1)  (2)  + CH_3OH

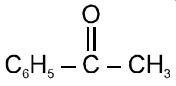
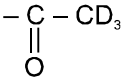
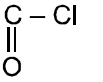
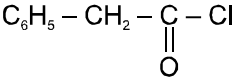
(3)  (4) (1) and (2) both

14. Which of the following does not give iodoform with NaOI ?

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

15. Identify product (B) in the following reaction sequence



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

16. Acetone and acetaldehyde are differentiated by

(1) HNO_2 (2) $NH_2OH/H^{\oplus}$ (3) NaOH + I_2 (4) $[Ag(NH_3)_2]^{\oplus}$

17. Schiff's base and schiff's reagent are

(1) Structural isomers (2) Anomers

(3) Diastereomers (4) Entirely different compounds.

18. 2-pentanone can be distinguished from 3- pentanone by the reagent ?

(1) 2, 4- Dinitrophenyl hydrazine (2)Tollen's reagent

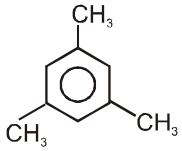
(3) I_2 and dilute NaOH (4) $NaHSO_3$

19. Arrange the following compounds in decreasing order of rate of exchange of O^{18} with H_2O^{18}

(X) CCl_3CHO (Y) CH_3CHO (Z) CH_3COCH_3 (W) CF_3CHO

(1) W > Z > X > Y (2) W > X > Y > Z (3) W > Y > Z > X (4) W > Z > Y > X

20.



The above compound describes a condensation polymer which can be obtained in two ways : either treating 3 molecules of acetone (CH_3COCH_3) with conc. H_2SO_4 or passing propyne ($CH_3C \equiv CH$) through a red hot tube. The name of polymer is :

(1) Phorone (2) Mesityl oxide (3) Diacetonyl alochol (4) Mesitylene.

21. Which of the following reactions represent incorrect product :

(1) $\begin{matrix}CH_2-OH\\ |\\ CH_2-OH\end{matrix} \xrightarrow{PCl_5} \begin{matrix}CH_2-Cl\\ |\\ CH_2-Cl\end{matrix}$ (2) $\begin{matrix}CH_2-OH\\ |\\ CH_2-OH\end{matrix} \xrightarrow[\Delta]{P_4+\ I_2} CH_2=CH_2$

(3) $\begin{matrix}CH_2-OH\\ |\\ CH_2-OH\end{matrix} \xrightarrow[\text{aqueous HCl}]{CH_3CHO} CH_3-CH\begin{matrix}O-CH_2\\ |\\ O-CH_2\end{matrix}$ (4) $\begin{matrix}CH_2-OH\\ |\\ CH_2-OH\end{matrix} \xrightarrow[H_2SO_4]{CH_3COOH} \begin{matrix}CH_2-O-C-CH_3\\ |\\ CH_2-O-C-CH_3\end{matrix}$ (O above each C)

22. Which of the following can not be obtained when alkenes are oxidised with $KMnO_4$ and then followed by acid hydrolysis ?

(1) alkanoic acids (2) alkanals (3) alkanones (4) carbon dioxide

23. Acetone will be obtained on ozonolysis of

(1) 1-pentene (2) 2-pentene (3) isopentene (4) 2-pentyne

24. Which reaction is not correct ?

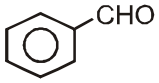
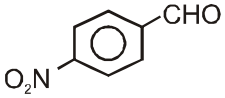
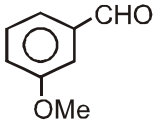
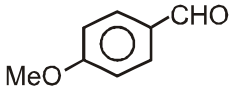
(1) $\begin{matrix}CHO\\ |\\ CHO\end{matrix} \xrightarrow{^{\ominus}OH} \begin{matrix}COO^{\ominus}\\ |\\ CH_2-OH\end{matrix}$

(2) $PhCOCHO \xrightarrow{OH^{\ominus}} Ph-\underset{\displaystyle OH}{\underset{|}{CH}}-COO^{\ominus}$

(3) $Me_3C-CHO \xrightarrow[200°C]{NaOH\ sol^{n}} Me_3C-COO^{\ominus} + Me_3C-CH_2OH$

(4) $CH_3-\underset{\displaystyle O}{\underset{\|}{C}}-CH_3 \xrightarrow{Zn-Hg/HCl} CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

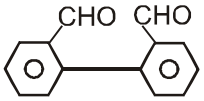
25. Arrange the following compounds in order of their rate of addition with $NaCN/H_2SO_4$

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

Correct order of rate of addition with HCN is :-

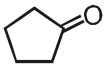
(1) 2 > 1 > 3 > 4 (2) 1 > 2 > 3 > 4 (3) 2 > 3 > 1 > 4 (4) 3 > 4 > 1 > 2

26. Which will exhibit Cannizaro reaction?

(1) Ph – COCHO (2)  (3) $\begin{matrix}CHO\\ |\\ CHO\end{matrix}$ (4) All of these

27. $(A) \xrightarrow[\Delta]{OH^{\ominus}} (P) \xrightarrow{LiAlH_4} (Q)$

If Q does not decolourise Baeyer reagent then A would be :-

(1) $PhCH_2CHO$ (2) CH_3COCHO (3)  (4) CH_3NO_2

28. The product X in the reaction is -

$$CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + CN^- \xrightarrow{H^+} C_4H_7NO \xrightarrow[H_2SO_4]{H_2O} X$$

(1) $CH_3CH_2COOCH_3$ (2) $CH_3-\underset{CN}{\underset{|}{CH}}-CH_3$ (3) $CH_3-\underset{OH}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-COOH$ (4) $CH_3-CH=CH-COOH$

29. Which of the following reactions will give benzaldehyde?

(1) $C_6H_5CH_2Cl \xrightarrow[H_2O,\Delta]{OH^-}$ (2) $C_6H_5CH(OCH_3)_2 \xrightarrow[H_2O]{H^+}$

(3) $C_6H_5COOH \xrightarrow[2.\ H_2O]{1.\ LiAlH_4}$ (4) None of these

30. The oxidation of 2-hexanol with H_2CrO_4 gives -

(1) CH_3CO_2H (2) $CH_3(CH_2)_2CO_2H$ (3) $CH_3(CH_2)_3-\overset{O}{\overset{\|}{C}}-CH_3$ (4) $CH_3(CH_2)_4CO_2H$

31. The products obtained in the reaction are -

$$CH_3CH_2-\overset{O}{\overset{\|}{C}}-\underset{CH_3}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-OH \xrightarrow{\Delta}$$

(1) $CH_3-\underset{CH_3CH_2-CH-O}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}$ $+ H_2O$

(2) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-CH_2-CH_3 + CO_2$

(3) $CH_3-CH_2-\underset{CH_3}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-OH + CO_2$

(4) none of these

32. $C_3H_8O \xrightarrow[K_2Cr_2O_7/H_2SO_4]{[O]} C_3H_6O \xrightarrow{I_2/NaOH} CHI_3 + [Y]$

In this reaction the first compound is

(1) $CH_3-CH_2-CH_2-OH$ (2) $CH_3-\underset{OH}{\underset{|}{CH}}-CH_3$ (3) $CH_3-O-CH_2-CH_3$ (4) CH_3-CH_2-CHO

33. An organic compound (X) with molecular formula $C_5H_{10}O$ yield phenyl hydrazone and gives a negative response to the iodoform test and Tollen's test. It produces n-pentane on reduction. The compound could be-

