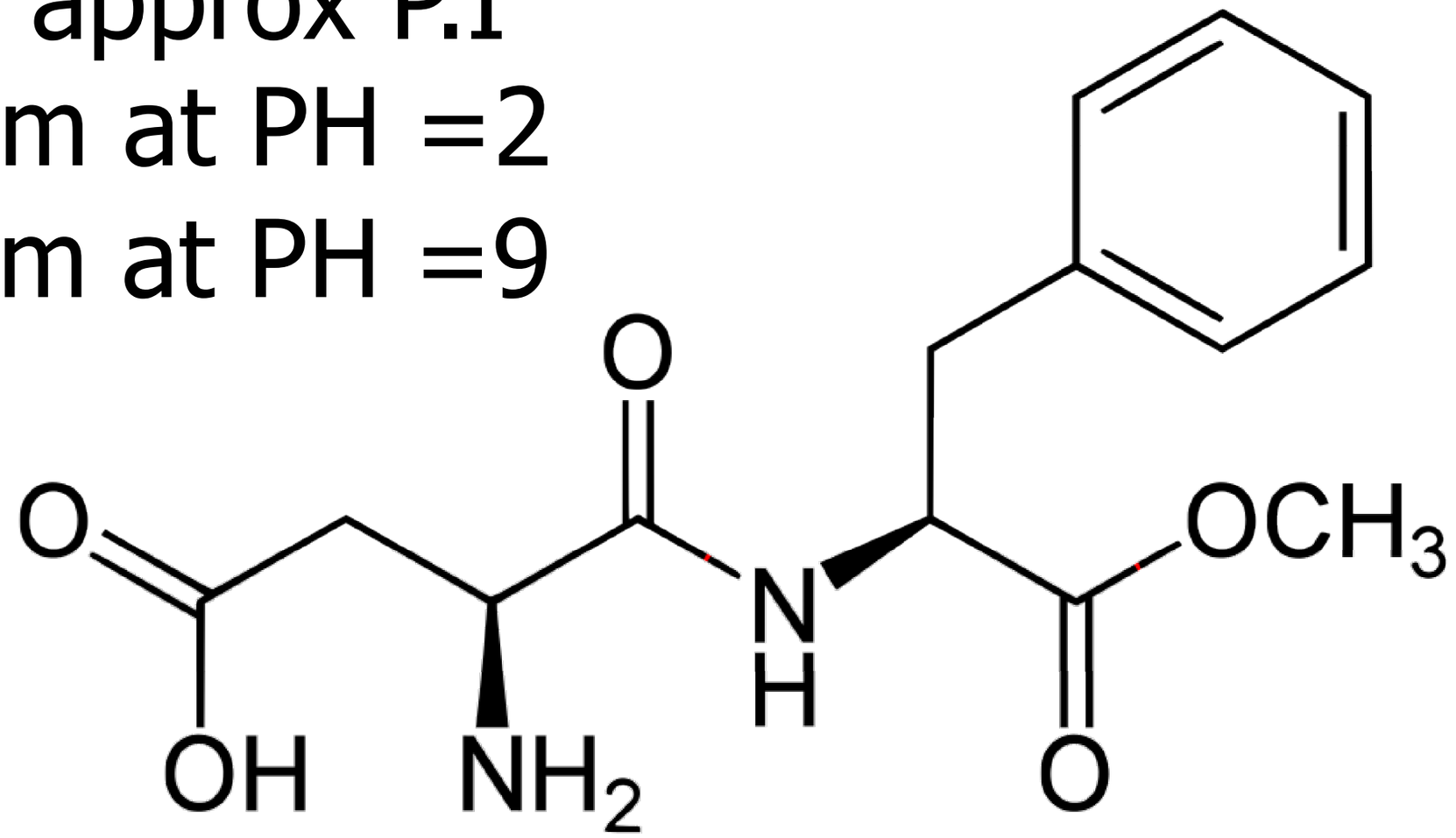
1. Name the A.A present
2. Calculate approx P.I
3. Major form at PH =2
4. Major form at PH =9

Aspartane



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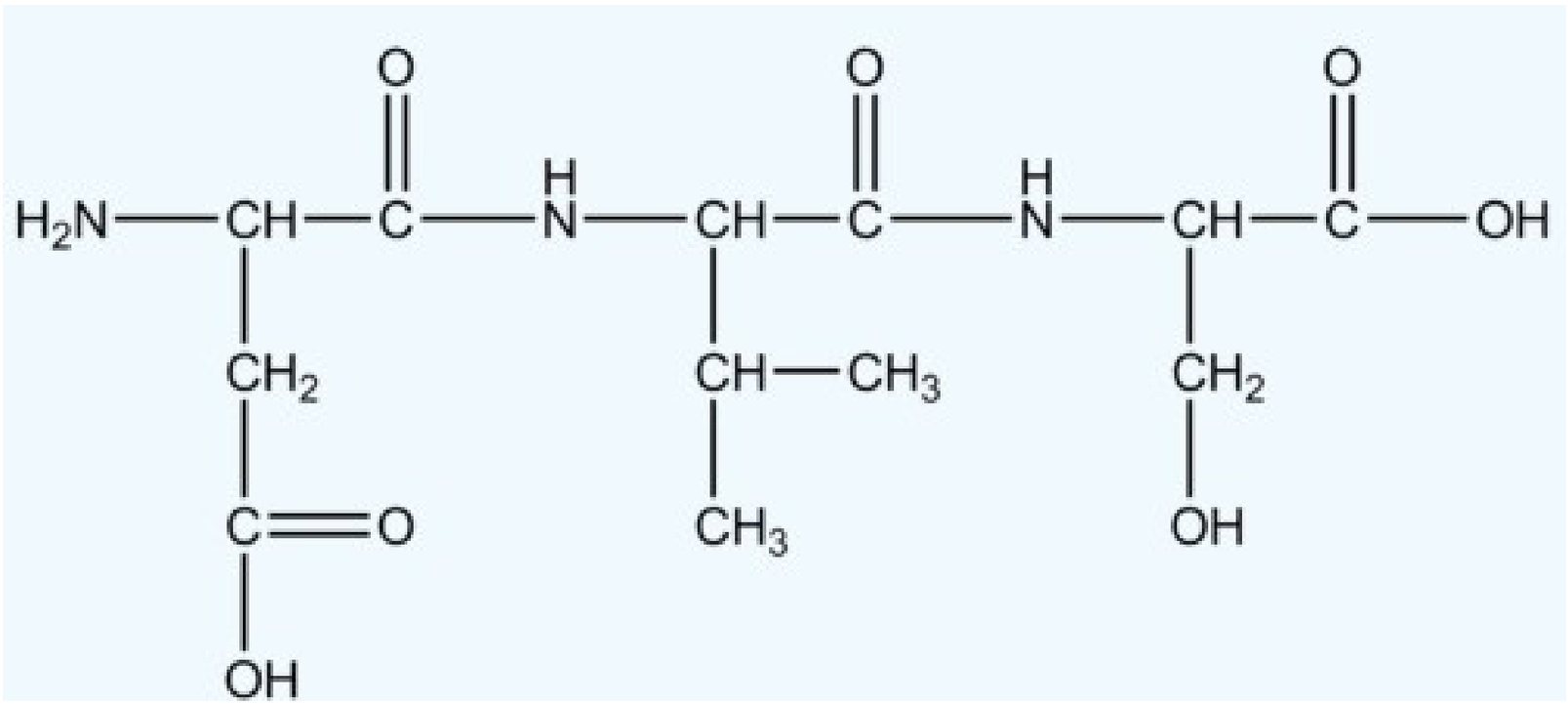
4. Major form at PH =9



