14 Chapter

ORGANIC CHEMISTRY
Some Techniques - (Practical Organic Chemistry)

A SINGLE CORRECT CHOICE TYPE

Each of these questions has 4 choices (a), (b), (c) and (d) for its answer, out of which ONLY ONE is correct.

1. In steam distillation of aniline, function of steam is
(a) to increase the vapour pressure of the liquid to be distilled
(b) to decrease the vapour pressure of the liquid to be distilled
(c) to carry vapours of the liquid with it, it has nothing to do with the vapour pressure of the liquid
(d) to dissolve the liquid due to high temperature

2. During steam distillation of a mixture of *o*-nitrophenol and *p*-nitrophenol
(a) vapours of *o*-nitrophenol are carried by steam because of its lower boiling point due to chelation.
(b) vapours of *o*-nitrophenols are carried by steam because of its lower boiling point and solubility in steam.
(c) vapours of *o*-nitrophenol are carried by steam because its boiling point is reduced by steam.
(d) vapours of *p*-nitrophenol are carried by steam because of its lower boiling point.

3. A mixture of two organic compounds A (b.p. 80°C) and B (b.p. 110°C) can be separated by
(a) sublimation
(b) steam distillation
(c) fractional distillation
(d) fractional crystallisation

4. A mixture of sugar and common salt can be separated by
(a) water (b) alcohol
(c) petroleum ether (d) all the three

5. Lassaigne's test for nitrogen is positive for which compound ?
(a) NH_2OH (b) NH_2NH_2
(c) H_2NCONH_2 (d) All the three

6. Diazo compounds, sometimes do not respond Lassaigne's test for nitrogen because
(a) these are quite stable compounds and do not decompose to elemental nitrogen
(b) these contain very little carbon
(c) these form organometallic compounds with sodium
(d) their nitrogen contents is removed, during heating, in the form of nitrogen gas

7. Which of the following compound will give white precipitate on heating with HNO_3 followed by addition of silver nitrate ?
(a) $(C_2H_5)_3NHCl$
(b) 2, 4, 6-Trinitrochlorobenzene
(c) Both (a) and (b)
(d) None of these

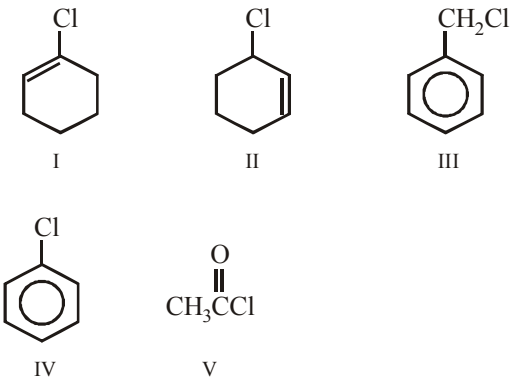
8. Lassaigne's extract of *p*-nitrochlorobenzene is acidified with dil.HNO_3 and then treated with silver nitrate solution, the white precipitate formed is due to
(a) AgCl
(b) AgCN
(c) both (a) and (b)
(d) no white ppt. is obtained.

9. Carius method is not reliable for the estimation of
(a) Cl (b) Br
(c) I (d) S

10. Positive Beilstein test for halogens shows that
(a) a halogen is definitely present
(b) a halogen may be present
(c) a halogen is absent
(d) none of these.

MARK YOUR RESPONSE					
	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ

11. An organic compound is boiled with HNO_3, cooled and then treated with $AgNO_3$, a white precipitate is obtained. The compound can be



(a) I, II, III or IV (b) II, III or V
(c) only V (d) Any of the five

12. Two g of an organic nitrogen-containing compound, on heating, decomposes to give 0.4 g of nitrogen. What should be nature of the compound ?

(a) $C_3H_7N_2Cl$ (b) $C_6H_5N_2Cl$
(c) $(CH_3)_3N$ (d) Data insufficient

13. The simplest ratio of number of C and H atoms in a hydrocarbon is found to be 1 and 2.37 respectively. The molecular weight for the hydrocarbon should be

(a) 42 (b) 43
(c) 84 (d) 86

14. An organic compound gives red colour upon treatment with chloroform and aluminium chloride, it can be

(a) C_6H_6 (b) $C_6H_5CH_3$
(c) Both (a) and (b) (d) $C_6H_5NO_2$

15. Breathalyzer tubes used to detect intoxication have a coating of

(a) Blue litmus solution
(b) Red litmus solution
(c) Sodium bicarbonate solution
(d) Sodium dichromate solution

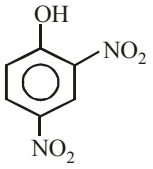
16. Which of the following is true?

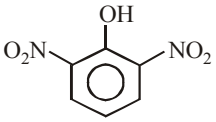
(a) Tollens' reagent gives a positive result with all aldehydes
(b) Tollens' reagent gives a negative result with all ketones
(c) Both are true
(d) None is true

17. Tollens' reagent responds to

(a) Glucose (b) Fructose
(c) Phenylhydroxyl amine (d) All the three

18. Which of the following does not give effervescences of CO_2 with aq. $NaHCO_3$ solution?

(a) H_2CO_3 (b) 

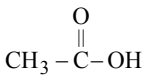
(c) 

(d) None of these

19. Sodium extract of an organic compound is acidified with dil. H_2SO_4 and then treated with excess of chlorine water in presence of carbon disulphide, a colourless solution is obtained. This indicates

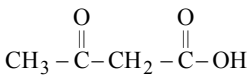
(a) absence of chlorine
(b) absence of bromine
(c) absence of all halogens
(d) chlorine may or may not be present

20. Which of the following statements is not true?

(a)  does not respond haloform test
(b) Schiff's reagent and Schiff's bases are different compounds
(c) All halogens give similar result in Beilstein test
(d) Fehling solution is a good reagent for detecting aromatic aldehydes

21. Which of the following does not respond iodoform test?

(a) $CH_3CH_2COCH_2Cl$

(b) 

(c) Both of these
(d) None of these

22. A mixture of diethyl ether and chlorobenzene can be separated by

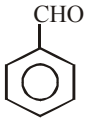
(a) water (b) aq. NaOH solution
(c) conc. H_2SO_4 (d) aq. $NaHCO_3$ solution

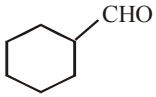
MARK YOUR RESPONSE					
	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ
	16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ
	21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ			

23. A nitrogenous substance on treatment with nitrous acid followed by NaOH gives a blue colour, it can be

(a) $CH_3CH_2NO_2$ (b) $(CH_3)_2CHNO_2$
(c) CH_3CH_2ONO (d) $(CH_3)_2CHONO$

24. Which of the following discharges colour of bromine in carbon tetrachloride?

(i) $CH_3CH = CH_2$ (ii) 

(iii) 

(iv) $CH_3C \equiv CH$

(a) (i) and (iv) (b) (i), (iii) and (iv)
(c) (i), (ii) and (iv) (d) All the four

25. Separation of a (R, S)–RCOOH into (R)– and (S)–RCOOH by the use of a (S)– base involves

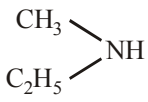
(a) the formation of diastereomers
(b) fractional crystallisation
(c) both (a) and (b)
(d) other factors

26. A derivative [X] of a carboxylic acid is inert to water but gives back the salt of the parent acid, when heated briefly with NaOH, [X] is

(a) CH_3COCl (b) $(CH_3CO)_2O$
(c) CH_3CONH_2 (d) Any of the three

27. A nitrogenous compound [X] of the formula C_3H_9N gives a precipitate with *p*-tosyl chloride in presence of aq. potassium hydroxide. The compound [X] is

(a) $CH_3CH_2CH_2NH_2$ (b) $(CH_3)_2CHNH_2$

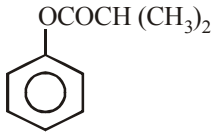
(c) 

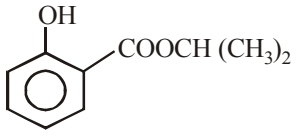
(d) $(CH_3)_3N$

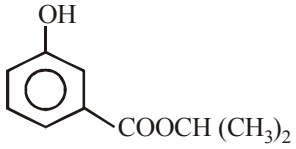
28. An organic compound A of the formula C_7H_8O is soluble in NaOH but not in $NaHCO_3$. On treatment with bromine water it gives a tribromo product. The compound A is