(1) Pentanal (2) 2-pentanone (3) 3-pentanone (4) amyl alcohol

34. Which of the following is a mixed ketone

(1) Pentanone (2) Acetophenone (3) Benzophenone (4) Butanone

35. Chloral is

(1) CCl_3CHO (2) CCl_3COCH_3 (3) CCl_3COCCl_3 (4) CCl_3CH_2OH

36. Carbonyl compounds are usually

(1) Ethers, aldehydes, ketones and carboxylic acids

(2) Aldehydes, ketones and carboxylic acids

(3) Aldehydes and ketones

(4) Carboxylic acids

37. Which of the aldehyde is most reactive ?
(1) C_6H_5–CHO (2) CH_3CHO (3) HCHO (4) All the equally reactive

38. $CH_3COCl \xrightarrow[Pd/BaSO_4]{2H} CH_3CHO+HCl$;

The above reaction is called
(1) Reimer-Tiemann reaction (2) Cannizzaro reaction
(3) Rosenmund reaction (4) Reformatsky reaction

39. Identify the product *C* in the series
$CH_3CN \xrightarrow{Na/C_2H_5OH} A \xrightarrow{HNO_2} B \xrightarrow{\text{Tollen's reagent}} C$
(1) CH_3COOH (2) CH_3CH_2NHOH (3) CH_3CONH_2 (4) CH_3CHO

40. Catalyst $SnCl_2$/HCl is used in
(1) Stephen's reduction (2) Cannizzaro reaction
(3) Clemmensen's reduction (4) Rosenmund's reduction

41. Methyl ethyl ketone is prepared by the oxidation of
(1) 2-propanol (2) 1-butanol (3) 2-butanol (4) *t*-butyl alcohol

42. O_3 reacts with $CH_2=CH_2$ to form ozonide. On hydrolysis it forms
(1) Ethylene oxide (2) *HCHO* (3) Ethylene glycol (4) Ethyl alcohol

43. When a mixture of methane and oxygen is passed through heated molybdenum oxide, the main product formed is
(1) Methanoic acid (2) Ethanal (3) Methanol (4) Methanal

44. An alkene of molecular formula C_9H_{18} on ozonolysis gives 2,2-dimethyl propanal & 2-butanon, then the alkene is
(1) 2, 2, 4-trimethyl -3-hexene (2) 2, 2, 6-trimethyl-3-hexene
(3) 2, 3, 4-trimethyl-2-hexene (4) 2, 2, 4-trimethyl-2-hexene

(B) Carboxylic Acid and Acid Derivatives

45. Hydrolysis of hydrogen cyanide results in the formation of
(1) Formic acid (2) Acetic acid (3) Formaldehyde (4) Acetaldehyde.

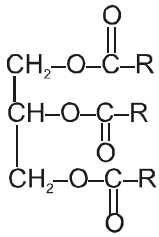
46. Which of the following does not give benzoic acid salt on oxidation with hot alkaline $KMnO_4$.
(1) Ph–CH_3 (2) Ph–CH=CH–CH_3 (3) Ph–C≡C–CH_3 (4) Ph–$C(CH_3)_3$

47. In Hunsdiecker reaction
(1) Number of carbon atoms decreased. (2) Number of carbon atoms increased
(3) Number of carbon atoms remains same (4) May be increase or decrease

48. An optically active compound (X) has molecular formula $C_4H_8O_3$. It evolves CO_2 with $NaHCO_3$. (X) reacts with $LiAlH_4$ to give an achiral compound. Structure of (X) is.

(1) $CH_3–CH_2–\underset{\displaystyle OH}{\underset{|}{CH}}–COOH$ (2) $CH_3–\underset{\displaystyle Me}{\underset{|}{CH}}–COOH$

(3) $CH_3–\underset{\displaystyle CH_2–OH}{\underset{|}{CH}}–COOH$ (4) $CH_3–\underset{\displaystyle OH}{\underset{|}{CH}}–CH_2–COOH$

49.  + 3 NaOH ⟶ (Q) + salt of fatty acid.

Product (Q) of the reaction is

(1) Ethylene glycol (2) Glycerol

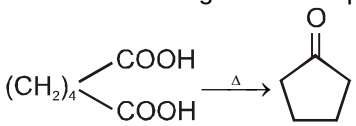
(3) Glyceryl tri nitrate (explosive) (4) Cumene hydrogen peroxides

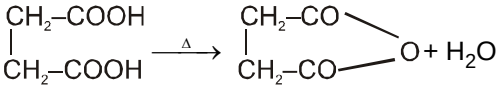
50. In the following reaction, C_2H_5OH acts as :

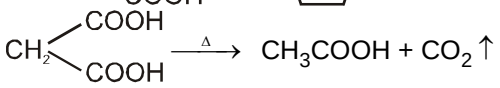
$$C_2H_5OH + CH_3COOH \xrightarrow[-H_2O]{\text{Conc. } H_2SO_4} CH_3COOC_2H_5$$

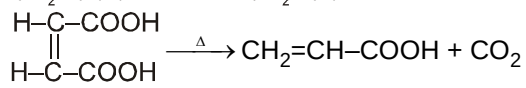
(1) electrophile (2) nucleophile (3) dehydrating agent (4) All of the above

51. Which of the following reaction represents **incorrect** product.

(1) 

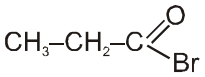
(2) 

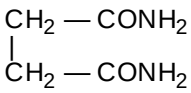
(3) 

(4) 

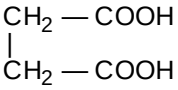
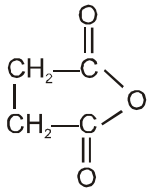
52. Starting from propanoic acid, the following reactions were carried out

Propanoic acid $\xrightarrow{SOCl_2}$ X $\xrightarrow{NH_3}$ Y $\xrightarrow{Br_2 + KOH}$ Z (the compound Z is)

(1) $CH_3–CH_2–Br$ (2) $CH_3–CH_2–NH_2$ (3)  (4) $CH_3–CH_2–CH_2–NH_2$

53.  $\xrightarrow[\Delta]{P_2O_5}$ $\xrightarrow[\Delta]{H_3O^{\oplus}}$ (P) (Q)

The product (Q) is

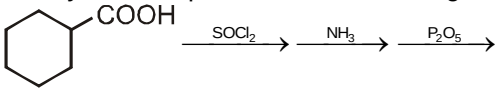
(1) $CH_3–CH_2–COOH$ (2)  (3)  (4) $CH_3–COOH$

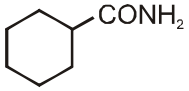
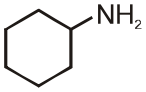
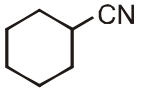
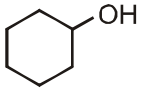
54. Which of the following reactions of alkanols does not involve C–O bond breaking

(1) $CH_3CH_2OH + SOCl_2$ (2) $CH_3CH(OH)CH_3 + PBr_3$

(3) $CH_3CH_2OH + CH_3COOH$ (4) ROH + HX

55. Identify the final product in the following sequence of reaction.

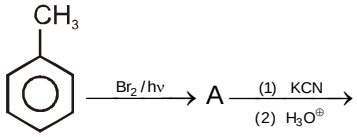


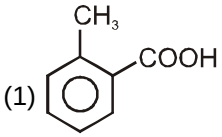
(1)  (2)  (3)  (4) 

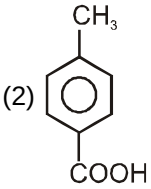
56. Which of the following acids remains unaffected on heating

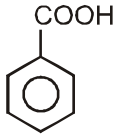
(1) Malonic acid (2) Malic acid (3) Fumaric acid (4) Succinic acid

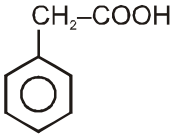
57. Identify the final product in the following sequence of reaction.