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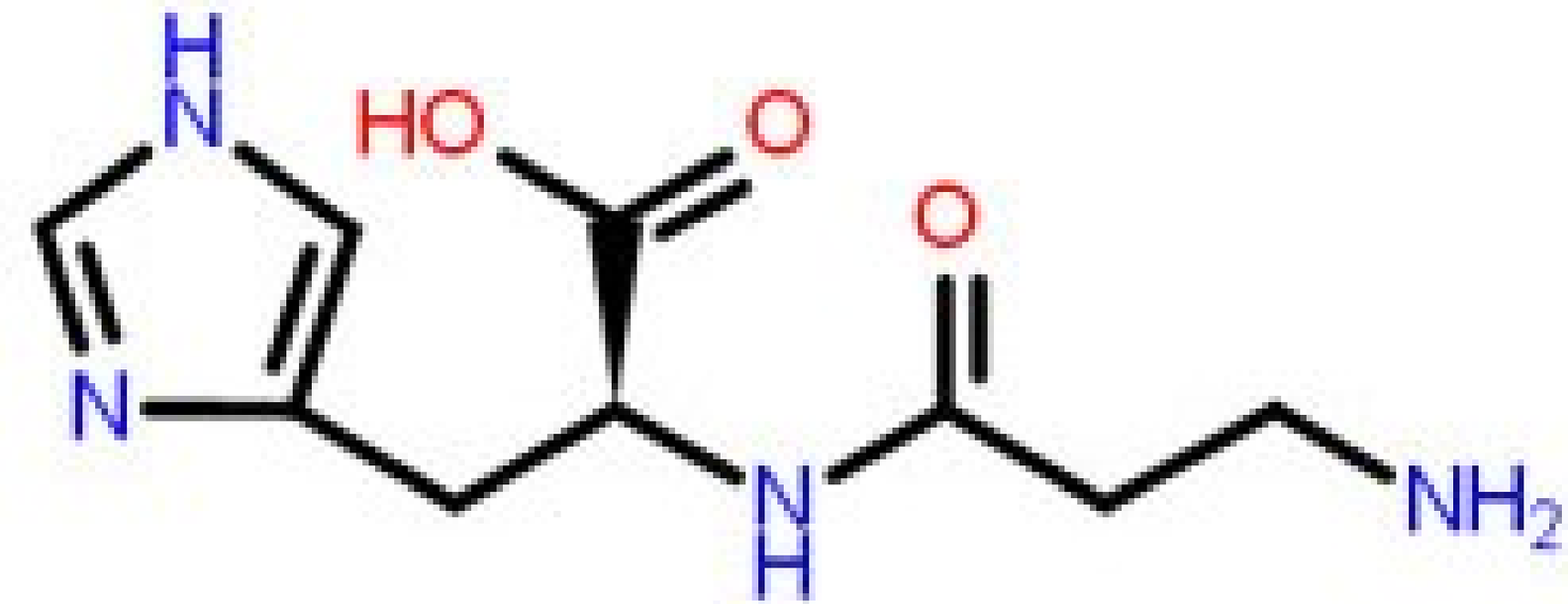

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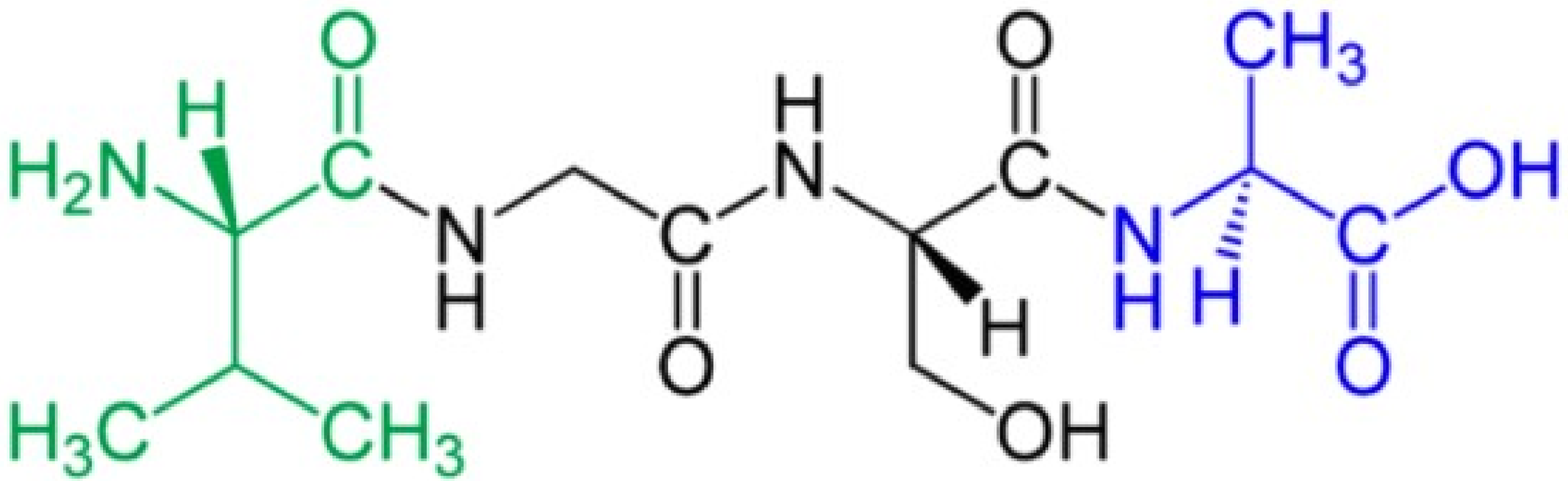

