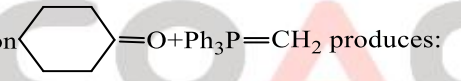
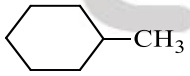
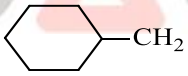
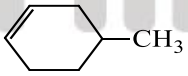
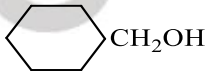
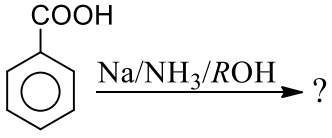
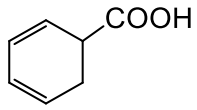
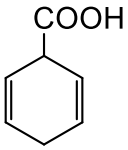
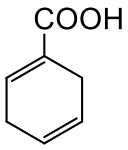
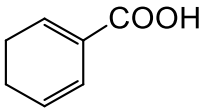
Date : **TEST ID: XIICH1201**
Marks : **CHEMISTRY**

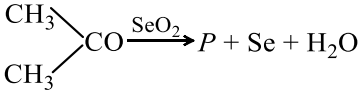
ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

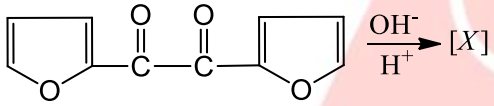
Single Correct Answer Type

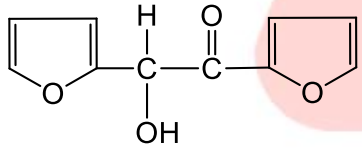
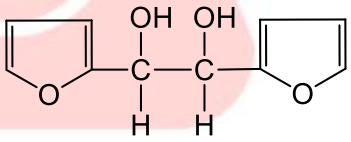
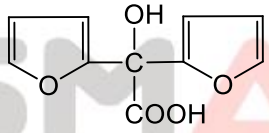
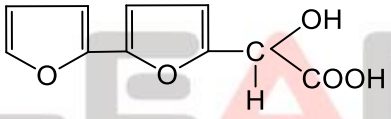
1. On heating with aqueous alkali, chloroform yields:
   a) HCHO b) HCOOH c) CH_3OH d) CO_2 and H_2O
2. A keto ester (A) with molecular formula $C_6H_{10}O_3$ on treatment with $NaOH + I_2$ does not give iodoform but on boiling with dilute KOH gives a compound (B) with molecular formula $C_4H_5O_3K$ which upon acidification followed by heating undergoes decarboxylation to give acetone. The keto ester (A) is
   a) $CH_3COCH_2CH_2COOCH_3$ b) $CH_3COCH_2COOC_2H_5$
   c) $CH_3CH_2OCH_2COOCH_3$ d) $CH_3 - COCH(CH_3)COOCH_3$
3. In the reaction, $HCHO + NH_3 \rightarrow X, X$ is
   a) *meta*-formaldehyde b) *para*-formaldehyde c) urotropine d) None of these
4. $CH_3CH_2 - CHO \xrightarrow[\text{alkali}]{\text{Dil.}}$ product
   The product in the above reaction is
   a) CH_3CH_2COOH b) $CH_3CH_2 - CH_2OH$
   c) $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—CHO$ d) $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CHO$
5. One mole of an organic compound requires 0.5 mole of oxygen to produce an acid. The compound may be:
   a) Alcohol b) Ether c) Ketone d) Aldehyde
6. Acetic acid reacts with PCl_5 to form
   a) $CH_2ClCOOH$ b) $CHCl_2COOH$ c) CH_3COCl d) CH_3COOCl
7. The calcium salt of the final oxidation product of ethanol on dry distillation gives:
   a) Formaldehyde b) Acetaldehyde c) Acetone d) Formic acid
8. Coal-tar is obtained as by product during :
   a) Destructive distillation of wood
   b) Destructive distillation of coal
   c) Destructive distillation of bones
   d) None of the above
9. CH_3COOH and C_6H_5COOH can be distinguished by:
   a) Flame test b) Solubility in water c) Physical state d) All of these
10. The reaction  produces:
    a)  b)  c)  d) 
11. Methylene chloride on hydrolysis yields:
    a) HCHO b) CH_3CHO c) CH_3COCl d) None of these
12. 
    Product is

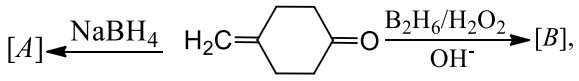
a) 
b) 
c) 
d) 