(1) 

(2) 

(3) 

(4) 

58. Identify product (Z) in following sequence of reaction

$CH_3–CH_2–CH_2–Br \xrightarrow{NaCN} (X) \xrightarrow[heat]{H_3O^{\oplus}} (Y) \xrightarrow[H^{\oplus}]{CH_3CH_2OH} (Z)$

(1) $CH_3–CH=CH–COOH$

(2) $CH_3–CH_2–CH_2–CH(–OCH_2–CH_3)_2$

(3) $CH_3–CH_2–CH_2–\underset{\underset{O}{\|}}{C}–O–CH_2–CH_3$

(4) $CH_3–CH_2–CH_2–CH(OCH_2–CH_3)_2$

59. What makes a lemon sour ?

(1) Tartaric acid (2) Oxalic acid (3) Citric acid (4) Hydrochloric acid

60. Vinegar contains

(1) 10–20% Acetic acid

(2) 50% Acetic acid

(3) 7–8% Acetic acid

(4) 100% Acetic acid

61. Methanoic acid is manufactred by the reaction of carbon monoxide and

(1) NaOH (2) dil HCl (3) conc. H_2SO_4 (4) PCl_5

62. $CH_3–CH_2–CH_2–COOH \xrightarrow{Red\ P + Br_2} CH_3-CH_2-\underset{\underset{Br}{|}}{CH}-COOH$

This reaction is called

(1) Cannizzaro reaction

(2) Schmit reaction

(3) Hell Volhard Zelinsky reaction

(4) Reimer tiemann reaction

63. $CH_3-\underset{\underset{O}{\|}}{C}-CH_2-CH_2-\underset{\underset{O}{\|}}{C}-OEt \longrightarrow CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-CH_2-\underset{\underset{O}{\|}}{C}-OEt$

The above conversion is carried out by

(1) $NaBH_4$ (2) $LiAlH_4$ (3) Na / EtOH (4) DIBAL

64. Which of the following compound takes maximum time for hydrolysis reaction.

(1) $CH_3-\underset{\underset{O}{\|}}{C}-Cl$

(2) $CH_3-\underset{\underset{O}{\|}}{C}-O-\underset{\underset{O}{\|}}{C}-CH_3$

(3) $CH_3-\underset{\underset{O}{\|}}{C}-OEt$

(4) $CH_3-\underset{\underset{O}{\|}}{C}-NH_2$

65. The reaction, RCOOR′ + R′′OH (excess) $\xrightarrow{H^+ or\ OH^-}$ RCOOR′′ + R′ OH is called.

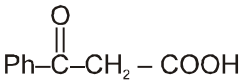
(1) Esterification (2) Trans-esterification (3) Saponification (4) Hydrolysis

66. Ethanol on heating with acetic acid in the presence of a few drops of sulphuric acid gives the smell of

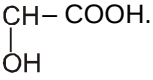
(1) Oil of wintergreen (2) Oil of mustard (3) Fruity smell (4) Oil of bitter almonds

67. Among the following, the acid which undergoes fastest decarboxylation is

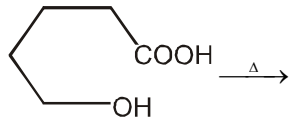
(1) 

(2) 

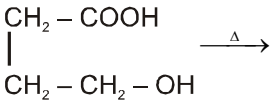
(3) PhCOOH

(4) 

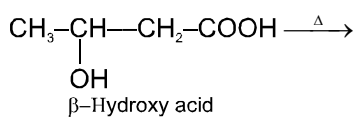
68. Which of the following reaction will not give cyclic products upon heating.

(1) 

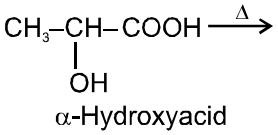
δ-Hydroxy acid

(2) 

γ-Hydroxy acid

(3) 

β–Hydroxy acid

(4) 

α-Hydroxyacid

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

(A) Aldehydes & Ketones

1. In this reaction : **[AIPMT 2003]**

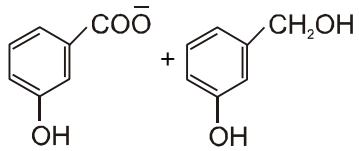
$CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN \xrightarrow{H_2O} CH_3CH(OH)COOH$

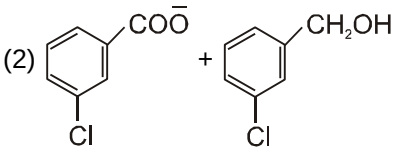
an asymmetric centre is generated. The acid obtained would be :

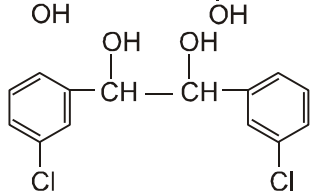
(1) D-isomer (2) L-isomer

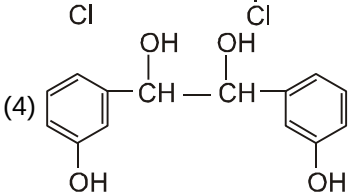
(3) 50% D + 50% L-isomer (4) 20% D + 80% L-isomer

2. When m-chlorobenzaldehyde is treated with 50% KOH solution, the product(s) obtained is (are) : **[AIPMT 2003]**

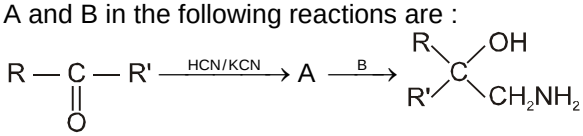
(1) 

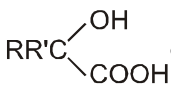
(2) 

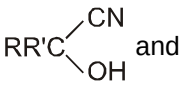
(3) 

(4) 

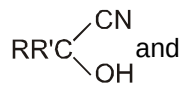
3. A and B in the following reactions are : **[AIPMT 2003]**



(1) A ⇒  and B ⇒ NH_3

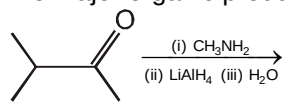
(2) A ⇒  and B ⇒ $H_3O^{\oplus}$

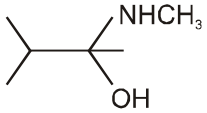
(3) A ⇒ RR'CH_2CN and B ⇒ NaOH

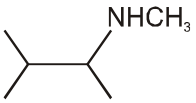
(4) A ⇒  and B ⇒ $LiAlH_4$

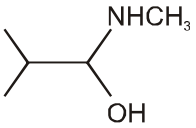
4. The reagent used for the separation of acetaldehyde from acetophenone is : **[AIPMT 2004]**
(1) $NaHSO_3$ (2) $C_6H_5NHNH_2$ (3) NH_2OH (4) NaOH + I_2

