

**Q1.**

Methylamine reacts with bromoethane by nucleophilic substitution to produce a mixture of products.

Which is **not** a possible product of this reaction?

- A  $\text{C}_2\text{H}_5\text{NHCH}_3$
- B  $(\text{C}_2\text{H}_5)_2\text{NCH}_3$
- C  $[(\text{C}_2\text{H}_5)_2\text{N}(\text{CH}_3)_2]^+ \text{Br}^-$
- D  $[(\text{C}_2\text{H}_5)_3\text{NCH}_3]^+ \text{Br}^-$

(Total 1 mark)

**Q2.**

Methylamine reacts with bromoethane by substitution to produce a mixture of products.

Which compound is not a possible product of this reaction?

- A  $\text{C}_2\text{H}_5\text{NHCH}_3$
- B  $(\text{C}_2\text{H}_5)_2\text{NCH}_3$
- C  $[(\text{C}_2\text{H}_5)_3\text{NCH}_3]^+ \text{Br}^-$
- D  $[(\text{C}_2\text{H}_5)_2\text{N}(\text{CH}_3)_2]^+ \text{Br}^-$

(Total 1 mark)

**Q3.**

Aqueous solutions of ammonia, ethylamine and phenylamine are prepared. Each solution has the same concentration.

Which is the correct order for the pH values of these solutions?

- A ammonia > ethylamine > phenylamine
- B ammonia > phenylamine > ethylamine
- C ethylamine > ammonia > phenylamine
- D ethylamine > phenylamine > ammonia

(Total 1 mark)

**Q4.**

Which compound is the strongest base?

- A Ammonia
- B Ammonium chloride
- C Methylamine
- D Phenylamine

**(Total 1 mark)****Q5.**What type of reaction is used to convert  $(\text{CH}_3)_3\text{N}$  into the cationic surfactant  $[(\text{CH}_3)_3\text{N}(\text{CH}_2)_{15}\text{CH}_3]\text{Cl}$ ?

- A Bronsted–Lowry acid-base reaction
- B Nucleophilic addition
- C Nucleophilic addition-elimination
- D Nucleophilic substitution

**(Total 1 mark)**