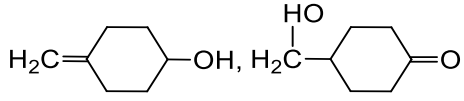
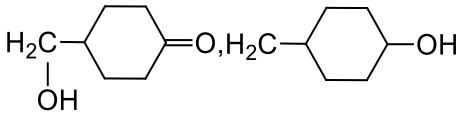
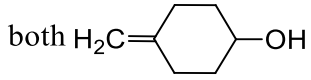
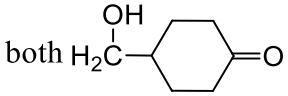
13. Which of the following compounds does not have a carboxyl group?
a) Methanoic acid b) Ethanoic acid c) Picric acid d) Benzoic acid
14. 2,4-dichlorophenoxy acetic acid is used as a:
a) Fungicide b) Insecticide c) Herbicide d) Moth repellent
15. Which one of the following is reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon?
a) Ethyl acetate b) Acetic acid c) Acetamide d) Butan-2-one
16. 3-pentanol on reaction with aluminium tertiary butoxide in the presence of acetone gives
a) 3-pentanal b) 2-pentanal c) 3-pentanone d) 2-pentanone
17. Bakelite is obtained from phenol by reacting with:
a) HCHO b) $(CH_2OH)_2$ c) CH_3CHO d) CH_3COCH_3
18. The silver salt of a fatty acid on refluxing with an alkyl halide gives an
a) Acid b) Ester c) Ether d) Amine
19. In the reaction, *P* is:



a) CH_3COCHO b) CH_3COOCH_3 c) CH_3COCH_2OH d) None of these
20. 

Product is
a) 
b) 
c) 
d) 

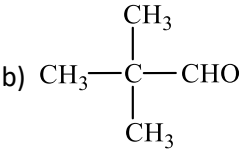
21. Which will give Hofmann bromamide reaction?
a)  b) CH_3CONH_2 c) H_2NCONH_2 d) All of these
22. Distillation involves all the following processes except:
a) Change of state b) Boiling c) Condensation d) Evaporation
23. 

[*A*] and [*B*] are
a) 
b) 
c) both 
d) both 

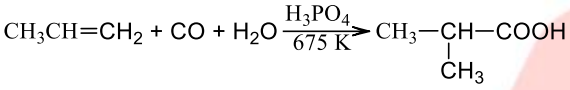
24. The reaction,
$CH_3CHO + H_2N—NH_2 \rightarrow CH_3CH=N\cdot NH_2$ is:

a) Elimination b) Addition c) Addition-elimination d) None of these

25. Which of the following would undergo aldol condensation?

a) CCl_3CHO b)  c) CH_3CH_2CHO d) HCHO

26. Acetalsehyde reacts with:
    a) Only nucleophiles
    b) Both electrophiles and nucleophiles
    c) Only electrophiles
    d) Only free radicals

27. 

    This reaction is called
    a) The Stevens reaction b) The carbonylation reactionc
    c) The Koch reaction d) Oxidation

28. Which of the following statement is correct?
    a) Acidity increases with increase in carbon atoms in carboxylic acids.
    b) Solubility of carboxylic acid increases with increase in carbon atoms.
    c) Boiling points of acids are higher than corresponding alcohols.
    d) None of the above.

29. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is
    a) Pyridinium chloro-chromate b) Chromic anhydride in glacial acetic acid
    c) Acidic dichromate d) Acidic permanganate

30. The catalyst used in Rosenmund reaction is
    a) Zn/Hg b) $Pd/BaSO_4$ c) Raney Ni d) Na in ethanol

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ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

ANSWER KEY

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

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HINTS AND SOLUTIONS

1 **(b)**

$CHCl_3 \xrightarrow{HOH} CH(OH)_3 \longrightarrow HCOOH$

2 **(b)**

The keto-ester (A) does not give haloform reaction inspite of the presence of CH_3CO- group in it. The reason is the presence of active methylene group $(ie, -CH_2-)$, which prevents the conversion of CH_3CO- to CX_3CO-

3 **(c)**

Formaldehyde reacts with NH_3 to form urotropine which is used as medicine to cure urinary infections.