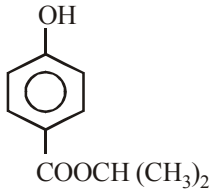
(a) *o*-Cresol (b) *m*-Cresol
(c) *p*-Cresol (d) Either of the three

29. An organic compound [X] of the formula $C_{10}H_{12}O_3$ is insoluble in water, dil. HCl and dil. aqueous $NaHCO_3$ solution. On distillation with dil. NaOH it gives an alkaline residue and a distillate which responds haloform test. The residue on acidification gives a steam volatile acid. The compound [X] is

(a) 

(b) 

(c) 

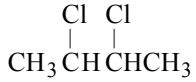
(d) 

30. An organic compound X of the formula $C_4H_8Cl_2$ on treatment with aqueous sodium hydroxide gives another compound Y which forms an oxime and undergoes haloform reaction, but does nto reduce Tollens' reagent. The compound X should be

(a) $Me_2CHCHCl_2$

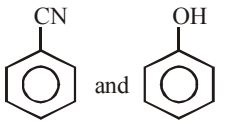
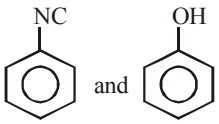
(b) $CH_3CH_2CH_2CHCl_2$

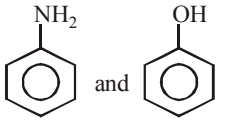
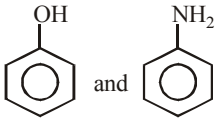
(c) $CH_3CH_2CCl_2CH_3$

(d) 

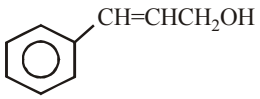
MARK YOUR RESPONSE					
	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ	30. ⓐⓑⓒⓓ		

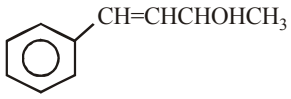
31. A mixture of two aromatic compounds A and B is separated by dissolving in chloroform followed by extraction with aq. KOH solution. The alkaline aqueous layer gives a mixture of two isomeric compounds on treatment with carbon tetrachloride. The organic layer containing compound A gives an unpleasant odour on treatment with alcoholic solution of KOH. Compounds A and B respectively are

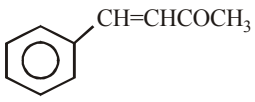
(a)  (b) 

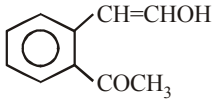
(c)  (d) 

32. An organic compound containing one oxygen gives red colour with ceric ammonium nitrate solution, decolorises alkaline potassium permanganate solution, responds iodoform test and shows geometrical isomerism. It should be

(a) 

(b) 

(c) 

(d) 

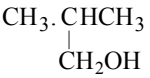
33. A pungent smelling organic liquid (A) containing C, H, O and Cl gives white precipitate with aqueous silver nitrate solution. On treatment with aqueous ammonia, (A) gives a neutral compound (B) which on treatment with sodium hypochlorite yields a basic compound C; A is

(a) $CH_3CH_2CH_2Cl$ (b) $CH_3CH{=}CHCl$

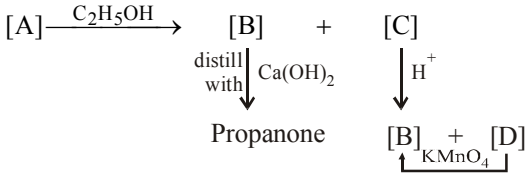
(c) RCl (d) RCOCl

34. An organic compound A on treatment with ethanoic acid in the presence of sulphuric acid gives an ester. On treatment with pyridinium chlorochromate, A gives compound B which regenerates A on treatment with dil. KOH; compound A is

(a) CH_3OH (b) $CH_3CHOHCH_3$

(c)  (d) Any of the three

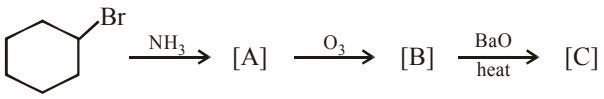
35. Identify A from the given set of reactions

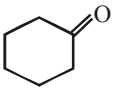
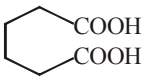


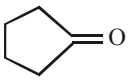
(a) CH_3COOH (b) CH_3COCl

(c) $(CH_3CO)_2O$ (d) $CH_3COOC_2H_5$

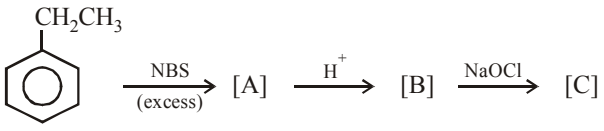
36. Identify the final product in the following reaction



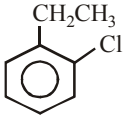
(a)  (b) 

(c)  (d) Both (a) and (b)

37. Identify the final product



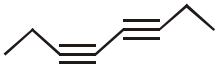
(a) C_6H_5COONa (b) $CHCl_3$

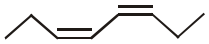
(c) Both (a) and (b) (d) 

MARK YOUR RESPONSE	31. ⓐⓑⓒⓓ	32. ⓐⓑⓒⓓ	33. ⓐⓑⓒⓓ	34. ⓐⓑⓒⓓ	35. ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	37. ⓐⓑⓒⓓ			

38. Glycerol $\xrightarrow{KHSO_4}$ [A] $\xrightarrow{LiAlH_4}$ [B]. Here B is

(a) Allyl alcohol (b) Acrolein
(c) Acrylic acid (d) Propyl alcohol

39.  $\xrightarrow{Na/NH_3}$ P; P is

(a)  (b) 
(c)  (d) All the three

40. Compound [A] of the formula $C_5H_8O_2$ liberates carbon dioxide on reaction with sodium bicarbonate. It exists in two diastereomeric forms. On hydrogenation, each diastereomer gives compound B which can be separated into two enantiomorphs. Compounds A and B respectively are

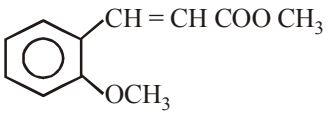
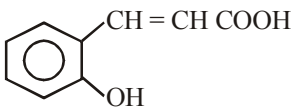
(a) $CH_3-\underset{|}{\overset{CH=CH_2}{C}}HCOOH$ and $CH_3\underset{|}{\overset{CH_2CH_3}{C}}HCOOH$

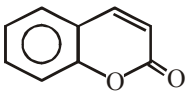
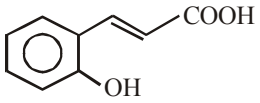
(b) $CH_3CH=CHCH_3$ and $CH_3CH_2CH_2CH_3$

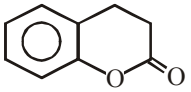
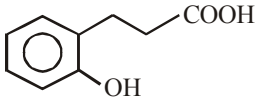
(c) $CH_3CH=C(CH_3)COOH$ and $CH_3CH_2CH(CH_3)COOH$

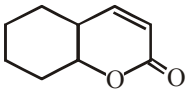
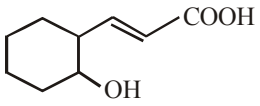
(d) $(CH_3)_2C=CHCOOH$ and $(CH_3)_2CHCH_2COOH$

41. A compound [X] discharges bromine water in CCl_4. The compound does not give effervescences of CO_2 with aq. $NaHCO_3$ solution. However, its hydrolysate with conc. KOH followed by acidification gives another compound Y which gives colour with $FeCl_3$ solution as well as effervescences of CO_2 with $NaHCO_3$ solution. Compounds X and Y respectively are

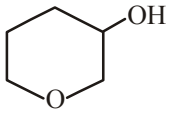
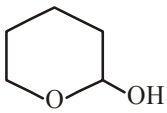
(a)  and 

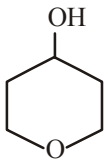
(b)  and 

(c)  and 

(d)  and 

42. Which of the following compounds give positive test with Tollen's reagent ?

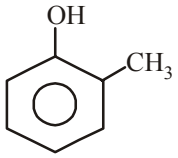
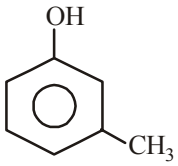
(a)  (b) 

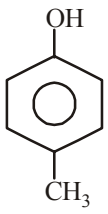
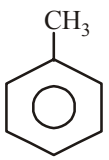
(c)  (d) none of the three

43. Acetaldehyde and benzal can be distinguished by

(a) fehling test (b) iodoform test
(c) both (a) and (b) (d) none of the two

44. On organic compound C_7H_8O is insoluble in water, dil. HCl and aq. $NaHCO_3$, but it dissolves in dil. NaOH. On treatment with bromine water it gives $C_7H_5OBr_3$ rapidly. The original compound is

(a)  (b) 

(c)  (d) 

MARK YOUR RESPONSE	38. ⓐⓑⓒⓓ	39. ⓐⓑⓒⓓ	40. ⓐⓑⓒⓓ	41. ⓐⓑⓒⓓ	42. ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	44. ⓐⓑⓒⓓ			

B COMPREHENSION TYPE

This section contains groups of questions. Each group is followed by some multiple choice questions based on a paragraph. Each question has 4 choices (a), (b), (c) and (d) for its answer, out of which ONLY ONE is correct.

