

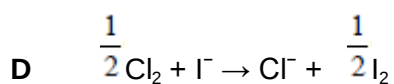
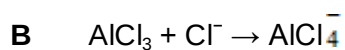
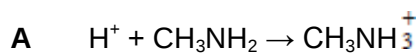
Name of the Student: _____

Max. Marks : 24 Marks

Time : 24 Minutes

Q1.

Which one of the following reactions does **not** involve donation of an electron pair?



(Total 1 mark)

Q2.

- (a) Name and outline a mechanism for the formation of butylamine, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$, by the reaction of ammonia with 1-bromobutane, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$.

Name of mechanism _____

Mechanism

(5)

- (b) Butylamine can also be prepared in a two-step synthesis starting from 1-bromopropane, $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$. Write an equation for each of the two steps in this synthesis.

Step 1

Step 2

(3)

- (c) (i) Explain why butylamine is a stronger base than ammonia.

- (ii) Identify a substance that could be added to aqueous butylamine to produce a basic buffer solution.

(3)

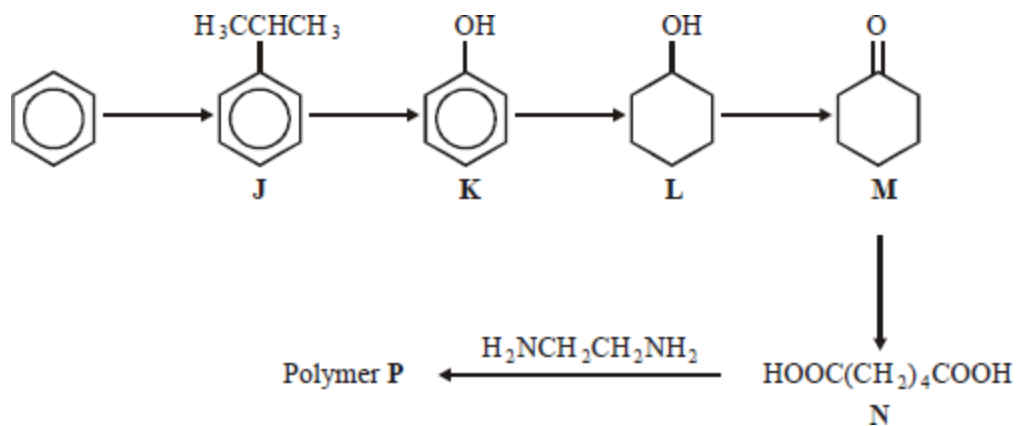
- (d) Draw the structure of a tertiary amine which is an isomer of butylamine.

(1)

(Total 12 marks)

Q3.

This question is about the following reaction scheme which shows the preparation of polymer **P**.



Polymer **P** is formed in a two-step reaction from **N**. The first stage is a neutralisation reaction. The volume, in cm^3 , of a 0.20 mol dm^{-3} solution of $\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$ required to neutralise $6.8 \times 10^{-3} \text{ mol}$ of the acid **N** is

- A 17
- B 34
- C 68
- D 136

(Total 1 mark)

Q4.

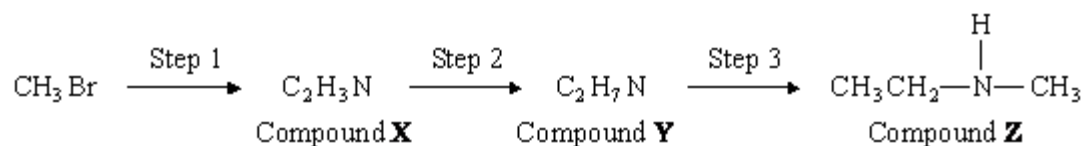
Which one of the following is **not** a correct general formula for the non-cyclic compounds listed?

- A alcohols $C_nH_{2n+2}O$
- B aldehydes $C_nH_{2n+1}O$
- C esters $C_nH_{2n}O_2$
- D primary amines $C_nH_{2n+3}N$

(Total 1 mark)

Q5.

Compound **Z** can be formed via compounds **X** and **Y** in the three step synthesis shown below.



Identify compounds **X** and **Y** and give reagents and conditions for Steps 1 and 2.

State the **type** of compound of which **Z** is an example.

Compound **Z** reacts with a large excess of bromomethane to form a solid product. Draw the structure of this product and name the type of mechanism for this reaction.

[illegible]

(Total 9 marks)