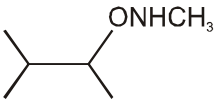
5. The major organic product formed from the following reaction is : **[AIPMT 2005]**



(1) 

(2) 

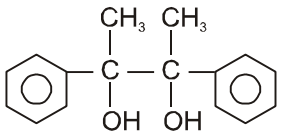
(3) 

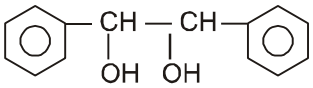
(4) 

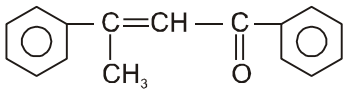
6. Which one of the following on treatment with 50% aq. NaOH yields the corresponding alcohol and acid : **[AIPMT 2007]**
(1) C_6H_5CHO (2) $CH_3CH_2CH_2CHO$ (3) CH_3COCH_3 (4) CH_3CHO

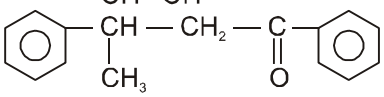
7. The product formed in aldol reaction is : **[AIPMT 2007]**
(1) a β-hydroxy aldehyde or ketone (2) an α-hydroxy aldehyde or ketone
(3) an α, β-unsaturated ester (4) a β-hydroxy acid

8. Acetophenone when reacted with a base C_2H_5ONa, yield a stable compound which has the structure : **[AIPMT 2008]**

(1) 

(2) 

(3) 

(4) 

9. A strong base can abstract an α-hydrogen from : **[AIPMT 2008]**
(1) Ketone (2) Alkane (3) Alkene (4) Amine

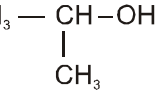
10. $H_2COH.CH_2OH$ on heating with per-iodic acid gives : **[AIPMT 2009]**
(1) $2CO_2$ (2) 2 HCOOH (3) 

(4) 2 

11. Match the compounds given in List I with their characteristic reactions given in List II. Select the correct option. **[AIPMT 2010]**

List I (Compounds)	**List II (Reactions)**
(a) $CH_3(CH_2)_3NH_2$	(i) Alkaline hydrolysis
(b) $CH_3C \equiv CH$	(ii) With KOH and $CHCl_3$ produces bad smell
(c) $CH_3CH_2COOCH_3$	(iii) Gives white ppt. with ammonical $AgNO_3$
(d) $CH_3CH(OH)CH_3$	(iv) With Lucas reagent cloudiness appears after 5 minutes

(1) a-(ii), b - (i), c - (iv), d- (iii) (2) a - (iii), b - (ii), c - (i), d - (iv)
(3) a - (ii), b - (iii), c - (i), d - (iv) (4) a - (iv), b - (ii), c - (iii), d - (i)

12. Following compounds are given **[AIPMT 2010]**
(i) CH_3CH_2OH (ii) CH_3COCH_3 (iii) 

(iv) CH_3OH
Which of the above compound (s), on being warmed with iodine solution and NaOH, will give iodoform?
(1) (i), (iii) and (iv) (2) Only (ii) (3) (i), (ii) and (iii) (4) (i) and (ii)

13. Clemmensen reduction of a ketone is carried out in the presence of which of the following ? **[AIPMT 2011]**

(1) Glycol with KOH (2) Zn-Hg with HCl (3) Li Al H_4 (4) H_2 and Pt as catalyst

14. Which one is a nucleophilic substitution reaction among the following ? **[AIPMT 2011]**

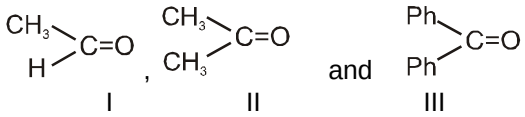
(1) $CH_3–CH=CH_2 + H_2O \xrightarrow{H^+} CH_3–\underset{\underset{OH}{|}}{CH}–CH_3$

(2) $RCHO + R'MgX \longrightarrow R–\underset{\underset{OH}{|}}{CH}–R'$

(3) $CH_3–CH_2–\underset{\underset{CH_3}{|}}{CH}–CH_2Br \longrightarrow CH_3–CH_2–\underset{\underset{CH_3}{|}}{CH}–CH_2NH_2$

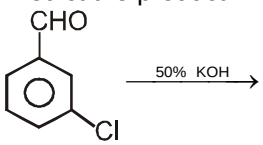
(4) $CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN$

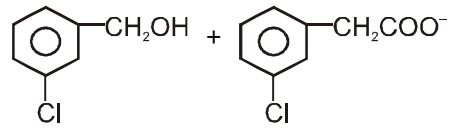
15. The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds : **[AIPMT 2011]**

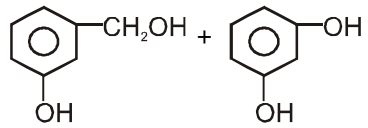


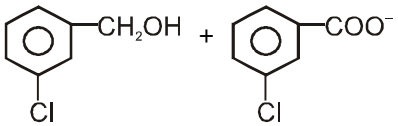
(1) III > II > I (2) II > I > III (3) I > III > II (4) I > II > III

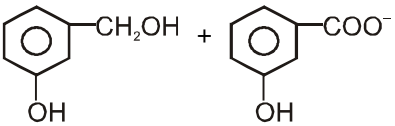
16. Predict the product in the given reaction. **[AIPMT 2012]**



(1) 

(2) 

(3) 

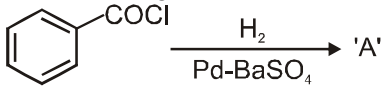
(4) 

17. Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is :

(1) $CH_3CH_2CH_2–\overset{\overset{O}{\|}}{C}–CH_3$ (2) $CH_3CH_2CH_2–\overset{\overset{O}{\|}}{C}–CH_2CH_2CH_3$ **[AIPMT 2012]**

(3) $(CH_3)_2C(OH)(OC_2H_5)$ (4) $(CH_3)_2C(OC_2H_5)_2$

18. Consider the following reaction :



The product 'A' is : **[AIPMT 2012]**

(1) C_6H_5CHO (2) C_6H_5OH (3) $C_6H_5COCH_3$ (4) C_6H_5Cl

19. Consider the reaction : **[AIPMT 2012]**

$RCHO + NH_2NH_2 \rightarrow RCH = N–NH_2$

What sort of reaction is it ?

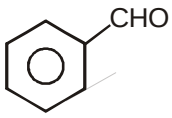
(1) Electrophilic addition - elimination reaction

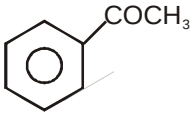
(2) Free radical addition - elimination reaction

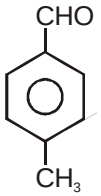
(3) Electrophilic substitution - elimination reaction

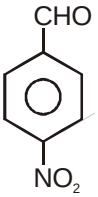
(4) Nucleophilic addition - elimination reaction

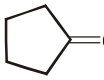
20. Which one is most reactive towards Nucleophilic addition reaction ? **[AIPMT 2014]**

(1) 

(2) 

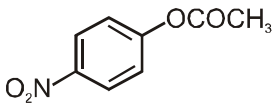
(3) 

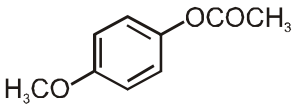
(4) 

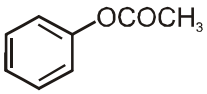
21. Treatment of cyclopentanone  with methyl lithium gives which of the following species ?