PASSAGE-1

Characteristic reactions of some of the important groups are given below :

I. Phenols and carboxylic acids are soluble in dil. NaOH, however only carboxylic acids are soluble in very diute (5%) aqueous $NaHCO_3$ solution with the evolution of CO_2 gas.

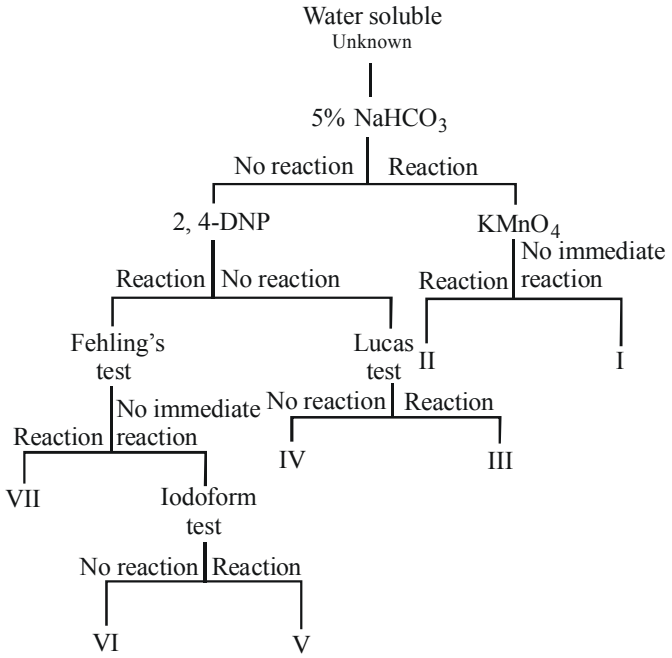
II. Lower alcohols containing five or less carbon atoms react with Lucas reagent, while the higher alcohols do not react with the reagent.

III. Aldehydes and ketones react with 2, 4-dinitrophenylhydrazine to give orange coloured crystals, however only aldehydes reduce Fehling solution.

IV. Acetaldehyde gives yellow precipitate with alkaline iodine

$$CH_3-\overset{\overset{O}{\|}}{C}-H \xrightarrow{I_2/OH^-} CHI_3\downarrow + HCOO^-$$

The following flow-sheet diagram was prepared on the basis of the above reactions.



1. Compound II should have
(a) – COOH group (b) an alcoholic group
(c) Both (a) and (b) (d) A phenolic –OH group

2. Compound III is
(a) C_6H_5OH (b) $C_6H_{11}OH$
(c) C_2H_5OH (d) Any of the three

3. Which of the following compound can be an aldehyde?
(a) V (b) VI
(c) VII (d) IV

4. Compound V can be
(a) CH_3CHO (b) CH_3COCH_3
(c) $CH_2ICOC_2H_5$ (d) Any of the three

PASSAGE-2

On the basis of solubility, organic compounds are grouped as below :

Group - I : *Soluble* in H_2O *and ether* : Salts of organic acids, ammino acids, amine chlorides, carbohydrates, polyfunctional compounds with hydrophilic groups. Arenesulphonic acids.

Group – II : *Soluble in* H_2O*, but insoluble in ether* : Monofunctional carboxylic acids, alcohols, aldehydes, ketones, esters, amides and nitriles having five or less carbon atoms. Monofunctional amines up to six carbon atoms.

Group – III : *Insoluble in* H_2O *but soluble in 5% NaOH, and 5%* $NaHCO_3$ *solution* : Carboxylic acids with six or less carbon atoms, phenols having electron withdrawing groups in ortho and/or para positions, and β – diketones.

Group – IV : *Insoluble in* H_2O *and 5%* $NaHCO_3$*, but soluble in 5% NaOH* : Phenols, enols, oximes, imides and thiophenols with six or more carbon atoms. Sulphonamides, and nitro compounds with α-hydrogens.

Group – V : *Insoluble in* H_2O *and NaOH, but soluble in HCl* : Anilines and aliphatic amines with 8 or more carbon atoms.

Group – VI : *Insoluble in* H_2O*, NaOH and HCl :* Neutral compounds containing sulphur or nitrogen with six or more carbon.

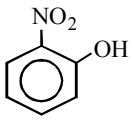
Group – VII : *Insoluble in* H_2O*, NaOH, HCl, but soluble in conc.* H_2SO_4 *and conc.* H_3PO_4: Esters, aldehydes, ketones, with six to eight carbon atoms.

Group – VIII : *Insoluble in* H_2O*, NaOH, HCl, conc.* H_3PO_4*, but soluble in conc.* H_2SO_4 : Unsaturated hydrocarbons.

MARK YOUR RESPONSE	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	

5. An organic compound is insoluble in water, but soluble in 5% aq. NaOH and 5% aq. $NaHCO_3$. It should be

(i) $\begin{matrix} CH_2COOH \\ | \\ CH_2COOH \end{matrix}$ (ii) C_6H_5COOH

(iii) 

(a) Only (ii) (b) (i) or (ii)

(c) (ii) or (iii) (d) Either of the three.

6. Low molecular weight amino acids fall into group I. This is most likely due to the fact that such amino acids are

(a) Hydrophilic and amphoteric

(b) Hydrophilic and basic

(c) Hydrophilic and acidic

(d) Hydrophobic and lipophilic

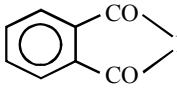
7. Phenols are soluble in sodium hydroxide solution and insoluble in dilute sodium bicarbonate.Phenol has a $pK_a = 10.0$, the introduction of an ortho bromine atom into the phenol would have the effect of

(a) Lowering the pK_a and thus decreasing the acidity of the phenol

(b) Lowering the $pK_a$and thus increasing the acidity of the phenol

(c) Increasing the $pK_a$and thus decreasing the acidity of the phenol

(d) increasing the pK_a and thus increasing the acidity of the phenol

8.  is expected to be

(a) Soluble in water and NaOH

(b) Soluble in water and HCl

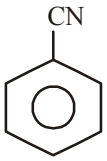
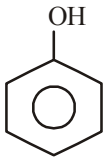
(c) Insoluble in water and soluble in NaOH

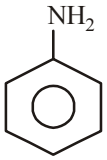
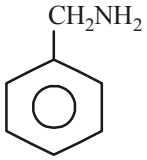
(d) Insoluble in water and soluble in HCl

PASSAGE-3

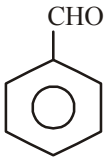
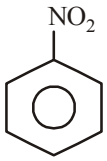
A mixture of two aromatic compounds (A) and (B) was separated by dissolving in chloroform followed by extraction with aqueous KOH solution. The organic layer containing compound (A) when heated with alcoholic solution of KOH produced a compound (C) having an unpleasant odour. The aqueous layer, when heated with chloroform and then acidified gave a mixture of two isomeric compounds D (higher boiling point) and E (having lower boiling point than D).