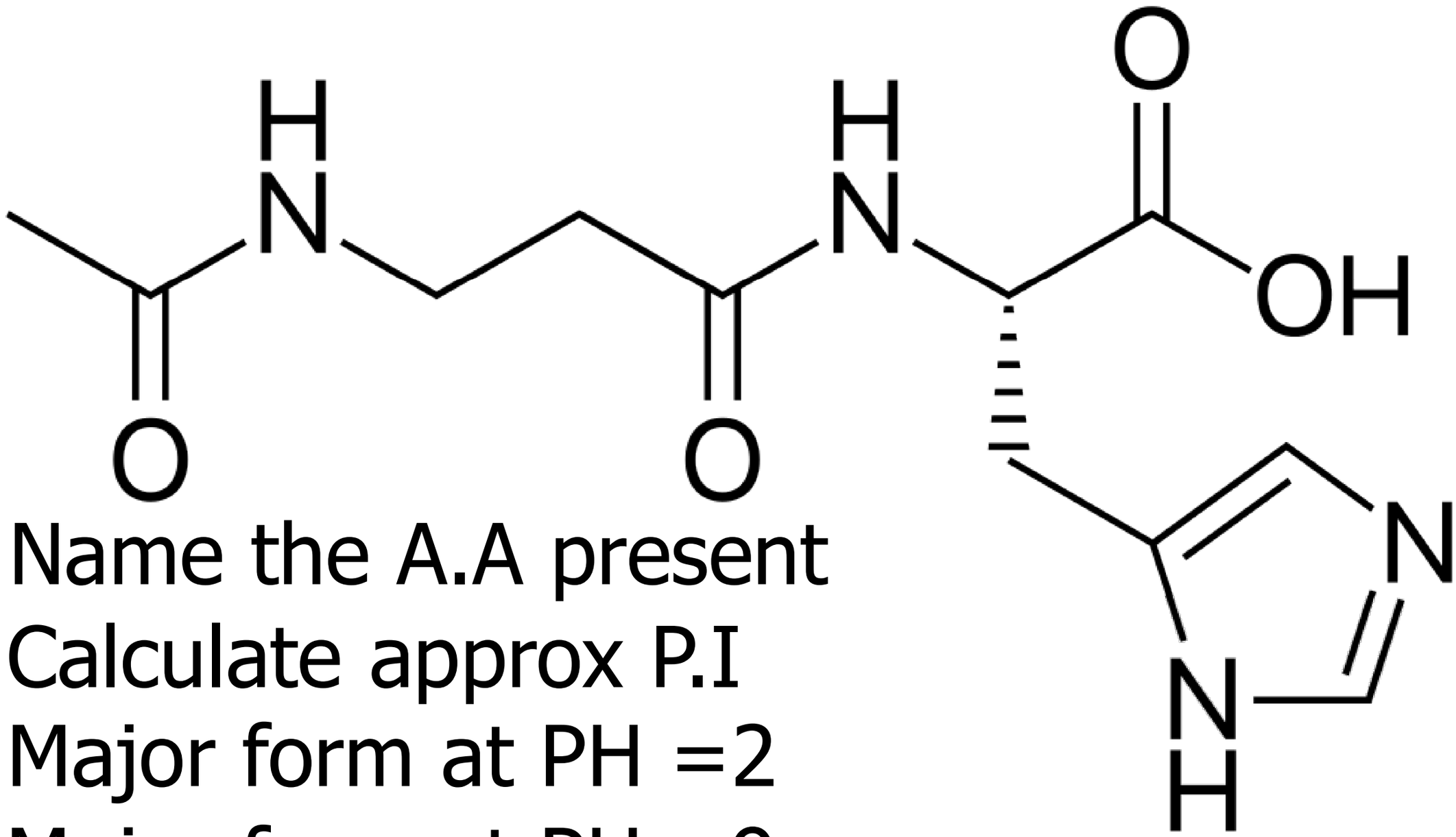

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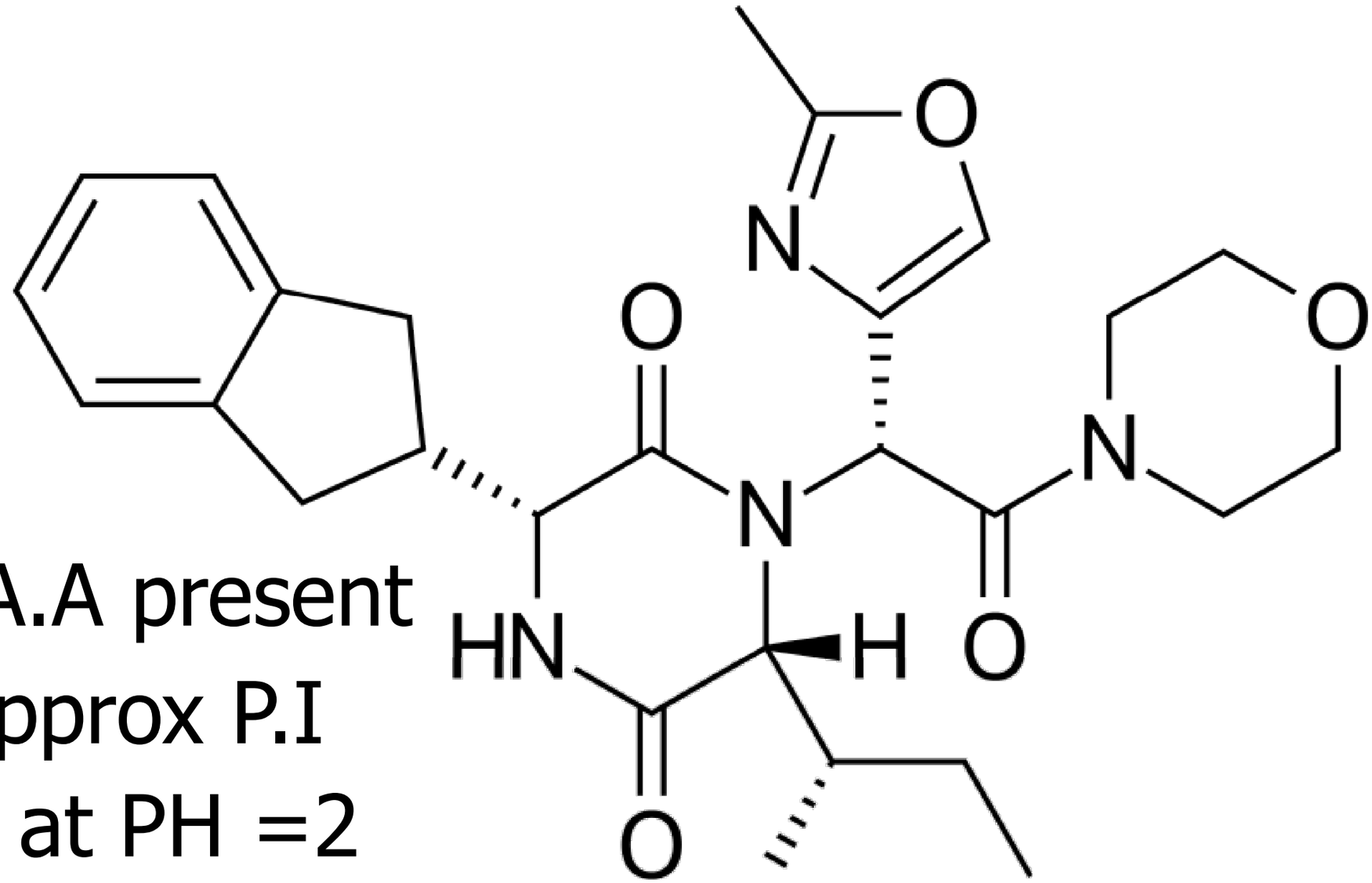


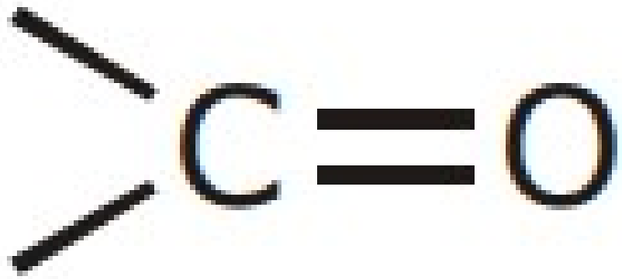
1. Name the A.A present
2. Calculate approx P.I
3. Major form at PH =2
4. Major form at PH =9

The total number of negative charge in the tetrapeptide, Gly-Glu-Asp-Tyr, t pH 12.5 will be _____. (Integer answer)

The number of chiral carbons present in sucrose is _____.

The number of chiral carbon(s) present in peptide, Ile-Arg-Pro, is _____.

The number of



groups present in a tripeptide Asp–Glu–Lys is ____.

Which one of the following compounds contains β-C_1-C_4 glycosidic linkage?