$6HCHO + 4NH_3 \rightarrow (CH_2)_6N_4$

Formaldehyde ammonia hexamethylene tetramine urotropine

4 **(d)**

Aldehydes and ketones having α-hydorgen atom undergo aldol condensation in presence of dilute base

5 **(d)**

$CH_3CHO \xrightarrow{[O]} CH_3COOH$

6 **(c)**

Acetic acid reacts with PCl_5 to form acetyl chloride.

$CH_3COOH + PCl_5 \longrightarrow CH_3COCl + POCl_3 + HCl$

acetic acid acetyl chloride

9 **(d)**

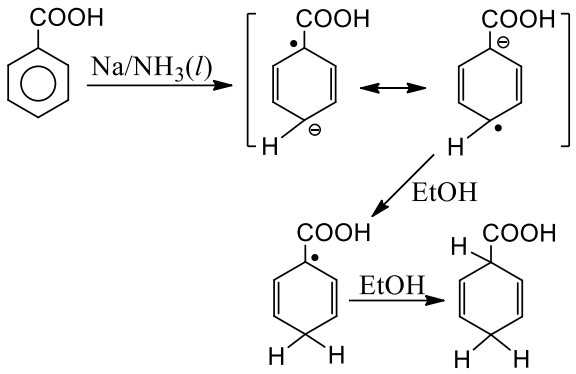
C_6H_5COOH is solid, less soluble in water and burn with smoky flame.

11 **(a)**

$CH_2Cl_2 \xrightarrow{HOH} HCHO$

12 **(b)**

When aromatic carboxylic acids are subjected to Birch reduction $(ie,$ Na or K in NH_3 and an alcohol), 1, 4-additional of hydrogen takes place and 1, 4-cyclohexadiene carboxylic acids are produced



13 **(c)**

Picric acid is 2,4,6-trinitrophenol.

14 **(c)**

Herbicides are the substances that kills plants or inhibit their growth. Selective herbicides affect only particular plant types, making it possible to attack weeds growing among cultivated plants.

15 **(d)**

Carbonyl compounds are reduced to corresponding alkanes with (Zn+ conc.HCl).

It is called Clemmensen reduction.

$$CH_3CH_2.\underset{\underset{O}{\|}}{C}-CH_3 \xrightarrow{Zn(Hg)+HCl} CH_3CH_2CH_2CH_3$$

16 **(c)**

Aluminium tertiary butoxide is an oxidising agent used for the oxidation of secondary alcohols into ketones.

$$CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_2-CH_3$$

3-pentanol

$$\xrightarrow{Al[OCMe_3]_3/acetone} CH_3-CH_2-\underset{\underset{O}{\|}}{C}-CH_2-CH_3$$

3-pentanone

18 **(b)**

The silver salt of fatty acid on refluxing with an alkyl halide, give an ester.

$$RCOOAg + R'Cl \xrightarrow{\Delta} \underset{\text{ester}}{RCOOR'} + AgCl$$

19 **(a)**

$$CH_3COCH_3 \xrightarrow{SeO_2} CH_3CO\cdot CHO + Se + H_2O$$

20 **(c)**

1, 2 diketone undergoes rearrangement to α-hydroxy carboxylic acid in presence of base. This reaction is known as benzilic acid rearrangement

23 **(b)**

In the given compound, carbonyl group is reduced to – OH group by $NaBH_4$ and it does not affect double bond. The another is hydroboration-oxidation reaction, in which one water molecule is added to double bond

26 **(b)**

$$CH_3CHO \xrightarrow{Na/C_2H_5OH} CH_3CH_2OH$$

28 **(c)**

1. Acidity decreases with increase in number of carbon atoms in carboxylic acid.

2. Solubility of carboxylic acid decrease with increase in number of carbon atoms. Higher acids are insoluble in H_2O.

3. Boiling points of acids are higher than corresponding alcohols due to greater extent of hydrogen bonding.

∴ (c) is correct answer.

29 **(b)**

Only suitable reagent is chromic anhydride in glacial acetic acid. Other will also effect (C=C) bond.

30 **(b)**

In the Rosenmund's reaction the acid chlorides are converted to corresponding aldehydes by catalytic reaction. This reaction is carried in the presence of palladium deposited over barium, sulphate.

$$\underset{\text{Acetyl chloride}}{CH_3-\overset{\overset{O}{\|}}{C}-Cl} + H_2 \xrightarrow{Pd,BaSO_4} \underset{\text{acetaldehyde}}{CH_3CHO} + HCl$$