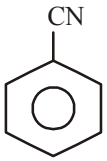
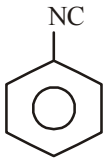
9. Compound A extracted into organic layer is

(a)  (b) 

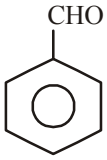
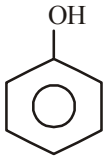
(c)  (d) 

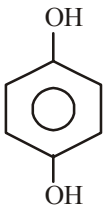
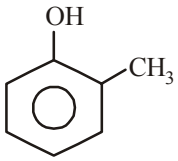
10. The unpleasant odour in compound C indicates it to be

(a)  (b) 

(c)  (d) 

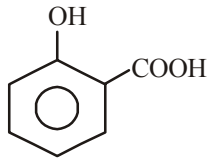
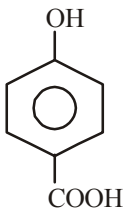
11. Compound B extracted in aqueous layer is

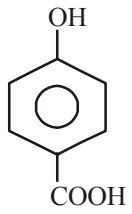
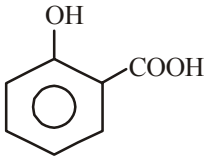
(a)  (b) 

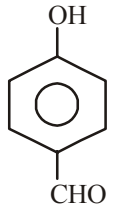
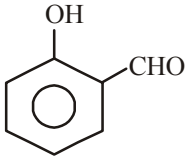
(c)  (d) 

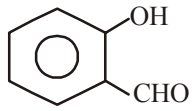
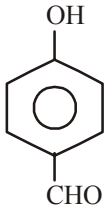
MARK YOUR RESPONSE					
	5. ⓐⓑⓒⓓ	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ
	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ			

12. The D and E respectively are

(a)  and 

(b)  and 

(c)  and 

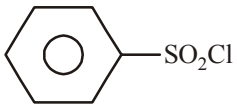
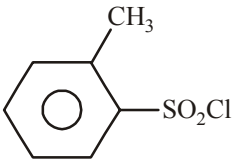
(d)  and 

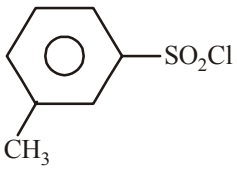
PASSAGE-4

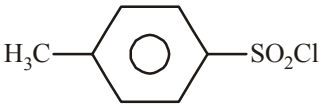
A mixture of three isomeric organic compounds (C_3H_9N) X, Y and Z is treated with tosyl chloride and NaOH and then shaken with ether when two layers are separated – the etheral layer and aqueous layer. The two layers are separated and treated separately with acid followed by distillation to give back the original compound.

On the basis of the above facts, answer the following questions.

13. Tosyl chloride is

(a)  (b) 

(c) 

(d) 

14. The ether layer contains

(a) $Ar-SO_2\underset{Na}{N}\,CH_2CH_2CH_3$

(b) $Ar-SO_2\overset{Na}{N}\,CH(CH_3)_2$

(c) $Ar-SO_2N(CH_3)C_2H_5$

(d) $(CH_3)_3N$

15. The aqueous layer contains

(a) $ArSO_2\overset{Na}{N}\,CH(CH_3)_2$ (b) $ArSO_2\overset{Na}{N}\,(CH_3)C_2H_5$

(c) $(CH_3)_3NNa$ (d) All the three

16. The acid extract of the etheral layer may contain

(a) $CH_3CH_2CH_2NH_2$ (b) $CH_3CH_2NHCH_3$

(c) $CH_3\overset{NH_2}{\overset{|}{C}}HCH_3$ (d) $(CH_3)_3N$

17. The isomeric compound of the acid extract of the aqueous layer can be differentiated from the other isomer by reaction with

(a) diethyl oxalate (b) alkaline chloroform

(c) both (a) and (b) (d) none of the two

MARK YOUR RESPONSE	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ
	17. ⓐⓑⓒⓓ				

PASSAGE-5

An organic compound is found to have following functional groups by usual qualitative analysis.

(i) A sulphonic acid group, $-SO_3H$

(ii) A carboxylic group, $-COOH$

(iii) An enolic group, $=\overset{|}{C}-OH$

(iv) An acetylenic hydrogen atom, $\equiv CH$

It is treated stepwise first with one mole of $NaHCO_3$, then with $NaHCO_3$ and finally with $NaNH_2$ to evolve different gases at each step.

18. The group reacted with $NaHCO_3$ is

(a) $-SO_3H$ (b) $-COOH$

(c) both (d) enolic

19. Molecular weight of the gas evolved on reaction with $NaH\overset{14}{C}O_3$ is

(a) 64 (b) 96

(c) 44 (d) 46

20. The gas evolved in the second step is

(a) SO_2 (b) SO_3

(c) CO_2 (d) $\overset{14}{C}O_2$

21. The gas evolved in the third step (last reaction) is

(a) CO_2 (b) H_2

(c) NH_3 (d) $\overset{14}{C}O_2$

MARK YOUR RESPONSE	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ	

C REASONING TYPE

In the following questions two Statement-1 (Assertion) and Statement-2 (Reason) are provided. Each question has 4 choices (a), (b), (c) and (d) for its answer, out of which ONLY ONE is correct. Mark your responses from the following options:

(a) Both Statement-1 and Statement-2 are true and Statement-2 is the correct explanation of Statement-1.
(b) Both Statement-1 and Statement-2 are true and Statement-2 is not the correct explanation of Statement-1.
(c) Statement-1 is true but Statement-2 is false.
(d) Statement-1 is false but Statement-2 is true.

1. **Statement-1** : During reaction of carboxylic acids with $NaHCO_3$, the CO_2 evolved comes from carboxyl group and not from $NaHCO_3$.
Statement-2 : Carbonic acid is a stronger acid than a carboxylic acid.

2. **Statement-1** : Ethyl acetoacetate gives reddish violet colour on treatment with ferric chloride.
Statement-2 : It exists predominantly in the keto-form.

3. **Statement-1** : 1-Phenylethanol can be distinguished from 2-phenylethanol by iodoform test.
Statement-2 : 1-Phenylethanol contains CH_3CHOH-group linked to carbon but 2-phenylethanol does not.

4. **Statement-1** : Both formic acid and oxalic acid decolourize $KMnO_4$ solution.
Statement-2 : Both are easily oxidised to CO_2 and H_2O.

5. **Statement-1** : Lassaigne's test is not shown by diazonium salts.
Statement-2 : Diazonium salts lose N_2 on heating much before it reacts with fused sodium.

6. **Statement-1** : Acetaldehyde reduces Fehling's solution but benzaldehyde does not.
Statement-2 : Acetaldehyde is a stronger reducing agent than benzaldehyde.

7. **Statement-1** : Lithium is not used in Lassaigne's test.
Statement-2 : It generally forms covalent compounds.

8. **Statement-1** : Essential oils are purified by steam distillation.
Statement-2 : Essential oils are insoluble in water but volatile in steam.

9. **Statement-1** : In case of volatile compounds, vapour density is one-half of molecular weight.
Statement-2 : Vapour density is the other name of density.

MARK YOUR RESPONSE	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	

10. **Statement-1** : Formic acid usually exists as a dimer but hydrogen fluoride exists as a polymer.
Statement-2 : In case of formic acid, an intramolecular hydrogen bond is present, but in case of HF, intermolecular hydrogen bond is present.

11. **Statement-1** : But-1-yne reacts with Tollen's reagent to give white ppt. of silver but-1-ynide but but-2-yne does not react.
Statement-2 : But-1-yne has acidic hydorgen but but-2-yne does not.

12. **Statement-1** : Fehling's solution can be used to distinguish benzaldehyde from acetaldehyde.
Statement-2 : The C–H bond of CHO group in benzaldehyde is stronger than the C–H bond of CHO group in acetaldehyde.

13. **Statement-1** : Lassaigne's test can be used to detect nitrogen in hydrazine, H_2NNH_2.
Statement-2 : Hydrazine reacts with fused sodium to give H_2 gas.

14. **Statement-1** : Diazonium salts do not respond Lassaigne's test for nitrogen.
Statement-2 : Diazonium compounds lose N_2 on heating before they combine with sodium.

15. **Statement-1** : Duma's method is more applicable to nitrogen containing organic compounds than Kjeldahl's method.
Statement-2 : Kjeldahl's method does not give satisfactory results for compounds in which nitrogen is linked to oxygen.

16. **Statement-1** : Victor Meyer test is used for distinguishing between 1°, 2° and 3° alcohols.
Statement-2 : Primary, secondary and tertiary nitroalkanes react differently with nitrous acid.