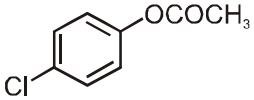
(1) Cyclopentanonyl cation (2) Cyclopentanonyl radical **[AIPMT 2015]**
(3) Cyclopentanonyl biradical (4) Cyclopentanonyl anion

22. Which one of the following esters gets hydrolysed most easily under alkaline conditions ? **[Re-AIPMT 2015]**

(1) 

(2) 

(3) 

(4) 

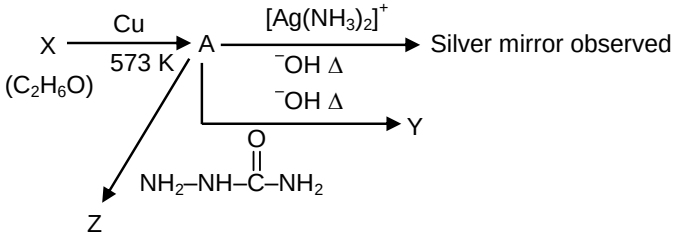
23. Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is : **[Re-AIPMT 2015]**
(1) a Grignard reagent
(2) hydrazine in presence of feebly acidic solution
(3) hydrocyanic acid
(4) sodium hydrogen sulphite

24. The product formed by the reaction of an aldehyde with a primary amine is : **[NEET-1 2016]**
(1) Aromatic acid (2) Schiff base (3) Ketone (4) Carboxylic acid

25. Which of the following reagents would distinguish cis-cyclopenta-1,2- diol from the trans-isomer ? **[NEET-1 2016]**
(1) Aluminium isopropoxide (2) Acetone (3) Ozone (4) MnO_2

26. The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is : **[NEET-1 2016]**
(1) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this processes is known as keto-enol tautomerism .
(2) a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.
(3) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.
(4) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known a carbonylation. **[NEET-1 2016]**

27. Consider the reaction **[NEET- 2017]**



Identify A, X, Y and Z

(1) A–Methoxymethane, X–Ethanoic acid, Y–Acetate ion, Z–hydrazine.

(2) A–Methoxymethane, X–Ethanol, Y–Ethanoic acid, Z–Semicarbazide.

(3) A–Ethanal, X–Acetaldehyde, Y–But–2–enal, Z-Semicarbazone.

(4) A–Ethanol, X-Acetaldehyde, Y-Butanone, Z-Hydrazone.

28. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecularmass. It is due to their : **[NEET- 2018]**

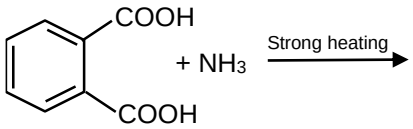
(1) Formation of intramolecular H-bonding

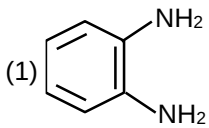
(2) Formation of intermolecular H-bonding

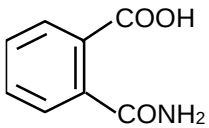
(3) more extensive association of carboxylic acid via vander Waals force of attraction

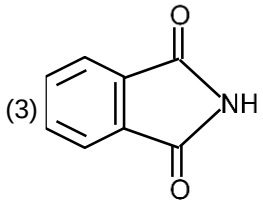
(4) formation of carboxylate ion

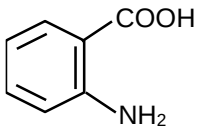
29. The major product of the following reaction is **[NEET-1- 2019]**



(1) 

(2) 

(3) 

(4) 

30. When vapour of a secondary alcohol is passed over heated copper at 573 K, the product formed is **[NEET-2- 2019]**

(1) a carboxylic acid (2) an aldehyde (3) a ketone (4) an alkene

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

1. At higher temperature, iodoform reaction is given by dilute solution of : **[AIIMS 2003]**

(1) $CH_3CO_2CH_3$ (2) $CH_3CO_2C_2H_5$ (3) $C_6H_5CO_2CH_3$ (4) $CH_3CO_2C_6H_5$

2. The reagent used for the separation of acetaldehyde from acetophenone is : **[AIIMS 2004]**

(1) $NaHSO_3$ (2) $C_6H_5NHNH_2$ (3) NH_2OH (4) NaOH-I_2

3. The most suitable reagent for the conversion of :

$RCH_2OH \longrightarrow RCHO$ is : **[AIIMS 2004]**

(1) $KMnO_4$ (2) $K_2Cr_2O_7$

(3) CrO_3 (4) PCC (pyridinium chloro chromate)

4. Methyl acetate and ethyl acetate can be distinguished by : **[AIIMS 2007]**

(1) hot alkaline $KMnO_4$ (2) Neutral $FeCl_3$ (3) Iodoform test (4) None of the above

5. 3-hydroxy butanal is formed when X-reacts with Y in dilute Z solution. What are X, Y and Z ? **[AIIMS 2008]**

	X	Y	Z		X	Y	Z
(1)	CH_3CHO,	$(CH_3)_2CO$,	NaOH	(2)	CH_3CHO,	$(CH_3)_3COH$,	NaCl
(3)	$(CH_3)_2CO$,	$(CH_3)_2CO$,	HCl	(4)	CH_3CHO,	CH_3CHO,	NaOH

6. An organic compound X on treatment with pyridinium chloro chromate in dichloromethane gives compound Y. Compound Y reacts with I_2 and alkali to form triiodomethane. The compound 'X' is **[AIIMS 2008]**

(1) C_2H_5OH (2) CH_3CHO (3) CH_3COCH_3 (4) CH_3COOH

7. If heavy water is taken as solvent instead of normal water while performing Cannizaro reaction, the products of the reaction are **[AIIMS 2009]**

(1) $RCOO^- + RCH_2OH$ (2) $RCOO^- + RCH_2OD$ (3) $RCOOD + RCD_2OD$ (4) $RCOO^- + RCD_2OD$

8. $(CH_3)_2 C = O + HCN \xrightarrow{H^+} \xrightarrow{H_3O^+} \xrightarrow[\Delta]{(i)\,H_2SO_4} \xrightarrow[(ii)\,H_2O_2,\,OH^-]{(i)\,BH_3-THF}$ product

The final predominant product is : **[AIIMS 2010]**

(1) $HOCH_2-CH(CH_3)-COOH$ (2) $CH_3-C(OH)(CH_3)-COOH$

(3) $CH_3-CH(OH)-CH_3$ (4) $CH_3-CH_2-C(=O)-COOH$

9. Carbonyl compounds undergo nucleophilic addition because of **[AIIMS 2012]**

(1) electronegativity difference of carbon and oxygen atoms

(2) electromeric effect

(3) more stable anion with negative charge on oxygen atom and less stable carbonium ion.

(4) All

10. **Assertion:**Acetoactic ester $CH_3-C(=O)-CH_2-C(=O)-OC_2H_5$ will give iodoform test **[AIIMS 2013]**

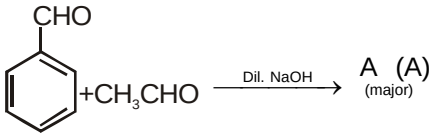
Reason: It contains $CH_3-C(=O)-$group

(1) If both assertion and reason are true and reason is a correct explanation of assertion.

(2) If both assertion and reason are true but reason is not a correct explanation of assertion.

(3) If assertion is true but reason is false.

(4) If assertion and reason both are false.

