# 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) $NH_2-C(=O)-NH_2$

**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 :

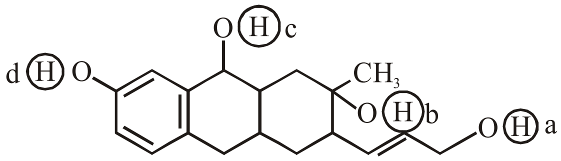
(1) $C = H_3C-C(CH_3)_2-OH$ ; $D = H_3C-CH_2-CH(OH)-CH_3$

(2) $C = H_3C-CH_2-CH_2-CH_2-OH$ ; $D = H_3C-C(CH_3)_2-OH$

(3) $C = H_3C-CH_2-CH(OH)-CH_3$ ; $D = H_3C-C(CH_3)_2-OH$

(4) $C = H_3C-CH_2-CH_2-CH_2-OH$ ; $D = H_3C-CH_2-CH(OH)-CH_3$

**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)

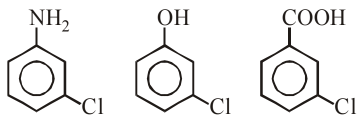
(3) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(e)

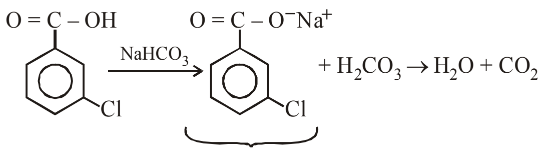
(4) (i)-(b), (ii)-(a), (iii)-(c), (iv)-(d)

## SOLUTION

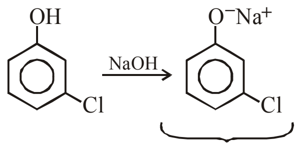
**1. NTA Ans. (3)**

**Sol.**

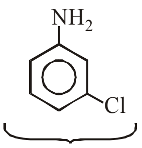




Fraction-A



Fraction-B



Fraction-C

**2. NTA Ans. (2)**

**Sol.** (A) Benzanilide $\rightarrow$ $Ph-NH-\overset{O}{\overset{\|}{C}}-Ph$ ($\mu$ = 2.71 D)

(B) Aniline $\rightarrow$ $Ph-NH_2$ ($\mu$ = 1.59 D)

(C) Acetophenone $\rightarrow$ $Ph-\overset{O}{\overset{\|}{C}}-CH_3$ ($\mu$ = 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)**

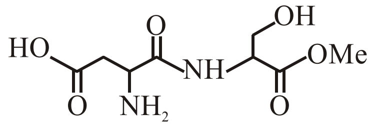
**Sol.** Kjeldahl's method for estimation of nitrogen is not applicable for nitrobenzene $C_6H_5NO_2$. because reaction with $H_2SO_4$, nitrobenzene can not give ammonia.

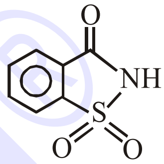
**5. NTA Ans. (1)**

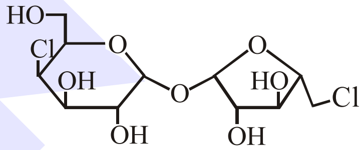
**Sol.** (i) Blue voilet color with Ninhydrine $\rightarrow$ amino acid derivative. So it cannot be saccharide or sucralose.

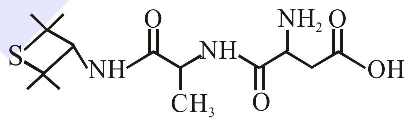
(ii) Lassaigne extract give +ve test with $AgNO_3$. So Cl is present, –ve test with $Fe_4[Fe(CN)_6]_3$ means N is absent. So it can't be Aspartame or Saccharine or Alitame, so C is sucralose.

(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.**

$$\underset{(A)}{CH_3-CH_2-\overset{O}{\overset{\|}{C}}-H} \xrightarrow{CH_3MgBr} \underset{(C)}{CH_3-CH_2-\overset{OH}{\overset{|}{CH}}-CH_3}$$

2° Alcohol

CAN test for alcohol : ✓

Iodoform test : ✓

$$\underset{(B)}{CH_3-\overset{O}{\overset{\|}{C}}-CH_3} \xrightarrow{CH_3MgBr} CH_3-\underset{CH_3}{\underset{|}{\overset{OH}{\overset{|}{C}}}}-CH_3$$

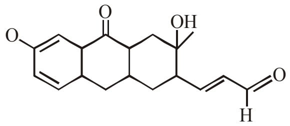
3° Alcohol

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 |