17. **Statement-1** : Diethyl amine undergoes Libermann nitrogen reaction.
Statement-2 : Secondary amines are more basic than primary amines.

18. **Statement-1** : *p*-Aminobenzoic acid forms azo dye but *o*-amino benzoic acid does not.
Statement-2 : Diazotisation of *o*-aminobenzoic acid forms benzyne by loss of CO_2 and N_2 as a result of electrons migration.

19. **Statement-1** : CH_3COOH and C_6H_5COOH can be distinguished by neutral $FeCl_3$ solution.
Statement-2 : $FeCl_3$ solution is acidic due to hydrolysis.

MARK YOUR RESPONSE					
	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ
	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ

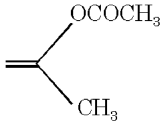
D MULTIPLE CORRECT CHOICE TYPE

Each of these questions has 4 choices (a), (b), (c) and (d) for its answer, out of which ONE OR MORE is/are correct.

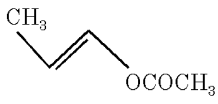
1. Unsaturation can be detected by bromine in carbon tetrachloride in
(a) Cyclohexene (b) 1,3-Cyclohexadiene
(c) Tetrachloroethene (d) Vinyl chloride

2. Which of the alcohol gives a positive iodoform test ?
(a) Benzylmethylcarbinol
(b) Phenylethylcarbinol
(c) Cyclopentylmethylcarbinol
(d) Isopropanol.

3. The product of acid hydrolysis of P and Q can't be distinguished by



(P)



(Q)

(a) Lucas reagent (*b*) 2, 4-DNP
(c) Fehling solution (*d*) $NaHSO_3$.

4. Compound A is obtained by following reaction.

$$CH_3COOC_2H_5 \xrightarrow[(ii)\ H_3O^+]{(i)\ C_2H_5ONa} [A]$$

Which of the following statement(s) is(are) true about A ?
(a) It gives red colour with blue litmus solution.
(b) It decomposes $NaHCO_3$ solution and evolves CO_2 gas.
(c) It decolourises bromine water colour.
(d) It reacts with 2,4-dinitrophenylhydrazine.

5. Which of the following statement is true?
(a) Maleic and fumaric acids are geometrical isomers.
(b) Maleic and fumaric acids are diastereomers
(c) Maleic acid is a stronger acid than fumaric acid
(d) Maleic and fumaric acids give same product on hydrogenation

MARK YOUR RESPONSE					
	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

6. Which of the following is *not true* about Hinsberg test? It is applicable to
(a) all amines
(b) liquid amines soluble in water
(c) liquid amines insoluble in water
(d) solid amines insoluble in water.

7. Libermann's nitroso reaction is used for testing
(a) 1° amine (b) 2° amine
(c) phenol (d) 3° amine.

8. *p*-Chloraniline and aniline hydrochloride can't be distinguished by
(a) Sandmeyer reaction (b) $NaHCO_3$
(c) $AgNO_3$ (d) Carbylamine test.

9. Which of the following compounds can reduce Tollen's reagent ?
(a) CH_3CHO (b) $C_6H_5NO_2$
(c) C_2H_5NHOH (d) $CH_2OHCOCH_3$

10. Simple distillation can't be used to separate
(a) a mixture of ether (b.p. 308 K) and toluene (b.p. 383 K)
(b) a mixture of benzene (b.p. 353 K) and thiophene (b.p. 357 K)
(c) a mixture of ethyl alcohol (b.p. 351 K) and water (b.p. 373 K)
(d) essential oils

11. A mixture of sugar and common salt can't be separated by
(a) water (b) alcohol
(c) petroleum ether (d) sublimation

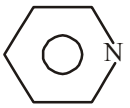
12. *p*-Chloroaniline and anilinium hydrochloride can be distinguished by
(a) $AgNO_3$ (b) Beilstein's test
(c) $NaHCO_3$ (d) Carbylamine reaction

13. $CH_3-\overset{\overset{O}{\|}}{C}-C_2H_5$ and $CH_3-\overset{\overset{O}{\|}}{C}-CMe_3$ can't be distinguished by
(a) iodoform test (b) sodium metal
(c) sodium bisulphite (d) 2, 4 - DNP

14. Which of the following will not show iodoform test ?
(a) $CH_3-\overset{\overset{O}{\|}}{C}-OH$
(b) $CH_3-\overset{\overset{O}{\|}}{C}-COOH$
(c) $CH_3-\overset{\overset{O}{\|}}{C}-OCH_3$
(d) $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-\overset{\overset{O}{\|}}{C}-OC_2H_5$

15. Which of the following will give brick red ppt. with Fehling solution ?
(a) Glucose (b) Benzaldehyde
(c) Fructose (d) Methanoic acid

16. Which of the following can be purified by steam distillation?
(a) Nitrobenzene
(b) Bromobenzene
(c) *p*-Hydroxybenzaldehyde
(d) Salicylaldehyde

17. Kjeldahl's method can't be used for
(a) $C_6H_5NO_2$ (b) $C_6H_5N=NC_6H_5$
(c) $C_6H_5NHCOC_6H_5$ (d) 

18. The desiccants used for absorbing water during Liebig's method for estimation of C and H are
(a) anhy. $CaCl_2$ (b) anhy. Na_2SO_4
(c) $MgSO_4.7H_2O$ (d) $Mg(ClO_4)_2$

MARK YOUR RESPONSE

6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ
11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ
16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ		

E MATRIX-MATCH TYPE

Each question contains statements given in two columns, which have to be matched. The statements in Column-I are labeled A, B, C and D, while the statements in Column-II are labelled p, q, r, s and t. Any given statement in Column -I can have correct matching with ONE OR MORE statement(s) in Column-II. The appropriate bubbles corresponding to the answers to these questions have to be darkened as illustrated in the following example:
If the correct matches are A–p, s and t; B–q and r; C–p and q; and D–s then the correct darkening of bubbles will look like the given.

	p	q	r	s	t
A	●			●	●
B		●	●		
C	●	●			
D				●	

1.

Column - I (Reagent)	Column - II (Group/compound)
A. Ammonical $AgNO_3$	p. $-\overset{\overset{O}{\|\|}}{C}-CH_3$
B. $NaHCO_3$	q. HCOOH
C. 2, 4-Dinitrophenylhydrazine	r. $-CHClCH_3$
D. I_2/NaOH	s. $-SO_3H$ group

2.

Column - I (Mixture)	Column - II (Method of separation)
A. Benzoic acid + Anthracene	p. Chromatography
B. Aniline + CCl_4	q. Chemical method
C. Glycine + Alanine	r. Vacuum distallation
D. Glycerol + Spent lye	s. Steam distillation

3.

Column - I (Compound)	Column - II (Test)
A. Ethanol	p. No response to Victor Meyer test
B. 2-Methylpropanol-2	q. Red colour in Victor Meyer test
C. Benzyl alcohol	r. Turbidity with Lucas reagent
D. Phenol	s. No response to Lucas reagent

4.

Column-I	Column-II
A. $C_6H_5-\overset{\overset{O}{\|\|}}{C}-CH_3$	p. Haloform reaction
B. $CH_3-\overset{\overset{O}{\|\|}}{C}-CH_2-\overset{\overset{O}{\|\|}}{C}-OC_2H_5$	q. Colour with $FeCl_3$
C. CH_3CH_2OH	e. Decolorisation of bromine colour
D. $CH_2=CH-CH=CH_2$	s. Phenolphthalein colour discharged by the alkaline solution

MARK YOUR RESPONSE

	p	q	r	s
1. A	(p)	(q)	(r)	(s)
B	(p)	(q)	(r)	(s)
C	(p)	(q)	(r)	(s)
D	(p)	(q)	(r)	(s)

	p	q	r	s
2. A	(p)	(q)	(r)	(s)
B	(p)	(q)	(r)	(s)
C	(p)	(q)	(r)	(s)
D	(p)	(q)	(r)	(s)

	p	q	r	s
3. A	(p)	(q)	(r)	(s)
B	(p)	(q)	(r)	(s)
C	(p)	(q)	(r)	(s)
D	(p)	(q)	(r)	(s)

	p	q	r	s
4. A	(p)	(q)	(r)	(s)
B	(p)	(q)	(r)	(s)
C	(p)	(q)	(r)	(s)
D	(p)	(q)	(r)	(s)

