DPP - Daily Practice Problems

Date : | **Start Time :** | **End Time :**

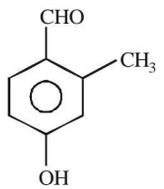
CHEMISTRY CC26

SYLLABUS : Aldehydes, Ketones and Carboxylic acids

Max. Marks : 120 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. IUPAC name of following will be



(a) 4-formyl 3-methyl 1-hydroxy benzene
(b) 4-formyl 3-methyl phenol
(c) 4-hydroxy 2-methyl benzaldehyde
(d) 4-hydroxy 2-methyl carbaldehyde

2. In which of the following, the number of carbon atoms does not remain same when carboxylic acid is obtained by oxidation

(a) CH_3COCH_3 (b) CCl_3CH_2CHO
(c) $CH_3CH_2CH_2OH$ (d) CH_3CH_2CHO

3. Acetone oxime is obtained by reacting acetone with

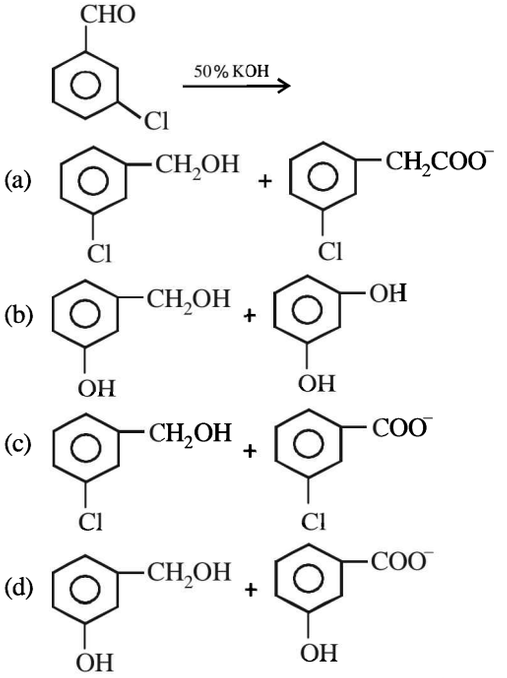
(a) NH_3 (b) NH_2OH
(c) NH_2Na (d) $NH_2.NH_2$

4. Which alkene on ozonolysis gives CH_3CH_2CHO and $CH_3\overset{\overset{O}{\|}}{C}CH_3$

(a) $CH_3CH_2CH=C(CH_3)_2$ (b) $CH_3CH_2CH=CHCH_2CH_3$
(c) $CH_3CH_2CH=CHCH_3$ (d) $CH_3-\underset{\underset{CH_3}{|}}{C}=CHCH_3$

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ

5. Predict the product in the given reaction.



6. The carboxyl functional group (– COOH) is present in

(a) picric acid (b) barbituric acid

(c) ascorbic acid (d) aspirin

7. Which one of the following is reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon?

(a) Acetamide (b) Acetic acid

(c) Ethyl acetate (d) Butan-2-one

8. Carboxylic acid group does not give the usual addition and elimination reactions of aldehydes and ketones because

(a) O–H bond is more polar than $>C=O$ group

(b) carboxylate ion gets ionised

(c) carboxylate ion gets stabilised by resonance

(d) it exists as – COOH and there is no carbonyl group

9. Phenylmethyl ketone can be converted into ethylbenzene in one step by which of the following reagents?

(a) $LiAlH_4$ (b) Zn-Hg/HCl

(c) $NaBH_4$ (d) CH_3MgI

10. In a set of the given reactions, acetic acid yielded a product C.

$$CH_3COOH + PCl_5 \longrightarrow A \xrightarrow[Anh.AlCl_3]{C_6H_6} B \xrightarrow[Ether]{C_2H_5MgBr} C$$

Product C would be -

(a) $CH_3-\underset{\displaystyle C_2H_5}{\underset{|}{C}}(OH)C_6H_5$ (b) $CH_3CH(OH)C_2H_5$

(c) $CH_3COC_6H_5$ (d) $CH_3CH(OH)C_6H_5$

11. An organic compound 'A' on treatment with NH_3 gives 'B' which on heating gives 'C', 'C' when treated with Br_2 in the presence of KOH produces ethylamine. Compound 'A' is:

(a) CH_3COOH (b) $CH_3CH_2CH_2COOH$

(c) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}COOH$ (d) CH_3CH_2COOH

12. Match the compounds given in List-I with List-II and select the suitable option using the code given below :

List I	**List-II**
(A) Benzaldehyde	(i) Phenolphthalein
(B) Phthalic anhydride	(ii) Benzoin condensation
(C) Phenyl benzoate	(iii) Oil of wintergreen
(D) Methyl salicylate	(iv) Fries rearrangement

Code :

	(A)	(B)	(C)	(D)
(a)	(iv)	(i)	(iii)	(ii)
(b)	(iv)	(ii)	(iii)	(i)
(c)	(ii)	(iii)	(iv)	(i)
(d)	(ii)	(i)	(iv)	(iii)

13. $C_6H_5CH=CHCHO \xrightarrow{X} C_6H_5CH=CHCH_2OH$

In the above sequence X can be :

(a) H_2/Ni (b) $NaBH_4$

(c) $K_2Cr_2O_7/H^+$ (d) Both (a) and (b)

14. Acetaldehyde reacts with semicarbazide and forms semicarbazone. Its structure is

(a) $CH_3CH=NNHCON=CHCH_3$

(b) $CH_3CH=NNHCONH_2$

(c) $CH_3CH=N-\underset{\displaystyle OH}{\underset{|}{N}}-CONH_2$

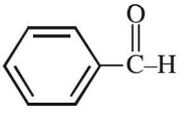
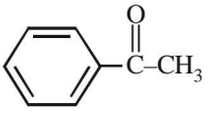
(d) $CH_3CH=N-CONHNH_2$

RESPONSE GRID					
	5. ⓐⓑⓒⓓ	**6.** ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ
	10. ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ

15. Which one of the following can be oxidised to the corresponding carbonyl compund?
(a) 2-hydroxy-propane
(b) Ortho-nitro-phenol
(c) Phenol
(d) 2-methyl-2 hydroxy-propane

16. Benzoic acid may be converted to ethyl benzoate by reaction with :
(a) Sodium ethoxide
(b) Ethyl chloride
(c) Dry HCl—C_2H_5OH
(d) Ethanol

17. Heating mixture of sodium benzoate and soda-lime gives
(a) benzene (b) methane
(c) sodium phenoxide (d) calcium benzoate

18. Which of the following compounds is most reactive towards nucleophilic addition reactions?
(a) $CH_3-\overset{\overset{O}{\|}}{C}-H$
(b) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$
(c) 
(d) 

19. The increasing order of the rate of HCN addition to compound A – D is
(A) HCHO (B) CH_3COCH_3
(C) $PhCOCH_3$ (D) PhCOPh
(a) D < C < B < A (b) C < D < B < A
(c) A < B < C < D (d) D < B < C < A

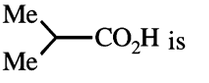
20. Sodium formate on heating yields
(a) Oxalic acid and H_2
(b) Sodium oxalate and H_2
(c) CO_2 and NaOH
(d) Sodium oxalate

21. 5 - methyl -2 -hexanone can be synthesised from acetoacetic ester and RX. Which of the following RX is used ?
(a) $(CH_3)_2CHBr$
(b) $(CH_3)_2CHCH_2Br$
(c) $CH_3CH_2CHBrCH_3$
(d) $(CH_3)_2CHCH_2CH_2Br$

22. The following tetrahedral intermediate breaks down to

$$CH_3-CH_2-\overset{\overset{OH}{|}}{\underset{\underset{OCH_3}{|}}{C}}-Cl$$

(a) propanal and HCl
(b) methyl propanoate and HCl
(c) propanoic acid and CH_3Cl
(d) propyl chloride and CH_3OH

23. The correct order of increasing acid strength of the compounds
(A) CH_3CO_2H (B) $MeOCH_2CO_2H$
(C) CF_3CO_2H (D)  is
(a) D < A < B < C (b) A < D < B < C
(c) B < D < A < C (d) D < A < C < B

24. The compound that neither forms semicarbazone nor oxime is
(a) HCHO
(b) CH_3COCH_2Cl
(c) CH_3CHO
(d) $CH_3CONHCH_3$

RESPONSE GRID					
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ

- -

25. Which of the following cannot reduce Fehling solution?
(a) Formic acid (b) Acetic acid
(c) Formaldehyde (d) Acetaldehyde