A Lactose

B Sucrose

C Maltose

D Amylose

Hydrolysis of sucrose gives :

A α-D-(−)-Glucose and β-D-(−)-Fructose

B α-D-(+)-Glucose and α-D-(−)-Fructose

C α-D-(−)-Glucose and α-D-(+)-Fructose

D α-D-(+)-Glucose and β-D-(−)-Fructose

Compound A gives D-Galactose and D-Glucose on hydrolysis. The compound A is :

A Amylose

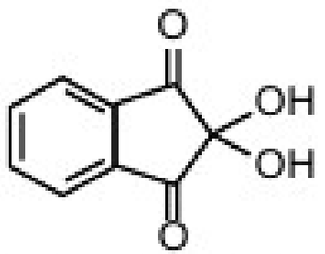
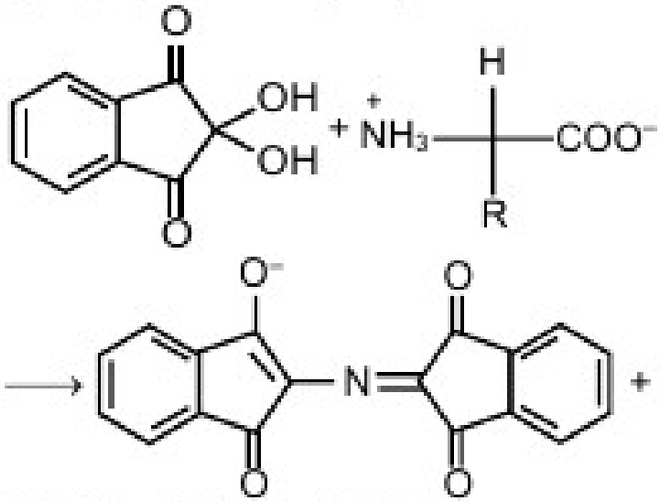
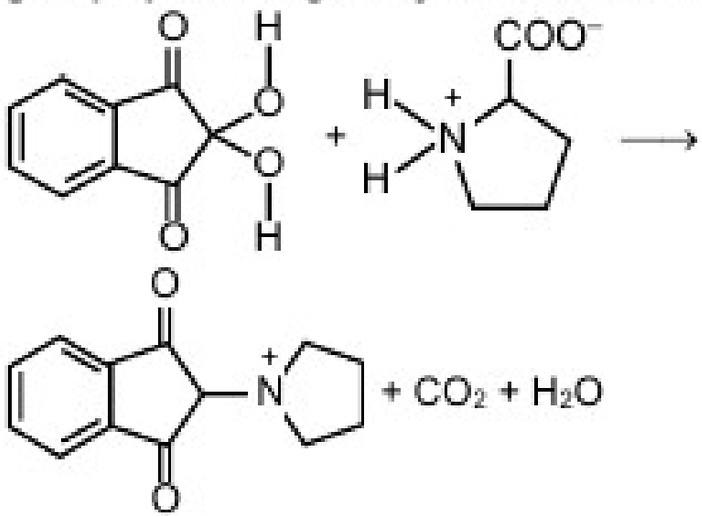
B Sucrose

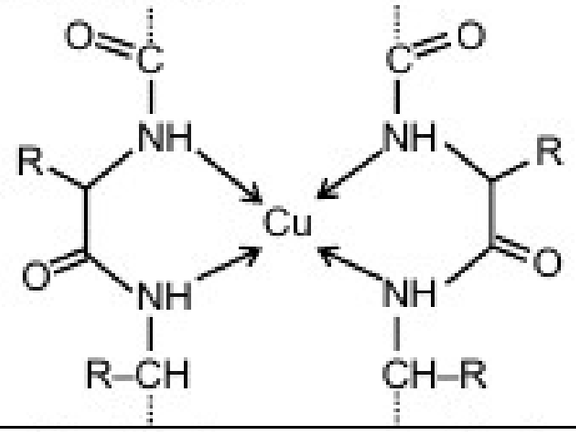
C Maltose

D Lactose

Test	Reagent	Observations	Reason	Test Given By
Molisch's Test	5% solution of **α-Napthol** in alcohol. + Few drops of conc. H_2SO_4.	Formation of **reddish violet ring** at the junction of two liquids.	Formation of furfural or furfural derivatives. 	**Carbohydrates**
Iodine Test	**I_2 solution** with a little KI.	**Blue/red/brown** colour solution.	Colour due to **formation of adsorption complex** of starch/dextrin/glucogene .	**Starch/dextrin/glycogens**
Seliwonoff's Test	0.5% **Resorcinol in conc. HCl** and heat for 5 minutes.	**Fiery red colour** or Coloured solution.	Complex formation.	**Fructose gives fiery red solution** but glucose, maltose and sucrose gives brown/violet coloured solutions. (Difference between fructose and glucose)
Bial's Test	**Orcinol** and a little $FeCl_3$ dissolved in ethanol	**Blue green** compound formed	Heating pentose with strong acids gives **furfural**. Which with Bial's reagent gives blue-green compound.	**Pentose** i.e. **Arabinose**

Osazone Test	**Phenylhydrazine -** hydrochloride mixture with anhydrous sodium acetate	**Yellow crystals** of Osazone	Formation of **Yellow crystals of Osazone**	Only **Glucose, Mannose and Fructose**.
Fehling's Solution Test	(i) **$CuSO_4.5H_2O$** is water. (ii) Alkaline solution (KOH) of **sodium Potassium tartarate**	**Red/brown** ppt. of Cupric oxide	Reducing sugar reduces Cu^{2+} to Cu_2O	Given by **Glucose, Fructose, Maltose, Lactose** (Not given by Sucrose)
Benedict's Solution Test	1. **$CuSO_4.5H_2O$** in water 2. Alkaline solution of **sodium citrate**.	**Red/brown** ppt. cupric oxide	Reducing sugar reduces Cu^{2+} to Cu_2O	Given by **Glucose, Fructose, Maltose, Lactose** (Not given by Sucrose)
Barfoed's Test	1. **Copper acetate** solution in water 2. Buffered with few drops of **Acetic acid**.	**Red/brown** ppt. cupric oxide	Reducing sugar reduces Cu^{2+} to Cu_2O	Given by **Glucose, Fructose, Maltose, Lactose** (Not given by Sucrose)

Test	Reagent	Observations	Test Given By
Ninhydrin Test	 Ninhydrin hydrate	Blue/purple or Yellow solution	α-amino acids with primary amino group gives blue/purple solution  $CO_2(g) + RCHO + H_2O$
			α-amino acids with secondary amino group "proline" gives yellow solution 

Biuret Test	**(i) Hydrated $CuSO_4$** **(ii) KOH solution** **(iii) Sod. Pot. Tartarate**	**Violet colour solution**	**<u>Tri-peptide, Polypeptide and Proteins</u>** Form violet coloured chelate complex in alkaline conditions.  * 2-peptide bonds are required for the formation of chelates, single aminoacids has no peptide bond or dipeptide (gives a negative test)
Xanthoproteic Test	Nitrating mixture	Yellow solution	Aminoacids/proteins with only **activated benzene ring** **"Tyrosine & Tryptophan"** gives this test.
Million's Test	Nitrating mixture - followed by Hg(I) and Hg(II) ions in the solution.	Red solution	Specifie test of **amino acid with phenolic groups**. **"Tyrosine"**
Hopleins cole Test			Specific test for the **"Tryptophan", the amino acid with indole group.**
Nitroprusside Test			Specific test for the **"Cysteine", the only amino acid with a thiol group.**

- **1. Which of the following is a polyamide?**
- (1) Teflon
- (2) Nylon – 6,6
- (3) Terylene
- (4) Bakelite

- **2. Which of the following is fully fluorinated polymer?**
- (1) Neoprene
- (2) Teflon
- (3) Thiokol
- (4) PVC

- **3.Bakelite is obtained from phenol by reacting with**
- (1) $(CH_2OH)_2$
- (2) CH_3CHO
- (3) CH_3COCH_3
- (4) HCHO