Answerkey

A Single Correct Choice Type

1.	b	**2.**	a	**3.**	b	**4.**	b	**5.**	c	**6.**	d	**7.**	c	**8.**	c	**9.**	c	**10.**	b
11.	b	**12.**	b	**13.**	d	**14.**	c	**15.**	d	**16.**	a	**17.**	d	**18.**	d	**19.**	d	**20.**	d
21.	b	**22.**	c	**23.**	b	**24.**	b	**25.**	c	**26.**	b	**27.**	c	**28.**	b	**29.**	b	**30.**	c
31.	c	**32.**	b	**33.**	d	**34.**	c	**35.**	c	**36.**	c	**37.**	c	**38.**	a	**39.**	c	**40.**	c
41.	b	**42.**	b	**43.**	c	**44.**	b												

B Comprehension Type

1	(c)	**5**	(c)	**9**	(c)	**13**	(d)	**17**	(c)	**21**	(c)
2	(c)	**6**	(a)	**10**	(d)	**14**	(c,d)	**18**	(a)		
3	(c)	**7**	(b)	**11**	(b)	**15**	(a)	**19**	(d)		
4	(d)	**8**	(c)	**12**	(c)	**16**	(b,d)	**20**	(c)		

C Reasoning Type

1	(d)	**5**	(a)	**9**	(c)	**13**	(d)	**17**	(b)
2	(b)	**6**	(a)	**10**	(c)	**14**	(a)	**18**	(a)
3	(a)	**7**	(a)	**11**	(a)	**15**	(b)	**19**	(b)
4	(a)	**8**	(a)	**12**	(a)	**16**	(a)		

D Multiple Correct Choice Type

1.	a,b,d	**2.**	a,c,d	**3.**	a,b,d	**4.**	a,c,d	**5.**	a,b,c,d	**6.**	a,b,d	**7.**	b,c	**8.**	a,b,d	**9.**	a,c,d	**10.**	b,c,d
11.	a,c	**12.**	a,c	**13.**	a,b,d	**14.**	a,c,d	**15.**	a,c,d	**16.**	a,b,d	**17.**	a,b,d	**18.**	a,d				

E Matrix-Match Type

1. **A-q; B-q, s; C-p; D-p, r**

2. **A-q; B-s; C-p; D-r**

3. **A-q, s; B-p, r; C-q, s; D-p, s**

4. **A-q, r; B-q, r, s; C-p; D-r**

Solutions

A Single Correct Choice Type

1. **(b)** In steam distillation of aniline, steam decreases vapour pressure of the liquid which in turn starts boiling below its usual boiling point. Hence steam distillation is considered analogous to distillation under reduced pressure.

2. **(a)** Only *o*-nitrophenol is capable of forming intramolecular H-bonding (chelation) which leads to its lower b.p. (less than 100°C) and also lower solubility in water (steam).

3. **(b)** Steam distillation can be applied only when one of the components has b.p. less than b.p. of water.

4. **(b)** Sugar and common salt, both are soluble in water and both are insoluble in petroleum ether, hence these two solvents can't be used. On the other hand, sugar is soluble in alcohol while sodium chloride is insoluble, hence the two can be separated by alcohol.

5. **(c)** Hydroxylamine and hydrazine, both do not have carbon, hence NaCN will not be formed in Lassaigne's extract leading to negative test for nitrogen.

6. **(d)** Since diazo compounds may lose nitrogen in the form of nitrogen gas, they sometimes do not respond Lassaigne's test for nitrogen.

7. **(c)** $(C_2H_5)_3N^+HCl^-$ is an ionic compound, so it will form precipitate of AgCl on adding $AgNO_3$. In 2, 4, 6-trinitrochlorobenzene, —Cl is activated due to the presence of three $-NO_2$ groups in *o*- and *p*-positions, so it will be very reactive leading to formation of AgCl on adding HNO_3 and $AgNO_3$.

8. **(c)** Lassaigne's extract for the compound *p*-nitrochlorobenzene contains both NaCN as well as NaCl, so on treatment with $AgNO_3$, the extract gives precipitate of AgCN as well as AgCl unless it is boiled with HNO_3 which will remove NaCN as gaseous HCN.

9. **(c)** Silver iodide is somewhat soluble in nitric acid.

10. **(b)** A positive Beilstein's test for halogens does not always indicate the presence of halogen since some halogen free compounds viz. urea, thiourea, amides etc. also respond this test. The reason being the fact that these halogen free compounds form cuprous cyanide which is volatile and decomposes to copper which burns with green flame.

11. **(b)** Only compounds containing reactive chlorine, i.e. when attached to sp^3 hybrid carbon will react with $AgNO_3$ forming white precipitate of AgCl. Unreactive chlorine (chlorine attached to sp^2 C) can give positive reaction with $AgNO_3$ when the compound is first fused with metallic sodium.

$$CH_3COCl \xrightarrow{H_2O} CH_3COOH + HCl$$

$$\xrightarrow{AgNO_3} AgCl\downarrow$$

12. **(b)** $\underset{2\text{ g}}{\text{N-containing compound}} \xrightarrow{heat} \underset{0.4\text{ g}}{N_2}$

0.4 g of N_2 is obtained from 2 g of compound

28 g of N_2 is obtained from $\frac{2}{0.4} \times 28 = 140$

Hence molecular weight of the compound is 140 which coincides with

$C_6H_5N_2Cl\,(72 + 5 + 28 + 35.5 = 140.5)$

13. **(d)** Simplest ratio of C : H = 1 : 2.37 or 3 : 7

$\therefore$ Empirical formula = C_3H_7

But C_3H_7 does not coincide to any hydrocarbon ; remember that a hydrocarbon can't have odd number of H atoms. Hence the molecular formula for the hydrocarbon should be C_6H_{14} whose molecular weight will be 72 + 14 = 86.

14. **(c)** The red colour is due to the formation of triarylmethyl cations, Ar_3C^+ which is formed by a Friedel-Craft reaction followed by a transfer of hydride ion.

$$ArH \xrightarrow[AlCl_3]{CHCl_3} ArCHCl_2 \xrightarrow[AlCl_3]{ArH}$$

$$Ar_2CHCl \xrightarrow[AlCl_3]{ArH} Ar_3CH$$

$$Ar_2CHCl \xrightarrow{AlCl_3} Ar_2\overset{+}{C}HAlCl_4^- \xrightarrow{Ar_3CH}$$

$$Ar_2CH_2 + Ar_3\overset{+}{C}AlCl_4^-$$

(orange to red colour)

Thus this test is given by all benzenoid compounds which can undergo Friedel-Craft reaction.

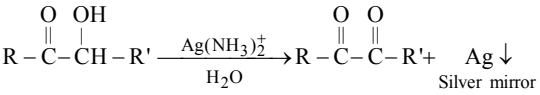
15. **(d)** The test is based upon the ease of oxidation of primary alcohol (e.g. C_2H_5OH) with dichromate.

$$CH_3CH_2OH + \underset{\text{Clear orange solution}}{Cr_2O_7^{2-}} \longrightarrow$$

$$CH_3CHO,\ CH_3COOH + Cr^{3+}$$

Greenish solution due to Cr^{3+}

16. **(a)** Tollens' reagent also oxidises α-hydroxyketones, hence positive result is observed in such case, but not in ordinary ketones.



17. **(d)** In presence of alkaline medium provided by Tollens' reagent, fructose isomerises to glucose which then responds Tollens' test.

18. **(d)** Each of them decompose aqueous solution of $NaHCO_3$. Recall that when at least two $-NO_2$ groups are present in *ortho* and *para* positions with respect to phenolic –OH group, it becomes highly acidic and gives effervescences of CO_2 with aq. $NaHCO_3$ solution.

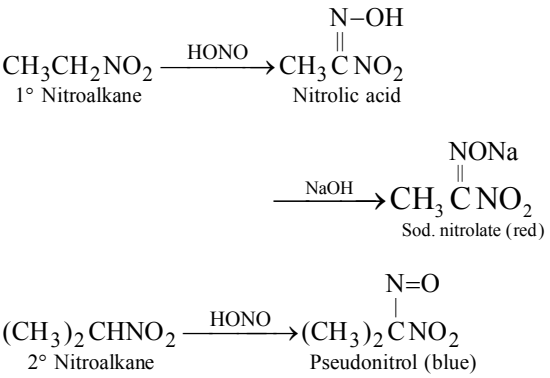
19. **(d)** This test is applied only for the detection of I and Br. Violet colour is produced in presence of iodine, while a brown or reddish colour is produced in presence of bormine.