26. Pinacolone is
(a) 2, 3-Dimethyl-2, 3-butanediol
(b) 3,3-Dimethyl-2-butanone
(c) 1-Phenyl-2-propanone
(d) 1, 1-Diphenyl-1, 2-ethandiol

27. Conversion of acetaldehyde into ethyl acetate in presence of aluminium ethoxide is called
(a) Aldol condensation (b) Cope reaction
(c) Tischenko reaction (d) Benzoin condensation

28. Self condensation of two moles of ethyl acetate in presence of sodium ethoxide yields
(a) acetoacetic ester
(b) methyl acetoacetate
(c) ethyl propionate
(d) ethyl butyrate

29. The reagent which can be used to distinguish acetophenone from benzophenone is
(a) 2,4- dinitrophenylhydrazine
(b) aqueous solution of $NaHSO_3$
(c) benedict reagent
(d) $I_2$and Na_2CO_3

30. The compound formed when malonic ester is heated with urea is
(a) Cinnamic acid (b) Butyric acid
(c) Barbituric acid (d) Crotonic acid.

RESPONSE GRID	**25.** ⓐⓑⓒⓓ **26.** ⓐⓑⓒⓓ **27.** ⓐⓑⓒⓓ **28.** ⓐⓑⓒⓓ **29.** ⓐⓑⓒⓓ **30.** ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 26 - CHEMISTRY			
Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	35	Qualifying Score	51
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

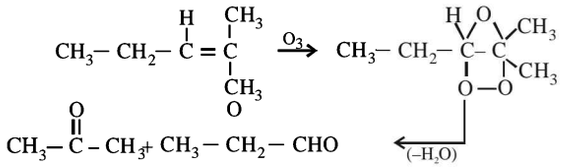
1. (c)

2. (a) Ketones on oxidation give carboxylic acids with lesser number of carbon atoms, i.e.,

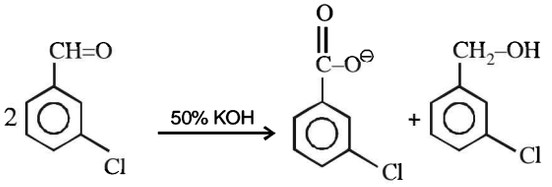
$$CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + CO_2 + H_2O$$

3. (b)

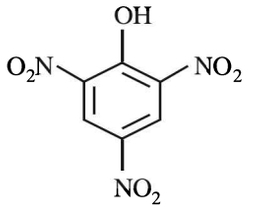
4. (a)



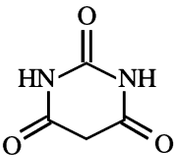
5. (c) Cannizzaro reaction - when an aldehyde containing no α – H undergo reaction in presence of 50% KOH. It disproportionates to form a molecule of carboxylic acid and a molecule of alcohol.



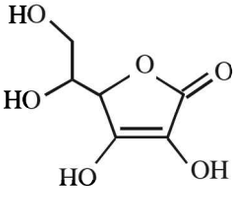
6. (d)



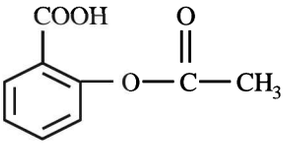
(Picric acid)



(Barbituric acid)



(Ascorbic acid)

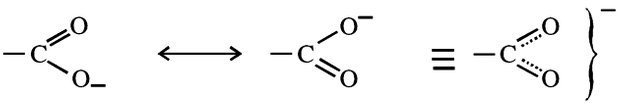


(Aspirin)

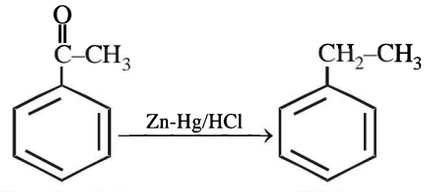
7. (d) It is Clemmensen's reduction

$$CH_3-\overset{\overset{O}{\|}}{C}-CH_2-CH_3 \xrightarrow[\text{Conc. HCl}]{\text{Zn}-\text{Hg}} CH_3CH_2-CH_2CH_3$$

8. (c) Due to resonance in carboxylate ion, the double bond character of C = O bond in carboxylic acids is greatly reduced as compared to that in aldehydes and ketones.



