PRACTICAL ORGANIC CHEMISTRY (POC)

1. A solution of m-chloroaniline, m-chlorophenol and m-chlorobenzoic acid in ethyl acetate was extracted initially with a saturated solution of $NaHCO_3$ to give fraction A. The left over organic phase was extracted with dilute NaOH solution to give fraction B. The final organic layer was labelled as fraction C. Fractions A, B and C, contain respectively :

(1) m-chlorobenzoic acid, m-chloroaniline and m-chlorophenol

(2) m-chloroaniline, m-chlorobenzoic acid and m-chlorophenol

(3) m-chlorobenzoic acid, m-chlorophenol and m-chloroaniline

(4) m-chlorophenol, m-chlorobenzoic acid and m-chloroaniline

2. A chromatography column, packed with silica gel as stationary phase, was used to separate a mixture of compounds consisting of (A) benzanilide (B) aniline and (C) acetophenone. When the column is eluted with a mixture of solvents, hexane : ethyl acetate (20 : 80), the sequence of obtained compounds :

(1) (B), (C) and (A)

(2) (C), (A) and (B)

(3) (A), (B) and (C)

(4) (B), (A) and (C)

3. A flask contains a mixture of isohexane and 3-methylpentane. One of the liquids boils at 63°C while the other boils at 60°C. What is the best way to seprate the two liquids and which one will be distilled out first?

(1) simple distillation, 3-methylpentane

(2) simple distillation, isohexane

(3) fractional distillation, isohexane

(4) fractional distillation, 3-methylpentane

4. Kjeldahl's method cannot be used to estimate nitrogen for which of the following compounds?

(1) $C_6H_5NO_2$ (2) $C_6H_5NH_2$

(3) $CH_3CH_2-C\equiv N$ (4) $NH_2-\overset{\overset{O}{\|}}{C}-NH_2$

5. A chemist has 4 samples of artificial sweetener A, B, C and D. To identify these samples, he performed certain experiments and noted the following observations :

(i) A and D both form blue-violet colour with ninhydrin.

(ii) Lassaigne extract of C gives positive $AgNO_3$ test and negative $Fe_4[Fe(CN)_6]_3$ test.

(iii) Lassaigne extract of B and D gives positive sodium nitroprusside test

Based on these observations which option is correct?

(1) A : Aspartame ; B : Saccharin ; C : Sucralose ; D ; Alitame

(2) A : Alitame ; B : Saccharin ; C : Aspartame ; D ; Sucralose

(3) A : Saccharin ; B : Alitame ; C : Sucralose ; D ; Aspartame

(4) A : Aspartame ; B : Alitame ; C : Saccharin ; D ; Sucralose

6. Two compounds A and B with same molecular formula (C_3H_6O) undergo Grignard's reaction with methylmagnesium bromide to give products C and D. Products C and D show following chemical tests.

Test	C	D
Ceric ammonium nitrate Test	Positive	Positive
Lucas Test	Turbidity obtained after five minutes	Turbidity obtained immediately
Iodoform Test	Positive	Negative

C and D respectively are :

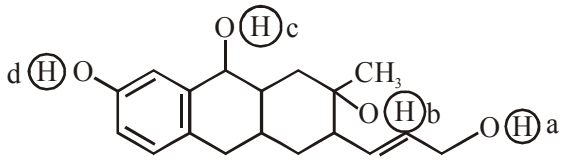
(1) $C=H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH$; $D=H_3C-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3$

(2) $C=H_3C-CH_2-CH_2-CH_2-OH$; $D=H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH$

(3) $C=H_3C-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3$; $D=H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH$

(4) $C=H_3C-CH_2-CH_2-CH_2-OH$; $D=H_3C-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3$

7. Consider the following reaction :



$\xrightarrow[\text{anhydride}]{\text{Chromic}}$ 'P'

The product 'P' gives positive ceric ammonium nitrate test. This is because of the presence of which of these –OH group(s) ?

(1) (c) and (d)
(2) (b) only
(3) (d) only
(4) (b) and (d)

8. Match the following :

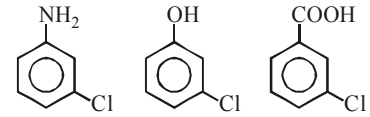
	Test/Method		**Reagent**
(i)	Lucas Test	(a)	$C_6H_5SO_2Cl$/aq. KOH
(ii)	Dumas method	(b)	$HNO_3/AgNO_3$
(iii)	Kjeldahl's method	(c)	CuO/CO_2
(iv)	Hinsberg Test	(d)	Conc. HCl and $ZnCl_2$
		(e)	H_2SO_4