20. **(d)** Fehling solution does not oxidise aromatic aldehydes because of bulky C_6H_5- group.

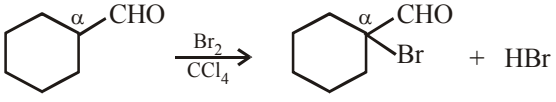
21. **(b)** Acetoacetic ester does not respond iodoform test.

22. **(c)** Only diethyl ether is soluble in conc. H_2SO_4, it is recovered from solution by dilution with water.

23. **(b)** Recall the Victor Meyer test for distinguishing between 1°, 2° and 3° alcohols.



24. **(b)** In addition to alkenes and alkynes, aliphatic aldehydes and ketones having α-hydrogen also rect with Br_2 and CCl_4.

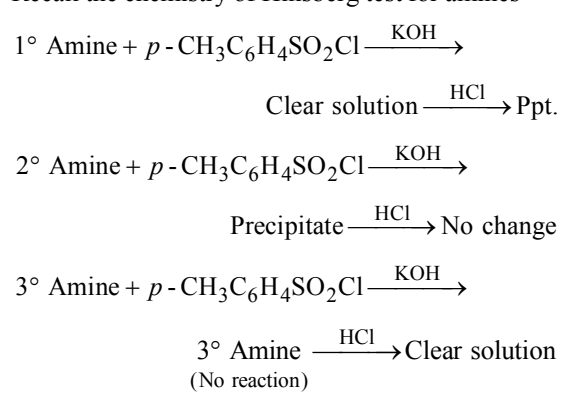


25. **(c)** Diastereomers have different solubilities and hence can be separated by fractional crystallisation.

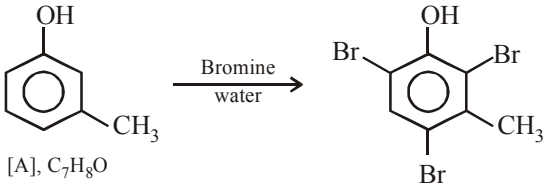
26. **(b)** Recall the relative ease of hydrolysis of the four derivatives of a carboxylic acid.

Acid chlorides > Acid anhydrides > Esters > Acid amides
(hydrolyzed by water) (hydrolyzed when heated) (hydrolyzed when refluxed with NaOH)

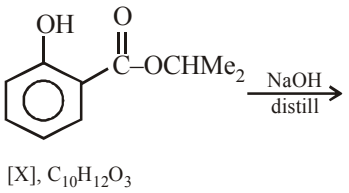
27. **(c)** Recall the chemistry of Hinsberg test for amines

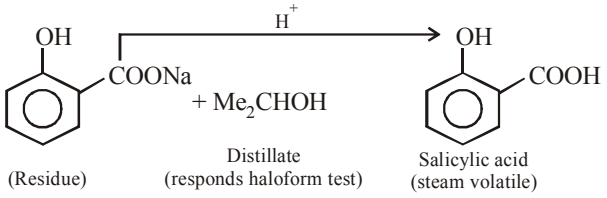


28. **(b)**

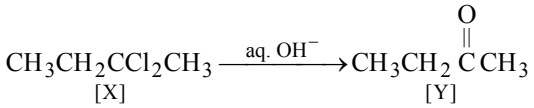


29. **(b)**

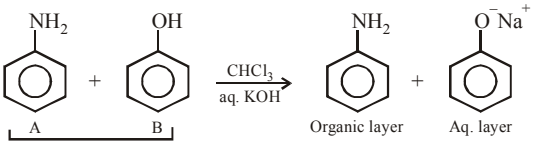


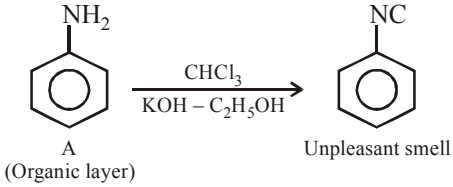


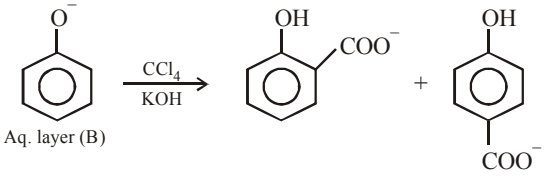
30. **(c)**



31. **(c)**







32. **(b)** Only option (*b*) explains all the given reactions.

33. **(d)** Only compound (*d*) responds all given reactions.

$$\underset{[B]}{R-\overset{O}{\overset{\|}{C}}-NH_2} \xleftarrow[NH_3]{aq.} \underset{[A]}{R-\overset{O}{\overset{\|}{C}}-Cl} \xrightarrow[AgNO_3]{H_2O} R-\overset{O}{\overset{\|}{C}}-OH + AgCl\downarrow$$

$$\underset{[B]}{R-\overset{O}{\overset{\|}{C}}-NH_2} \xrightarrow{NaClO} \underset{[C]}{R-NH_2}$$

34. **(c)** $\underset{[A]}{1°\text{Alcohol}} \xrightarrow{PCC} \underset{[B]}{\text{Aldehyde}} \xrightarrow[\text{(Cannizzaro reaction)}]{\text{dil. KOH}}$

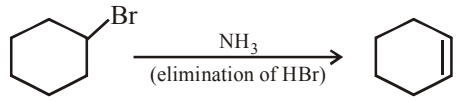
$\underset{[A]}{1°\text{Alcohol}}$ + Sod. salt of acid

35. **(c)** $\underset{[A]}{(CH_3CO)_2O} \xrightarrow{C_2H_5OH} \underset{[B]}{CH_3COOH} + \underset{[C]}{CH_3COOC_2H_5}$

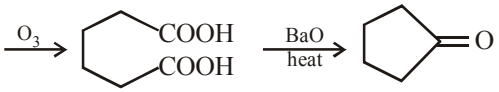
$$\underset{[C]}{CH_3COOC_2H_5} \xrightarrow{H^+} \underset{[B]}{CH_3COOH} + \underset{[D]}{C_2H_5OH}$$

($KMnO_4$ oxidises [D])

36. **(c)**

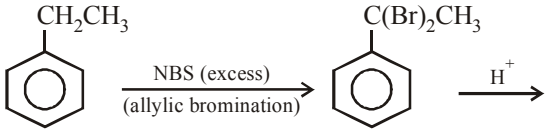


A 2° halide [A]

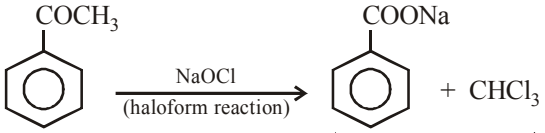


[B] [C]

37. **(c)**

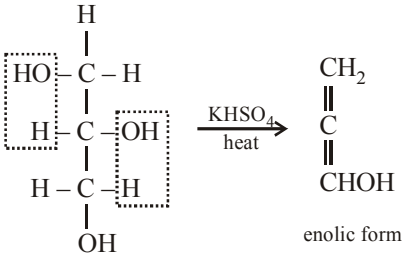


[A]

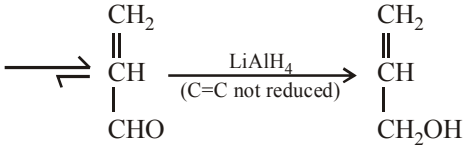


[B] [C]

38. **(a)**

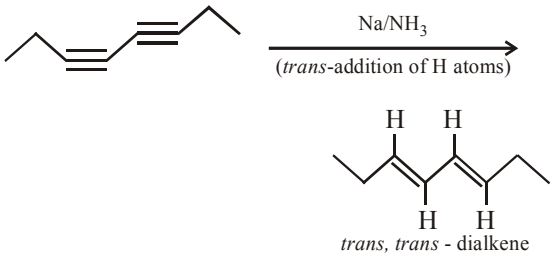


enolic form



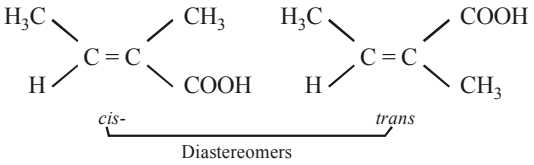
keto

39. **(c)**



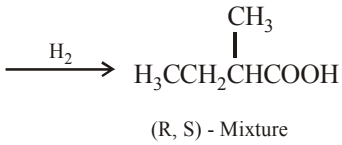
trans, trans - dialkene

40. **(c)**



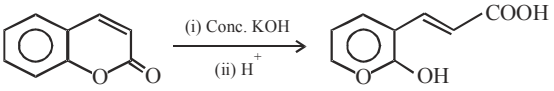
cis- *trans*

Diastereomers



(R, S) - Mixture

41. **(b)**



[X] [Y]

B COMPREHENSION TYPE

1. **(c)** Since the II is soluble in aq. $NaHCO_3$ and oxidised by $KMnO_4$, it should have a $-COOH$ group and an alcoholic group (1° or 2°).