11.  will be- **[AIIMS 2014]**

(1) $C_6H_5CH(OH)-CH_2CHO$ (2) $C_6H_5CH=CH-CHO$

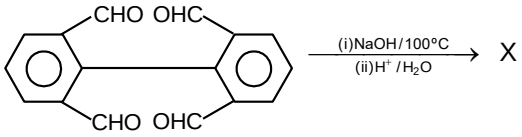
(3) $C_6H_5CH_2CH_2CHO$ (4) Both (b) & (c)

12. **Assertion :** Benzaldehyde is more reactive than ethanol towards nucleophilic attack **[AIIMS 2014]**
Reason : The overall effect of –I and +R effect of phenyl group decreases the electron density on the carbon atom of >C = O group in benzaldehyde.
(1) If both assertion and reason are true and reason is a correct explanation of assertion.
(2) If both assertion and reason are true but reason is not a correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If assertion and reason both are false.

13. In the following reaction **[AIIMS 2015]**

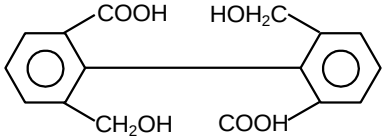
$CH_3CHO+NH_2.NH_2 \rightarrow A \xrightarrow{B} CH_3CH_3+N_2$

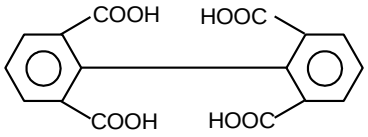
Identify A and B.
(1) $CH_3CH=NNH_2$ and C_2H_5ONa (2) $CH_3CH_2–NH_2$ and C_2H_5ONa
(3) $CH_3–NH–NH–CH_3$ and C_2H_5OH (4) $CH_3CH_2NH_2$ and C_2H_5OH

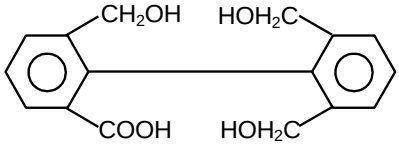
14. 

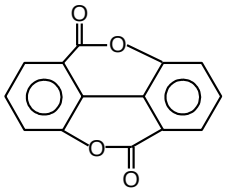
[AIIMS 2015]

Major product 'X' is

(1) 

(2) 

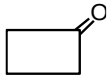
(3) 

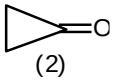
(4) 

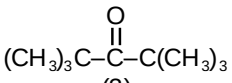
15. **Assertion :** Benzaldehyde is less reactive in comparison to ethanol towards nucleophilic attack.
Reason : All the carbon atoms of benzaldehyde are sp^2–hybridised. **[AIIMS 2015]**
(1) If both assertion and reason are true and reason is a correct explanation of assertion.
(2) If both assertion and reason are true but reason is not a correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If assertion and reason both are false.

16. **Assertion :** Benzaldehyde is more reactive than ethanol towards nuclephilic attack. **[AIIMS 2016]**
Reason : The overall effect of –I and + R effect of phenyl group decreases the electron density on the carbon atom of  C=O group .
(1) If both assertion and reason are true and reason is a correct explanation of assertion.
(2) If both assertion and reason are true but reason is not a correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If assertion and reason both are false.

17. Arrange the following in the order of increasing value of the equilibrium constant for hydration , K_{hyd} (smallest value first) : **[AIIMS 2016]**

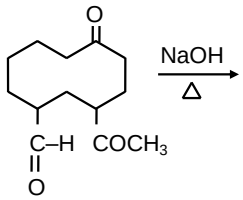

(1)

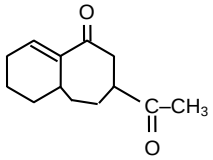

(2)

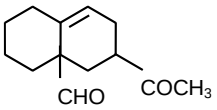

(3)

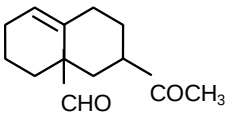
(1) 2 < 1 < 3 (2) 3 < 1 < 2 (3) 1 <2 < 3 (4) 2 < 3 < 1

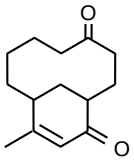
18. Final product of given Reaction : **[AIIMS 2018]**

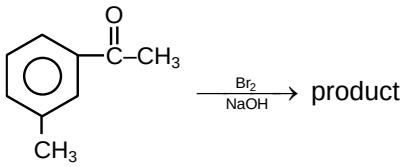


(1) 

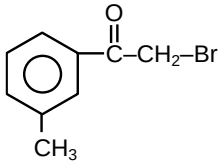
(2) 

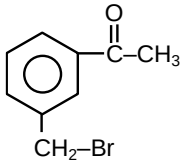
(3) 

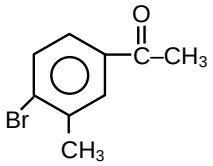
(4) 

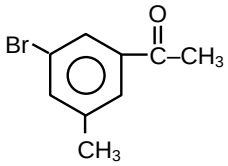
19. 

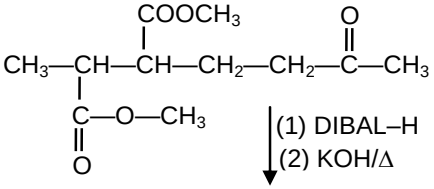
[AIIMS 2018]

(1) 

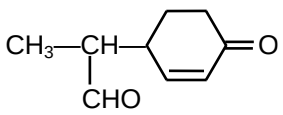
(2) 

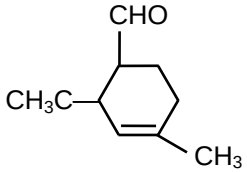
(3) 

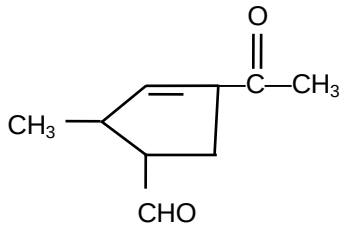
(4) 

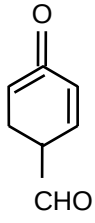
20. 

[AIIMS 2018]

(1) 

(2) 

(3) 

(4) 

PART - III : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

(A) Aldehydes and Ketones

1. On vigorous oxidation by permangnate solution $(CH_3)_2C = CHCH_2CHO$ gives **[AIEEE-2002]**

(1) $(CH_3)_2CO$ and $OHCCH_2CHO$ (2) $(CH_3)_2C(OH)-CH(OH)CH_2CHO$

(3) $(CH_3)_2CO$ and $OHCCH_2COOH$ (4) $(CH_3)_2CO$ and $CH_2(COOH)_2$

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) Benzoic acid (3) Butanal (4) Benzaldehyde

3. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound. If water during the reaction is continuously removed the compound formed is generally known as **[AIEEE-2005]**

(1) an amine (2) an imine (3) an enamine (4) a Schiff's base

4. The decreasing order of the ratio of HCN addition to compounds a to d is **[AIEEE-2006]**

(a) HCHO (b) CH_3COCH_3 (c) $PhCOCH_3$ (d) PhCOPh

(1) d > b > c > a (2) d > c > b > a (3) c > d > b > a (4) a > b > c > d

5. In the following sequence of reactions, **[AIEEE-2007]**

$CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$. The compound 'D' is

(1) n-propyl alcohol (2) propanal (3) butanal (4) n-butyl alcohol

6. In the following sequence of reactions, the alkene affords the compound 'B' **[AIEEE-2008]**
.The compound B is

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

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

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

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

the slowest step is :