4. The polymer containing strong intermolecular forces e.g. hydrogen bonding, is

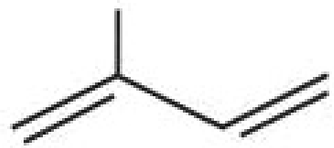
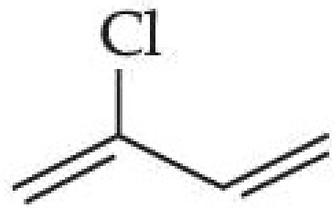
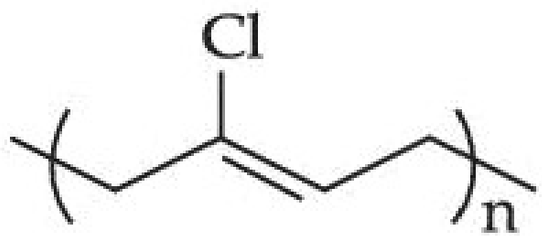
- (1) teflon
- (2) nylon 6,6
- (3) polystyrene
- (4) natural rubber

- **Which one is classified as a condensation polymer?**
- (1) Acrylonitrile
- (2) Dacron
- (3) Neoprene
- (4) Teflon

- **The species which can best serve as an initiator for the cationic polymerization is**
- (1) $LiAlH_4$
- (2) HNO_3
- (3) $AlCl_3$
- (4) BuLi

- **Nylon threads are made of**
- (1) Polyester polymer
- (2) Polyamide polymer
- (3) Polyethylene polymer
- (4) Polyvinyl polymer

Match List-I with List-II :

	List - I		List - II
(a)	Chloroprene	(i)	
(b)	Neoprene	(ii)	
(c)	Acrylonitrile	(iii)	
(d)	Isoprene	(iv)	$CH_2=CH-CN$

Monomer units of Dacron polymer are :

A ethylene glycol and phthalic acid

B ethylene glycol and terephthalic acid

C glycerol and terephthalic acid

D glycerol and phthalic acid

Which among the following is not a polyester?

A Novolac

B PHBV

C Dacron

D Glyptal

Monomer of Novolac is :

A 3-Hydroxybutanoic acid

B phenol and melamine

C o-Hydroxymethylphenol

D 1, 3-Butadiene and styrene

The polymer formed on heating Novolac with formaldehyde is :

A Bakelite

B Polyester

C Melamine

D Nylon 6, 6

A biodegradable polyamide can be made from :

A Glycine and isoprene

B Hexamethylene diamine and adipic acid

C Glycine and aminocaproic acid

D Styrene and caproic acid

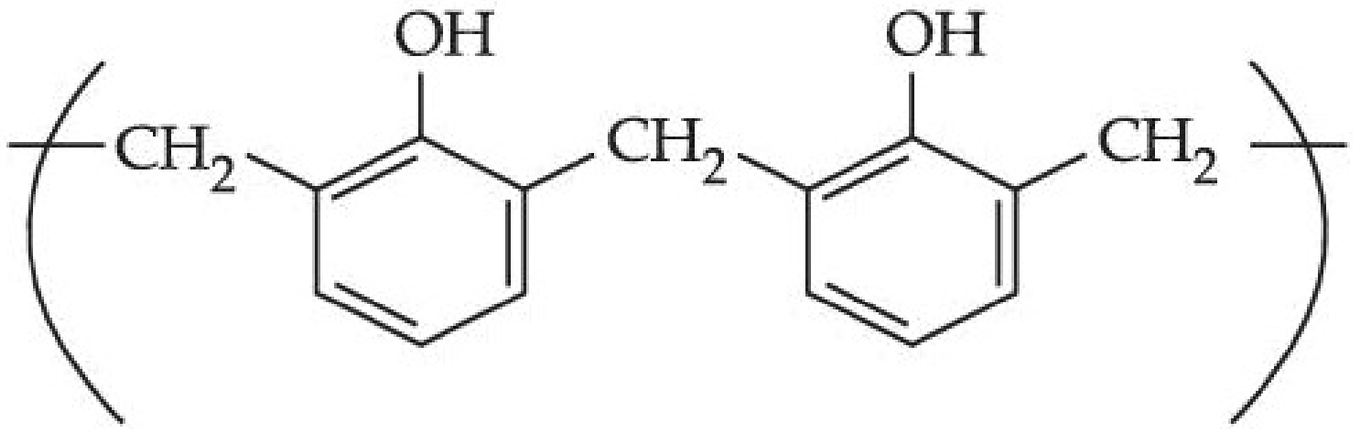
Which polymer has 'chiral' monomer(s) ?

A Nylon 6,6

B Buna-N

C PHBV

D Neoprene



is a repeating unit for :

A Novolac

B Buna-N

C Acrilan

D Neoprene

Bakelite is a cross-linked polymer of formaldehyde and :

A PHBV

B Buna-S

C Novolac

D Dacron

Identify the incorrect statement from the following

A Amylose is a branched chain polymer of glucose

B Starch is a polymer of α-D glucose

C β-Glycosidic linkage makes cellulose polymer

D Glycogen is called as animal starch

Orlon fibres are made up of :

A Polyacrylonitrile

B Polyesters

C Polyamide

D Cellulose

The correct match between Item - I and Item - II is :

Item - I	Item - II
(a) Natural rubber	(I) 1, 3-butadiene + styrene
(b) Neoprene	(II) 1, 3-butadiene + acrylonitrile
(c) Buna-N	(III) Chloroprene
(d) Buna-S	(IV) Isoprene

Consider the Assertion and Reason given below.

Assertion (A) : Ethene polymerized in the presence of Ziegler Natta Catalyst at high temperature and pressure is used to make buckets and dustbins.

Reason (R) : High density polymers are closely packed and are chemically inert.

Choose the correct answer from the following:

A Both (A) and (R) are correct and (R) is the correct explanation of (A).

B Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C (A) is correct but (R) is wrong.

D (A) and (R) both are wrong.

- A peptide synthesized by the reactions of one molecule each of Glycine, Leucine, Aspartic acid and Histidine will have _____ peptide linkages.

Which of the following polymer is used in the manufacture of wood laminates?

A Melamine formaldehyde resin

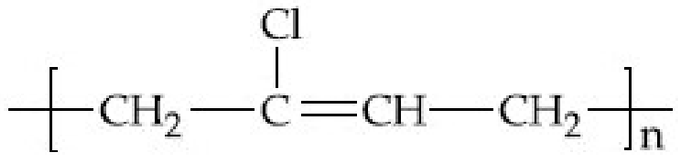
B Urea formaldehyde resin

C cis-poly isoprene

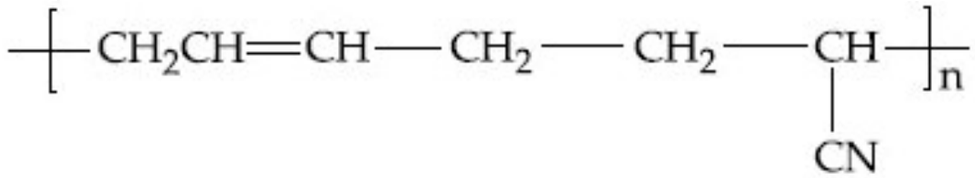
D Phenol and formaldehyde resin

The structure of Neoprene is :

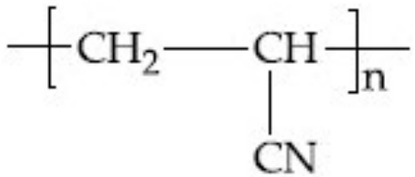
A



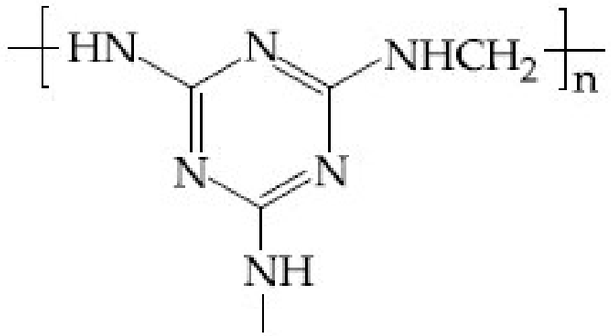
B



C



D



Which statement is correct?