2. **(c)** Compound III reacts with Lucas reagent, so it should be an alcohol with less than six carbon atoms.

3. **(c)** Among the three given options, Fehling test is given only by VII.

4. **(d)** From the flow-sheet diagram, it is evident that compound V undergoes iodoform reaction. Since all the three compounds can undergo iodoform reaction, all the three options are correct.

$$\underset{}{ICH_2-\overset{O}{\overset{\|}{C}}-CH_2CH_3} \xrightarrow{I_2} \underset{}{I_3C-\overset{O}{\overset{\|}{C}}-CH_2CH_3}$$

$$\xrightarrow{OH^-} CHI_3\downarrow + CH_3CH_2COO^-$$

5. **(c)** Succinic acid (a C–4 acid) is soluble in all the three given reagents.

6. **(a)** Since the given amino acids fall in group I, it means that they have hydrophilic groups. For solubility in water, the group should be amphoteric (like salts), and not acids or bases.

7. **(b)** Since the presence of an electron-withdrawing group in *ortho* and or *para* position of a phenol makes the compound more acidic than the parent phenol, its presence decreases the pK_a value of the parent compound.

8. **(c)** The given compound does not form significant H-bond with H_2O, hence insoluble in water. Its N is not basic enough because its lone pair is involved in resonance, hence insoluble in HCl. However, it is soluble in NaOH because the H present on N is acidic and its removal stabilizes the anion to a significant extent.

C REASONING TYPE

1. **(d)** **Correct A :** During reaction of carboxylic acids with $NaHCO_3$, CO_2 evolved comes from $NaHCO_3$.

2. **(b)** Ethyl acetoacetate gives reddish violet colour with $FeCl_3$ due to enol form.

3. **(a)** **R** is the correct explanation of **A**.

4. **(a)** **R** is the correct explanation of **A**.

5. **(a)** **R** is the correct explanation of **A**.

6. **(a)** **R** is the correct explanation of **A**.

7. **(a)** **R** is the correct explanation of **A**.

8. **(a)** **R** is the correct explanation of **A**.

9. **(c)** **Correct R :** Vapour density and density of a volatile organic compound are quite different.

10. **(c)** **Correct R :** Formic acid being a bent molecule forms a cyclic dimer while HF being a linear molecule forms a polymer by H-bonding.

11. **(a)** **R** is the correct explanation of **A**.

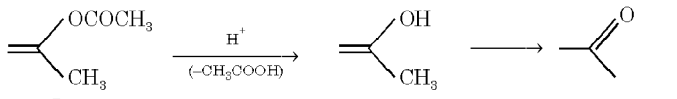
12. **(a)** **R** is the correct explanation of **A**.

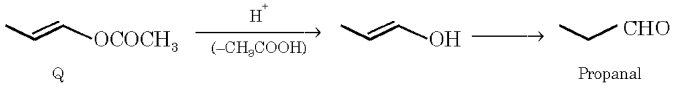
D MULTIPLE CORRECT CHOICE TYPE

1. (a,b,d) $Cl_2C{=}CCl_2$ does not add because of presence of electro-negative chlorine on both of the doubly carbon atoms.

2. **(a,c,d)** Phenylethylcarbinol, $PhCH(OH)CH_2CH_3$ does not have —$CHOHCH_3$ group, so does not respond to haloform test.

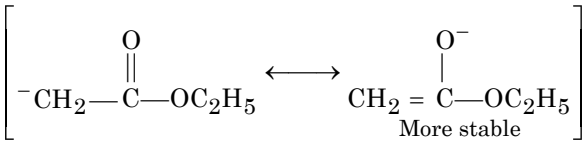
3. **(a,b,d)**

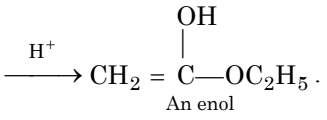




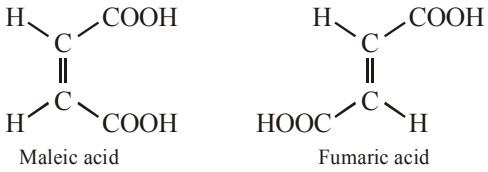
Acetone and propanal can be distinguished by Fehling solution, and not by others.

4. **(a,c,d)** $CH_3{-}\overset{\overset{O}{\|}}{C}{-}OC_2H_5 \longrightarrow$



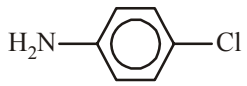


5. **(a,b,c,d)** All the four statements are true.

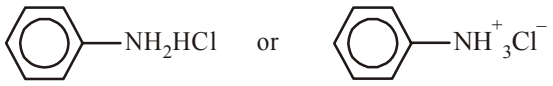


6. **(a,b,d)** Hinsberg test is applicable to liquid amines which are insoluble in water because water solubility of the amine decreases nucleophilicity of nitrogen.

7. **(b,c)** In Libermann's nitroso test 2° amine and phenol are used as reagents.

8. **(a,b,d)** 

p-Chloroaniline
(—Cl is non-reactive)



(—Cl is reactive)

p-Chloroaniline reacts with $AgNO_3$. The three other options (a, b and d) are not proper reagents to distinguish.

9. **(a,c,d)** Aldehydes, α-hydroxyketones and hydroxylamines reduce Tollens' reagent.

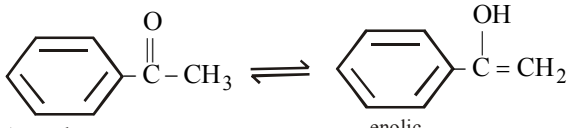
10. **(b,c,d)** Simple distillation is applied when boiling points of the two components differ by more than 10°C. Ethanol and water both are capable of forming intermolecular H-bonds with each other, so they distil together. The constituents of essential oils have nearly similar boiling point.

11. **(a,c)** Sugar and common salt, both are soluble in water and both are insoluble in petroleum ether, hence these two solvents can't be used. On the other hand, sugar is soluble in alcohol while sodium chloride is insoluble, hence the two can be separated by alcohol. Sodium chloride undergoes sublimation.

E MATRIX-MATCH TYPE

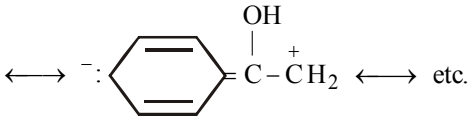
4. **A-q, r; B-q, r, s; C-p; D-r**

Acetophenone (A) and acetoacetic ester (B) do not undergo haloform reaction although they contain CH_3CO^- grouping.



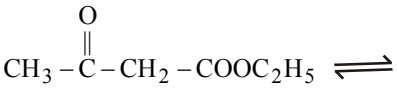
Acetophenone
Keto

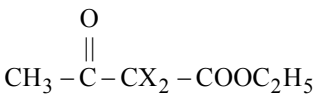
enolic



Thus substitution of methyl hydrogens by iodine is not possible.

In acetoacetic ester, the methylene group is highly reactive so it reacts with X_2 in presence of NaOH, while the CH_3- group does not react.





Both of these compounds (A and B) have C = C and enolic group, due to enolic structure, hence they discharge Br_2 colour and also respond $FeCl_3$ test.