(1) the transfer of hydride to the carbonyl group (2) the abstraction of proton from the carboxylic group

(3) the deprotonation of $PhCH_2OH$ (4) the attack of : $\overset{\ominus}{O}H$ at the carboxyl group

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

(1) 2, 2, 2–Trichloroethanol (2) Trichloromethanol

(3) 2, 2, 2–Trichloropropanol (4) Chloroform

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

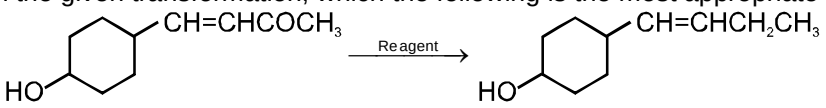
(1) Acetaldehyde (2) Acetone (3) Formaldehyde (4) Benzophenone

10. Iodoform can be prepared from all except : **[AIEEE 2012, 4/120]**

(1) Ethyl methyl ketone (2) Isopropyl alcohol

(3) 3–Methyl–2–butanone (4) Isobutyl alcohol

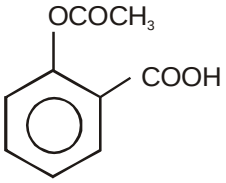
11. In the given transformation, which the following is the most appropriate reagent ? **[AIEEE 2012, 4/120]**



(1) NH_2NH_2, (2) Zn–Hg/HCl (3) Na, Liq, NH_3 (4) $NaBH_4$

(B) Carboxylic Acid and Acid Derivatives

12. Compound A given below is : **[AIEEE-2002]**



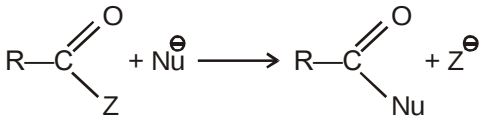
(1) antiseptic (2) antibiotic (3) analgesic (4) pesticide

13. End product of the following reaction is : **[AIEEE-2002]**

$$CH_3CH_2COOH \xrightarrow[\text{red P}]{Cl_2} \xrightarrow{\text{alcoholic KOH}}$$

(1) $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCOOH$ (2) $\underset{\displaystyle OH}{\underset{|}{CH_2}}CH_2COOH$ (3) $CH_2 = CHCOOH$ (4) $\underset{\displaystyle Cl}{\underset{|}{CH_2}}\underset{\displaystyle OH}{\underset{|}{C}}HCOOH$

14. Rate of the reaction is fastest when Z is : **[AIEEE-2004]**



(1) Cl (2) $OCOCH_3$ (3) OC_2H_5 (4) NH_2

15. Consider the acidity of the carboxylic acids : **[AIEEE-2004]**

(a) PhCOOH (b) o-$NO_2C_6H_4COOH$

(c) p-$NO_2C_6H_4COOH$ (d) m-$NO_2C_6H_4COOH$

which of the following order is correct ?

(1) a > b > c > d (2) b > c > d > a (3) b > d > a > c (4) b > d > c > a

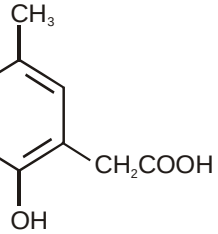
16. On mixing ethyl acetate with aqueous sodium chloride, the composition of the resultant solution is : **[AIEEE-2004]**

(1) $CH_3COOC_2H_5 + NaCl$ (2) $CH_3Cl + C_2H_5COONa$

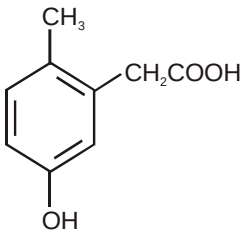
(3) $CH_3COCl + C_2H_5OH + NaOH$ (4) $CH_3COONa + C_2H_5OH$

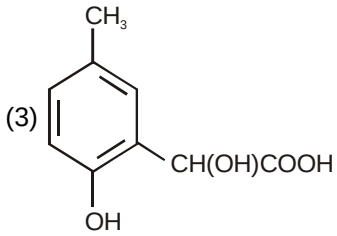
17. p-cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form, the compound B. The latter on acidic hydrolysis gives chiral carboxylic acid. The structure of the carboxylic acid is : **[AIEEE-2005]**

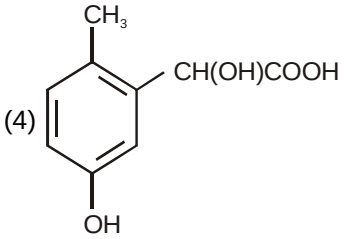
(1)



(2)



(3) 

(4) 

18. An organic compound having molecular mass 60 is found to to contain C = 20%, H = 6.67% and N = 46.67% while rest is oxygen. On heating it gives NH_3 along with a solid residue. The solid residue give violet colour with alkaline copper sulphate solution. The compound is : **[AIEEE-2005]**

(1) $CH_3CH_2CONH_2$ (2) $(NH_2)_2CO$ (3) CH_3CONH_2 (4) CH_3NCO

19. A liquid was mixed with ethanol and a drop of concentrated H_2SO_4 was added. A compound with a fruity smell was formed. The liquid was : **[AIEEE-2009]**

(1) HCHO (2) CH_3COCH_3 (3) CH_3COOH (4) CH_3OH

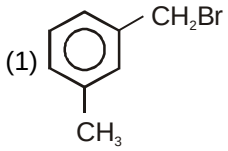
20. Sodium ethoxide has reacted with ethanoyl chloride. The compound that is produced in the above reaction is : **[AIEEE-2011]**

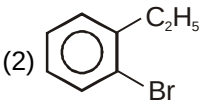
(1) Diethyl ether (2) 2-Butanone (3) Ethyl chloride (4) Ethyl ethanoate

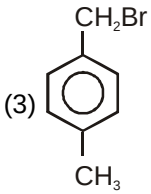
21. A compound with molecular mass 180 is acylated with CH_3COCl to get a compound with molecular mass 390. The number of amino groups present per molecule of the former compound is : **[JEE (Main) 2013, 4/120]**

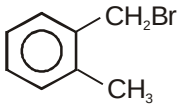
(1) 2 (2) 5 (3) 4 (4) 6

22. Compound (A), C_8H_9Br, gives a white precipitate when warmed with alcoholic $AgNO_3$. Oxidation of (A) gives an acid (B), $C_8H_6O_4$. (B) easily forms anhydride on heating. Identify the compound (A). **[JEE (Main) 2013, 4/120]**

(1) 

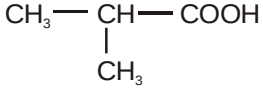
(2) 

(3) 

(4) 

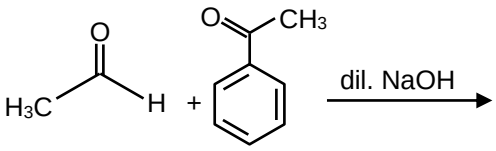
23. An organic compound A upon reacting with NH_3 gives B. On heating B gives C. C in presence of KOH reacts with Br_2 to given $CH_3CH_2NH_2$. A is : **[JEE (Main) 2013, 4/120]**

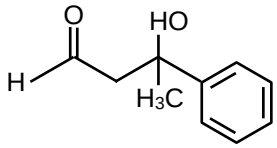
(1) CH_3COOH (2) $CH_3CH_2CH_2COOH$

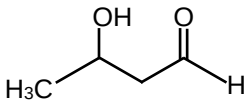
(3) 