A Buna-N is a natural polymer.

B Synthesis of Buna-S needs nascent oxygen.

C Buna-S is a synthetic and linear thermosetting polymer.

D Neoprene is an addition copolymer used in plastic bucket manufacturing.

Match **List I** with **List II**.

List I **(Monomer Unit)**	**List II** **(Polymer)**
(a) Caprolactum	(i) Natural rubber
(b) 2-Chloro-1, 3-butadiene	(ii) Buna-N
(c) Isoprene	(iii) Nylon 6
(d) Acrylonitrile	(iv) Neoprene

Test for Sulphur :

(2) Sodium extract with sodium nitroprusside, appearance of a violet colour further indicates the presence of sulphur.

$S^{2-} + [Fe(CN)_5NO]^{2-} \longrightarrow [Fe(CN)_5NOS]^{4-}$
Violet

$$Na_2S + Na_2[Fe(CN)_5NO] \longrightarrow Na_4[Fe(CN)_5NOS]$$

sod. nitroprusside — Sod. thionitroprusside (Violet colour)

Test for both Sulphur & Nitrogen :

(3) If nitrogen and sulphur both are present in an organic compound, sodium thiocyanate is formed. It gives blood red colour and no Prussian blue since there are no free cyanide ions.

$$Na + C + N + S \longrightarrow NaSCN$$

$$Fe^{3+} + SCN^{-} \longrightarrow [Fe(SCN)]^{2+}$$

Blood red

Test for Halogens :

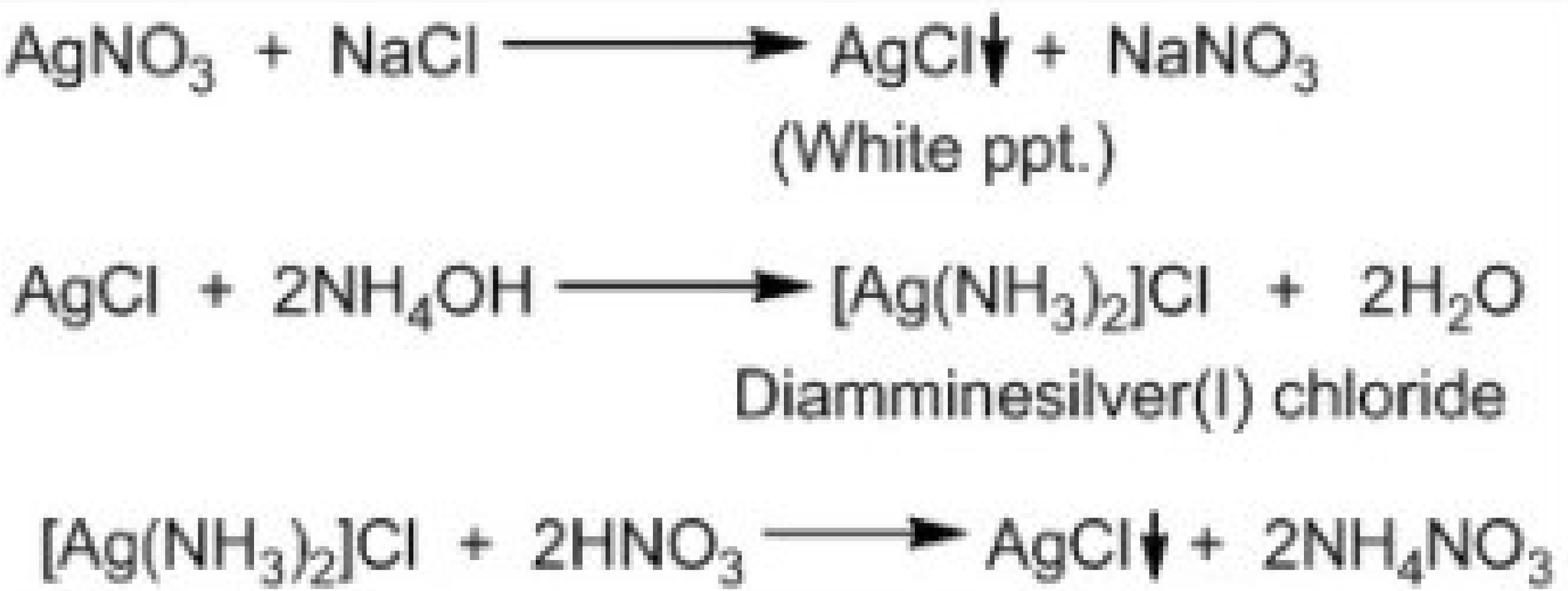
Step I : Sodium extract is acidified with nitric acid
Step II : treated with silver nitrate.
1. A white precipitate, soluble in ammonium hydroxide shows the presence of chlorine,
2. a yellowish precipitate, sparingly soluble in ammonia shows the presence of bromine
3. a yellow precipitate, insoluble in ammonium hydroxide shows the presence of iodine.

$X^- + Ag^+ \longrightarrow AgX$ **X represents a halogen – Cl, Br or I.**

Test for Halogens :

If nitrogen or sulphur is also present in the compound, the sodium fusion extract is first boiled with conc nitric acid to decompose cyanide or sulphide of sodium formed during Lassaigne's test.

These ions would otherwise interfere with silver nitrate test for halogens.


AgNO3 + NaCl → AgCl↓ + NaNO3
(White ppt.)
AgCl + 2NH4OH → [Ag(NH3)2]Cl + 2H2O
Diamminesilver(I) chloride
[Ag(NH3)2]Cl + 2HNO3 → AgCl↓ + 2NH4NO3

Test for Phosphorus :

Step I : Compound is heated with an oxidising agent (sodium peroxide). The phosphorus present in the compound is oxidised to phosphate.

Step II. The solution is boiled with nitric acid and then treated with ammonium molybdate. A yellow colouration indicates the presence of phosphorus.

$$Na_3PO_4 + 3HNO_3 \longrightarrow H_3PO_4 + 3NaNO_3$$

$$H_3PO_4 + 12(NH_4)_2MoO_4 + 21HNO_3 \longrightarrow (NH_4)_3PO_4.12MoO_3 + 21NH_4NO_3 + 12H_2O$$

Ammonium molybdate Ammonium phosphomolybdate

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$$H_3PO_4 + 12(NH_4)_2MoO_4 + 21HNO_3 \longrightarrow (NH_4)_3PO_4.12MoO_3 + 21NH_4NO_3 + 12H_2O$$

Ammonium molybdate Ammonium phosphomolybdate

QUANTITATIVE ANALYSIS

Let W gram of O.C gives x gram of CO_2. % of C is

$$C_nH_mO_x \xrightarrow{\text{Oxidation}} n\,CO_2 + m/2\,H_2O$$

1 mole OC $\equiv$ n. mole CO_2 $\equiv$ m/2 mole H_2O.