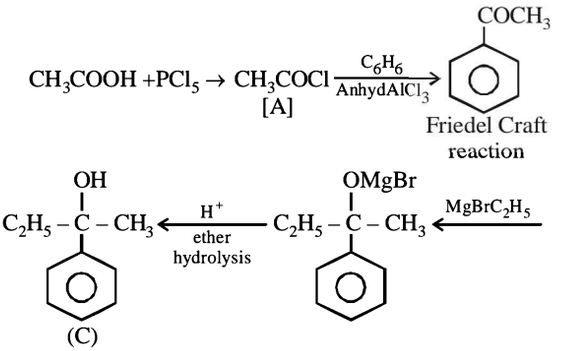
9. (b)



Phenyl methyl ketone — Ethyl benzene

This reaction is known as Clemmensen's reduction.

10. (a)

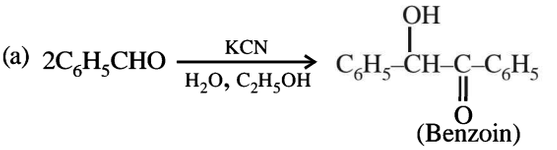


(C)

11. (d) Since, C when heated with Br_2 in presence of KOH produces ethylamine, hence it must be propanamide and hence the organic compound (A) will be propanoic acid. The reactions follows.

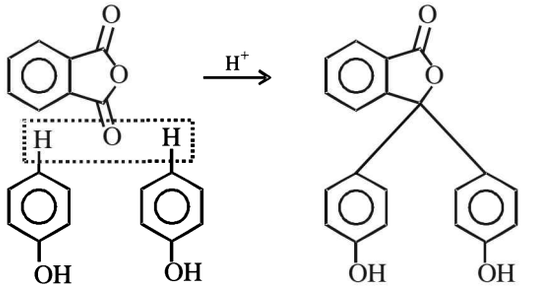
$$\underset{\text{(A)}}{CH_3-CH_2-COOH} \xrightarrow{NH_3} \underset{\text{(B)}}{CH_3-CH_2-COO^-NH_4^+} \xrightarrow{\Delta} \underset{\text{(C)}}{CH_3-CH_2-CONH_2} \xrightarrow[\text{Hoffmann bromamide reaction}]{KOH+Br_2} \underset{\text{(Ethylamine)}}{CH_3-CH_2-NH_2}$$

12. (d) (a)



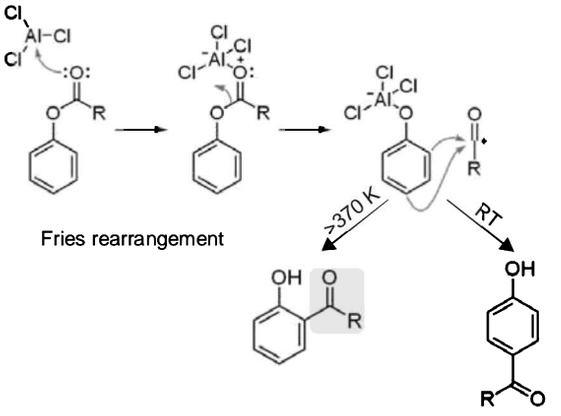
(Benzoin)

(b)



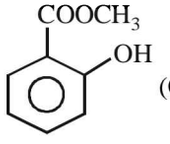
Phenolphthalein

(c)



Fries rearrangement

(d)

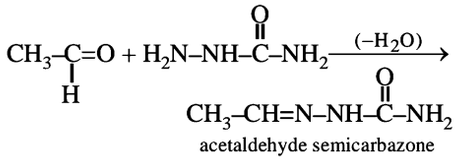


(Oil of wintergreen)

13. **(b)** $NaBH_4$ selectively reduces the aldehyde group to alcohol without affecting double bond in a organic compound. So, X is $NaBH_4$.

$$C_6H_5CH=CHCHO \xrightarrow{NaBH_4} C_6H_5CH=CHCH_2OH$$

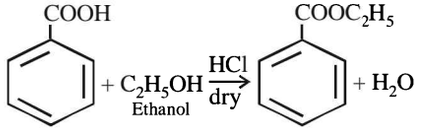
14. **(b)**



acetaldehyde semicarbazone

15. **(a)**

16. **(c)**



This process is known as esterification.