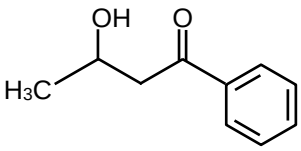
(4) CH_3CH_2COOH

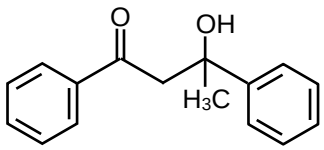
24. The major product formed in the following reaction is : **[JEE (Main) 2019, 4/120]**



(1) 

(2) 

(3) 

(4) 

25. In the following reaction **[JEE (Main) 2019, 4/120]**

Aldehyde + Alcohol $\xrightarrow{HCl}$ Acetal

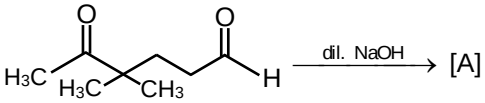
Aldehyde	Alcohol
HCHO	^{t}BuOH
CH_3CHO	MeOH

The best combination is :

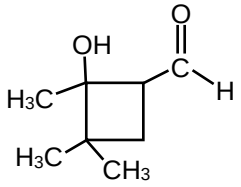
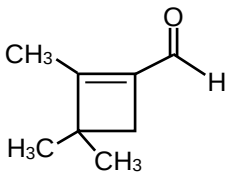
(1) HCHO and ^{t}BuOH (2) CH_3CHO and ^{t}BuOH

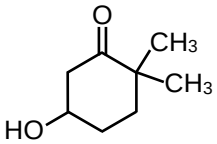
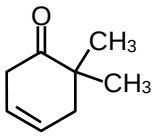
(3) HCHO and MeOH (4) CH_3CHO and MeOH

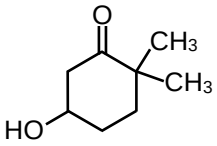
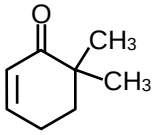
29. In the following reactions, products A and B are : **[JEE (Main) 2019, 4/120]**

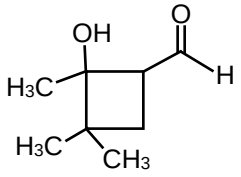
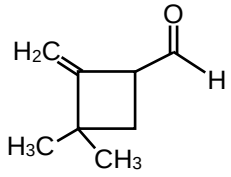


[A] $\xrightarrow[\Delta]{H_3O^+}$ [B]

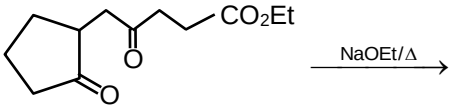
(1) (A) =  ; (B) = 

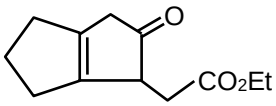
(2) (A) =  ; (B)= 

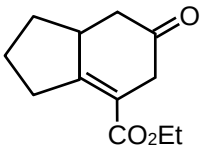
(3) (A) =  ; (B)= 

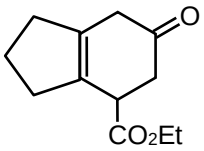
(4) (A) =  ; (B) = 

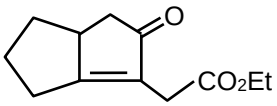
30. The major product obtained in the following reaction is; **[JEE (Main) 2019, 4/120]**



(1) 

(2) 

(3) 

(4) 

Answers

EXERCISE - 1

SECTION (A)

1.	(1)	**2.**	(1)	**3.**	(3)	**4.**	(3)	**5.**	(1)	**6.**	(4)	**7.**	(3)
8.	(1)												

SECTION (B)

1.	(2)	**2.**	(4)	**3.**	(4)	**4.**	(1)	**5.**	(2)	**6.**	(3)	**7.**	(4)
8.	(2)	**9.**	(3)	**10.**	(1)	**11.**	(2)	**12.**	(4)	**13.**	(1)	**14.**	(2)
15.	(1)	**16.**	(3)	**17.**	(1)	**18.**	(1)						

SECTION (C)

1.	(2)	**2.**	(2)	**3.**	(2)	**4.**	(1)	**5.**	(2)	**6.**	(1)	**7.**	(1)
8.	(4)												

SECTION (D)

1.	(1)	**2.**	(4)	**3.**	(3)	**4.**	(2)	**5.**	(3)	**6.**	(1)	**7.**	(2)
8.	(1)	**9.**	(2)	**10.**	(1)	**11.**	(4)	**12.**	(3)	**13.**	(3)	**14.**	(3)
15.	(4)												

SECTION (E)

1.	(4)	**2.**	(4)	**3.**	(3)	**4.**	(3)	**5.**	(3)	**6.**	(2)	**7.**	(1)
8.	(2)	**9.**	(1)	**10.**	(2)								

SECTION (F)

1.	(3)	**2.**	(3)	**3.**	(1)	**4.**	(1)	**5.**	(3)	**6.**	(2)	**7.**	(3)

SECTION (G)

1.	(3)	**2.**	(1)	**3.**	(4)	**4.**	(2)	**5.**	(4)	**6.**	(1)	**7.**	(2)
8.	(2)	**9.**	(3)										

SECTION (H)

1.	(2)	**2.**	(1)	**3.**	(2)	**4.**	(4)	**5.**	(3)	**6.**	(3)	**7.**	(4)
8.	(3)	**9.**	(1)	**10.**	(1)	**11.**	(3)						

SECTION (I)

1.	(2)	**2.**	(3)	**3.**	(4)	**4.**	(4)	**5.**	(4)				

EXERCISE - 2

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

EXERCISE - 3

PART-I

1.	(3)	**2.**	(2)	**3.**	(4)	**4.**	(1)	**5.**	(2)	**6.**	(1)	**7.**	(1)
8.	(3)	**9.**	(1)	**10.**	(4)	**11.**	(3)	**12.**	(3)	**13.**	(2)	**14.**	(3)
15.	(4)	**16.**	(3)	**17.**	(4)	**18.**	(1)	**19.**	(4)	**20.**	(4)	**21.**	(4)
22.	(1)	**23.**	(2)	**24.**	(2)	**25.**	(2)	**26.**	(1)	**27.**	(3)	**28.**	(2)
29.	(3)	**30.**	(3)										

PART-II

1.	(2)	**2.**	(1)	**3.**	(4)	**4.**	(3)	**5.**	(4)	**6.**	(1)	**7.**	(2)
8.	(1)	**9.**	(4)	**10.**	(4)	**11.**	(2)	**12.**	(1)	**13.**	(1)	**14.**	(1)
15.	(2)	**16.**	(1)	**17.**	(2)	**18.**	(1)	**19.**	(1)	**20.**	(1)		

PART-III

1.	(4)	**2.**	(4)	**3.**	(3)	**4.**	(4)	**5.**	(1)	**6.**	(3)	**7.**	(1)
8.	(1)	**9.**	(1,3)	**10.**	(4)	**11.**	(1)	**12.**	(3)	**13.**	(3)	**14.**	(1)
15.	(2)	**16.**	(1)	**17.**	(3)	**18.**	(2)	**19.**	(3)	**20.**	(4)	**21.**	(2)
22.	(4)	**23.**	(4)	**24.**	(3)	**25.**	(3)	**29.**	(3)	**30.**	(4)		