Given x gram of CO_2 obtained.

mole of $CO_2 = \frac{x}{44}$.

mole of C $= x/44 \times 1$

Weight of C $= \frac{x}{44} \times 1 \times 12$ gram.

% by wt of C $= \frac{x}{44} \times \frac{12}{W} \times 100\,\%$.

Let W gram of O.C. gives x gram of H_2O. % of H is

$$C_nH_mO_x \xrightarrow{\text{Oxidation.}} n\,CO_2 + m/2\,H_2O$$

1 mole O.C $\equiv$ n. mole CO_2 $\equiv$ m/2 Mole of H_2O

- Wt of H_2O obtained = x gram.

Mole of H_2O $= \frac{x}{18}$

Mole of H $= \frac{x}{18} \times 2.$

Wt of H $= \frac{x}{18} \times 2$ gram

% by Wt of H $= \frac{x}{18} \times \frac{2}{W} \times 100\ \%$

Let W gram of OC. gives x gram of AgCl. % of Cl is

Ag = 108, Cl = 35.5

Given. x gram of AgCl obtained.

$$\text{mole of AgCl} = \frac{x}{143.5}$$

$$\text{mole of Cl} = \frac{x}{143.5}$$

$$\text{Wt of Cl} = \frac{x}{143.5} \times 35.5$$

$$\% \text{ of Cl by Wt} = \frac{x}{143.5} \times \frac{35.5}{W} \times 100\%$$

let W gram of OC. gives x gram of AgBr. % of Br is.

Ag = 108, Br = 80

Given x gram of AgBr obtained.

$$\text{Mole of AgBr} = \frac{x}{188}.$$

$$\text{Mole of } Br^- = \frac{x}{188} \times 1$$

$$\text{Wt of Br} = \frac{x}{188} \times 80 \text{ gram}$$

$$\% \text{ of Br} = \frac{x}{188} \times \frac{80}{W} \times 100\%$$

let W gram of OC. gives x gram of AgI. % of I is

Ag = 108, I = 127.

Given x gram of AgI obtained.

$$\text{mole of AgI} = \frac{x}{207}, \quad \text{mole of } I^- = \frac{x}{207}$$

$$\text{wt of I} = \frac{x}{207} \times 127.$$

$$\% \text{ of I} = \frac{x}{207} \times \frac{127}{W} \times 100\ \%.$$

let W gram of OC. gives x gram of $BaSO_4$. % of S is

M.Wt $BaSO_4$ = 233.

Given x gram of $BaSO_4$ obtained.

$$\text{Mole of } BaSO_4 = \frac{x}{233}$$

$$\text{mole of S} = \frac{x}{233} \times 1$$

$$\text{Wt of S} = \frac{x}{233} \times 32\ g$$

$$\% \text{ of S} = \frac{x}{233} \times \frac{32}{W} \times 100\ \%$$

Let W gram of OC. gives X gram of $(NH_4)_3PO_4 \cdot 12MoO_3$.
by adding ammonia and ammonium molybdate.

Mol. wt of $(NH_4)_3PO_4 \cdot 12MoO_3$ = 1877 g.

Wt of ammonium phosphomolybdate = X gram

mole " " " = $\frac{X}{1877}$.

mole of P atom = $\frac{X}{1877} \times 1$.

Wt of P atom = $\frac{X}{1877} \times \frac{1}{3} \times 31$ g

% wt of P is = $\frac{X}{1877} \times \frac{31}{W} \times 100$.

Let W gram of O.C gives X gram of Magnesium Pyrophosphate $Mg_2P_2O_7$ by adding magnesia mixture & heating

Mol. wt of $Mg_2P_2O_7$ = 222 gram/mole.

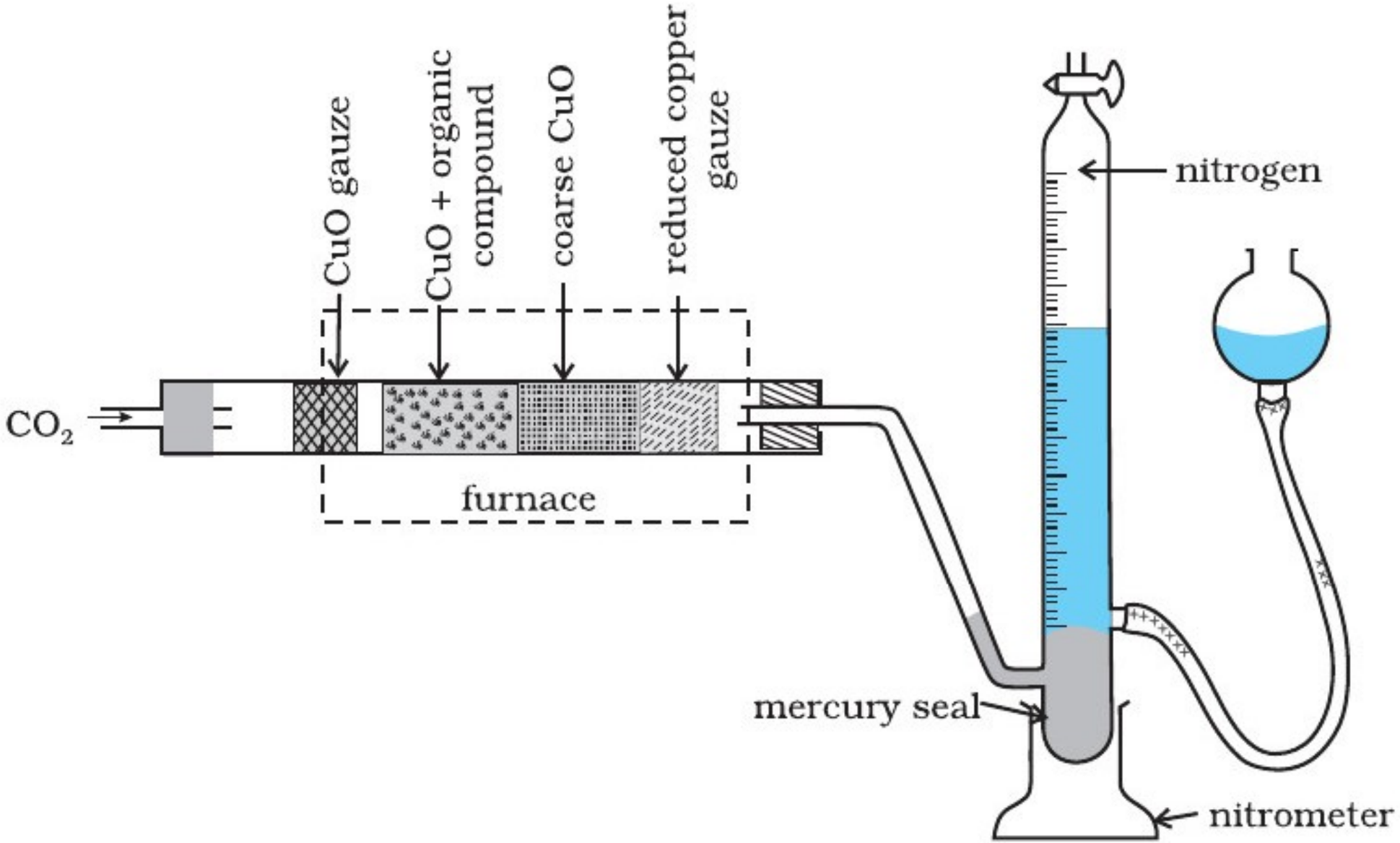
Wt of $Mg_2P_2O_7$ = X gram.