17. **(a)**

18. **(a)**

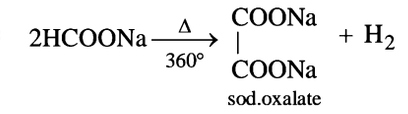
19. **(a)** Addition of HCN to carbonyl compounds is nucleophilic addition reaction. The order of reactivity of carbonyl compounds is

Aldehydes (smaller to higher) Ketones (smaller to higher), Then

$PhCOPh < Ph.COCH_3 < CH_3COCH_3 < HCHO$

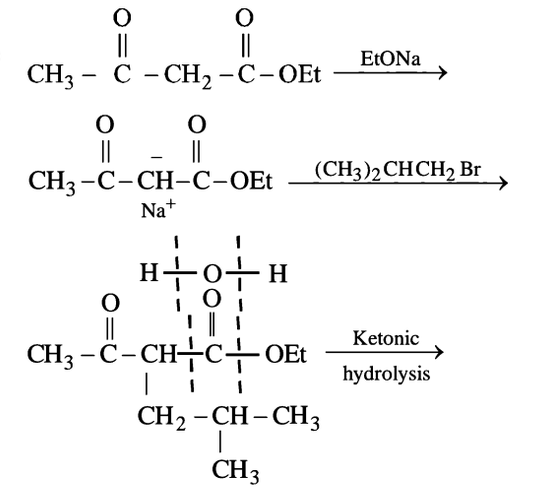
The lower reactivity of ketones is due to presence of two alkyl group which shows +I effect. The reactivity of ketones decreases as the size of alkyl group increases.

20. **(b)**

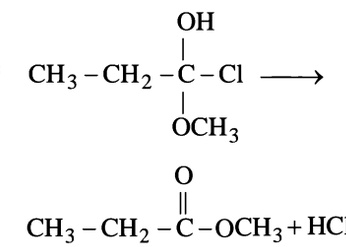


sod.oxalate

21. **(b)**



22. **(b)**



23. **(a)** The correct order of increasing acid strength

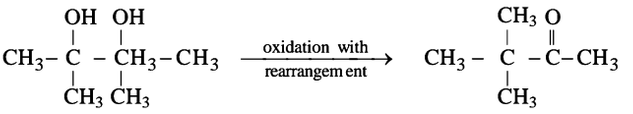
$(Me)_2CH.COOH < CH_3COOH < MeOCH_2COOH < CF_3COOH$

Electron withdrawing groups increase the acid strength and electron donating groups decrease the acid strength.

24. **(d)**

25. **(b)** Acetic acid does not have –CHO grouping, while all others (HCOOH, HCHO and CH_3CHO) have –CHO grouping

26. **(b)** Pinacolone is oxidation product of pinacol.



Pinacol

Pinacolone

3, 3-dimethyl-2-butanone

27. **(c)** Aldehydes having α- H atom, when treated with *aluminium ethoxide* (in place of NaOH or KOH), undergo Cannizzaro type of reaction with a difference that the product isolated is an ester rather than salt of acid or alcohol. Such reaction in called Tischenko reaction.

$$\underset{\text{Acetaldehyde}}{2CH_3CHO} \xrightarrow{Al(OC_2H_5)_3}$$

$$[CH_3COOH + CH_3CH_2OH] \rightarrow \underset{\text{Ethylacetate}}{CH_3COOC_2H_5}$$

28. **(a)** It is an example of Claisen condensation. The product is acetoacetic ester.

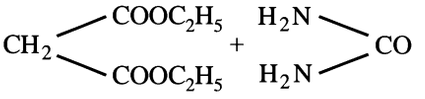
$$CH_3\overset{O}{\overset{\|}{C}}-\boxed{OC_2H_5+H}-CH_2-\overset{O}{\overset{\|}{C}}-OC_2H_5 \longrightarrow$$

$$CH_3-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-OC_2H_5$$

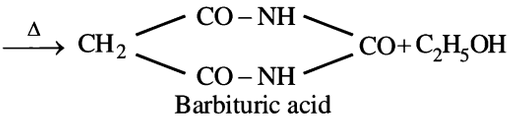
(ethyl acetoacetate)

29. **(d)** I_2 and Na_2CO_3 react with acetophenone ($C_6H_5COCH_3$) to give yellow ppt. of CHI_3 but benzophenone ($C_6H_5COC_6H_5$) does not and hence can be used to distinguish between them.

30. **(c)**



Malonic ester



Barbituric acid