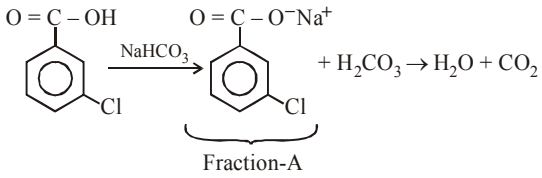
(1) (i)-(d), (ii)-(c), (iii)-(e), (iv)-(a)
(2) (i)-(b), (ii)-(d), (iii)-(e), (iv)-(a)
(3) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(e)
(4) (i)-(b), (ii)-(a), (iii)-(c), (iv)-(d)

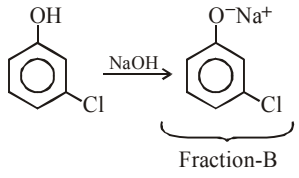
SOLUTION

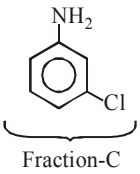
1. NTA Ans. (3)

Sol.









2. NTA Ans. (2)

Sol. (A) Benzanilide → $Ph–NH–\overset{\overset{O}{\|}}{C}–Ph$ (μ = 2.71 D)

(B) Aniline → $Ph–NH_2$ (μ = 1.59 D)

(C) Acetophenone → $Ph–\overset{\overset{O}{\|}}{C}–CH_3$ (μ = 3.05 D)

Dipole moment : C > A > B

Hence the sequence of obtained compounds is (C), (A) and (B)

3. NTA Ans. (3)

Sol. Liquid which have less difference in boiling point can be isolated by fractional distillation and liquid with less boiling point will be isolated first.

4. NTA Ans. (1)

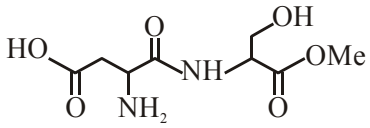
Sol. Kjeldahl's method for estimation of nitrogen is not applicable for nitrobenzene $C_6H_5NO_2$. because reaction with H_2SO_4, nitrobenzene can not give ammonia.

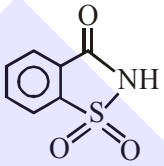
5. NTA Ans. (1)

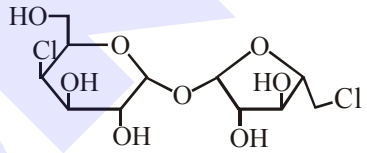
Sol. (i) Blue voilet color with Ninhydrine → amino acid derivative. So it cannot be saccharide or sucralose.

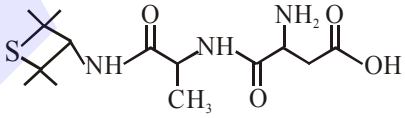
(ii) Lassaigne extract give +ve test with $AgNO_3$. So Cl is present, –ve test with $Fe_4[Fe(CN)_6]_3$ means N is absent. So it can't be Aspartame or Saccharine or Alitame, so C is sucralose.

(iii) Lassaigne solution of B and D given +ve sodium nitroprusside test, so it is having S, so it is Saccharine and Alitame.

(A) Aspartame 

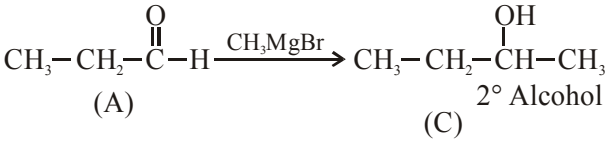
(B) Saccharine 

(C) Sucralose 

(D) Alitame 

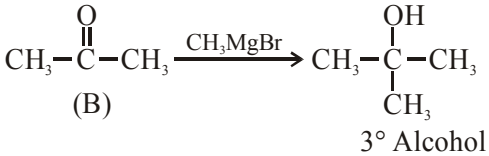
6. Official Ans. by NTA (3)

Sol.



CAN test for alcohol : ✓

Iodoform test : ✓

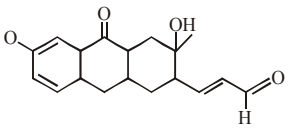


CAN test for alcohol : ✓

Lucas test : Immediately

Iodoform test : ×

7. Official Ans. by NTA (2)

Sol. Compound $\xrightarrow[\text{anhydride}]{\text{Chromic}}$ 

due to pressure of b

8. Official Ans. by NTA (1)

Sol.

Test	**Correct reagent**
(i) Lucas test $\longrightarrow$	conc. HCl + $ZnCl_2$
(ii) Dumas method $\longrightarrow$	CuO / CO_2
(iii) Kjeldahl's method $\longrightarrow$	H_2SO_4
(iv) Hinsberg Test $\longrightarrow$	$C_6H_5SO_2Cl$ + aq. KOH