$$\text{Mole of } Mg_2P_2O_7 = \frac{X}{222}$$

$$\text{Mole of } P = \frac{X}{222} \times 2$$

$$\text{Wt of } P = \frac{X}{222} \times 2 \times 31 \text{ g}$$

$$\% \text{ of } P = \frac{X}{222} \times \frac{62}{W} \times 100 \%$$


CuO gauze
CuO + organic compound
coarse CuO
reduced copper gauze
CO_2
furnace
nitrogen
mercury seal
nitrometer

In Duma's Method 0.3 g of an O.C gives 50 ml of N_2 gas at 300k and 715 mm of Hg. find % of N_2 in O.C. [aq. tension = 15 MM at 300K].

$$OC \xrightarrow[\Delta]{CuO} N_2 \text{ gas.}$$

1. Corrected dry N_2 pressure = 715 − 15 = 700 MM = $700/760$ atom.
2. Temp = 300k.
3. mole of N_2 gas = $\frac{PV}{RT} = \frac{700}{760} \times \frac{50}{1000} \times \frac{1}{0.0821} \times \frac{1}{300}$ = (x).
4. mole of N. atom = 2x.
5. wt of N atom = 2·x × 14g.
6. % of N = $\frac{2X.14}{W} \times 100$.

In Kjeldahl method, ammonia evolved from 0.5g of OC is neutralised by 10 ml of 1 M H_2SO_4. find % of N.

Method

$$OC \xrightarrow[2.\ NaOH]{1.\ H_2SO_4} NH_3\uparrow \xrightarrow[(1)]{H_2SO_4} (NH_4)_2SO_4$$

[2] [1]

* m.mole of H_2SO_4 used = $10 \times 1 = 10$ mmole.
* M.Mole of NH_3 evolved = $2 \times 10 = 20$ m.mole.
* wt of NH_3 = $\frac{20 \times 17}{1000}$ g. * M.Mole of N = 20 mmole
* wt of N atom = $\frac{20 \times 14}{1000}$ g

% of N atom = $\frac{20 \times 14}{1000} \times \frac{}{0.5} \times 100$.

1. A g. of O.C was digested in kjeldahl method and evolved ammonia was absorbed in 60 ml of M/10 H_2SO_4. The unreacted acid required 20 ml of M/10 NaOH. find % of N.

O.C $\xrightarrow[2.\ NH_3.]{1.\ H_2SO_4.}$ NH_3 evolved $\rightarrow$ H_2SO_4 $\leftarrow$ NaOH

Rxn-1 $2NH_3 + 1\,H_2SO_4 \rightarrow (NH_4)_2SO_4$, Rxn-2. $2NaOH + 1\,H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

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1. m. mole of H_2SO_4 taken = $60 \times M/10 = 6$ m mole.

2. m. mole of NaOH used with excess H_2SO_4 = $20 \times M/10 = 2$.

3. m. mole of H_2SO_4 [consumed by NaOH] = $2/2 = 1$ m. mole.

4. m. mole of H_2SO_4 [Neutralised by NH_3] = $6 - 1 = 5$ m mole.

5. m. mole of NH_3 produced = $5 \times 2 = 10$ m. mole

6. m. mole of N atom in OC = $10 \times 1 = 10$ m. mole

7. wt of N atom = $\frac{10 \times 14}{1000}$ g.

8 % by wt of N = $\frac{10 \times 14}{1000 \times w} \times 100\%$

$= \frac{10 \times 14}{1000 \times 1.4} \times 100 = 10\%$

1 JEE Main 2021 (Online) 16th March Evening Shift

MCQ (Single Correct Answer)

Match List - I with List - II :

	List - I **Test/Reagents/Observation(s)**		**List - II** **Species detected**
(a)	Lassaigne's Test	(i)	Carbon
(b)	Cu(II) oxide	(ii)	Sulphur
(c)	Silver nitrate	(iii)	N, S, P, and halogen
(d)	The sodium fusion extract gives black precipitate with acetic acid and lead acetate	(iv)	Halogen Specifically

4 JEE Main 2021 (Online) 26th February Morning Shift

MCQ (Single Correct Answer)

Which of the following is 'a' FALSE statement ?

A Carius method is used for the estimation of nitrogen in an organic compound.

B Kjeldahl's method is used for the estimation of nitrogen in an organic compound.

C Carius tube is used in the estimation of sulphur in an organic compound.

D Phosphoric acid produced on oxidation of phosphorus present in an organic compound is precipitated as $Mg_2P_2O_7$ by adding magnesia mixture.

Which one of the following is likely to give a precipitate with $AgNO_3$ solution ?

A $CHCl_3$

B $(CH_3)_3CCl$

C CCl_4

D $CH_2=CH-Cl$

4 JEE Main 2019 (Online) 12th April Morning Slot

MCQ (Single Correct Answer)

An organic compound 'A' is oxidizod with Na_2O_2 followed by boiling with HNO_3. The resultant solution is then treated with ammonium molybdate to yield a yellow precipitate.

Based on above observation, the element present in the given compound is:

A Fluorine

B Phosphorus

C Nitrogen

D Sulphur

2 **JEE Main 2015 (Offline)**

MCQ (Single Correct Answer)

In Carius method of estimation of halogens, 250 mg of an organic compound gave 141 mg of AgBr. The percentage of bromine in the compound is: (at. Mass Ag = 108; Br = 80)

A 48

B 60

C 36

D 24

3 **JEE Main 2014 (Offline)**

MCQ (Single Correct Answer)

For the estimation of nitrogen, 1.4 g of organic compound was digested by Kjeldahl method and the evolved ammonia was absorbed in 60 mL of M/10 sulphuric acid. The unreacted acid required 20 ml of M/10 sodium hydroxide for complete neutralization. The percentage of nitrogen in the compound is:

A 3%

B 5%

C 6%

D 10%

1. A g. of O.C was digested in kjeldahl method and evolved ammonia was absorbed in 60 ml of M/10 H_2SO_4. The unreacted acid required 20 ml of M/10 NaOH. find % of N.

O.C $\xrightarrow[2.\ NH_3.]{1.\ H_2SO_4.}$ NH_3 evolved $\rightarrow$ H_2SO_4 $\leftarrow$ NaOH

Rxn-1 $2NH_3 + 1\,H_2SO_4 \rightarrow (NH_4)_2SO_4$, Rxn-2. $2NaOH + 1\,H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

---

1. m. mole of H_2SO_4 taken = $60 \times M/10 = 6$ m mole.

2. m. mole of NaOH used with excess H_2SO_4 = $20 \times M/10 = 2$.

3. m. mole of H_2SO_4 [consumed by NaOH] = $2/2 = 1$ m. mole.

4. m. mole of H_2SO_4 [Neutralised by NH_3] = $6 - 1 = 5$ m mole.

5. m. mole of NH_3 produced = $5 \times 2 = 10$ m. mole

6. m. mole of N atom in OC = $10 \times 1 = 10$ m. mole

7. wt of N atom = $\frac{10 \times 14}{1000}$ g.

8 % by wt of N = $\frac{10 \times 14}{1000 \times w} \times 100\%$

$= \frac{\cancel{10} \times 14}{\cancel{1000} \times 10.4} \times \cancel{100} = 10\%$

29.5 mg of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in 20 mL of 0.1 M HCl solution. The excess of the acid required 15 mL of 0.1 M NaOH solution for complete neutralization. The percentage of nitrogen in the compound is

A 59.0

B 47.4

C 23.7

D 29.5