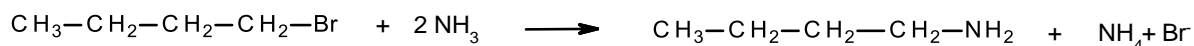


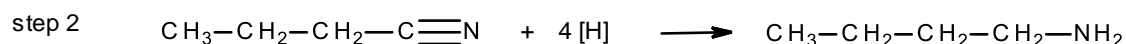
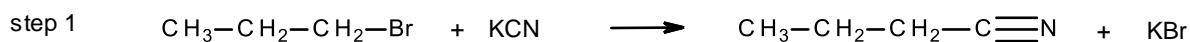


TASK 1

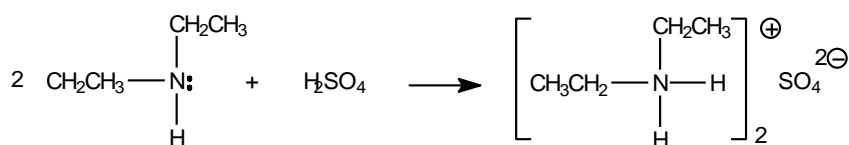
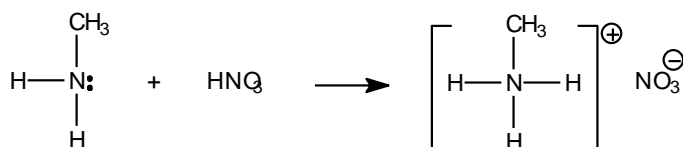
Route 1



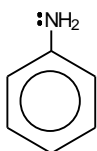
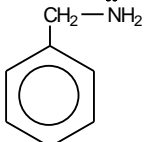
Route 2



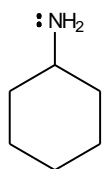
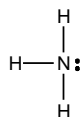
TASK 2



TASK 3

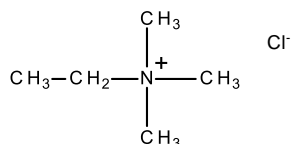
	amine	amine	stronger base	reason
1	methylamine $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}-\text{N}:\text{:} \\ \\ \text{H} \end{array}$	diethylamine $\begin{array}{c} \text{CH}_2\text{CH}_3 \\ \\ \text{CH}_3\text{CH}_2-\text{N}:\text{:} \\ \\ \text{H} \end{array}$	diethylamine	<ul style="list-style-type: none">• 2^o compared to 1^o• Diethylamine has greater electron density on N lone pair• Diethylamine has greater ability to accept H⁺
2	propylamine $\begin{array}{c} \text{CH}_2\text{CH}_2\text{CH}_3 \\ \\ \text{H}-\text{N}:\text{:} \\ \\ \text{H} \end{array}$	phenylamine 	propylamine	<ul style="list-style-type: none">• Lone pair on phenylamine N is partially delocalised into benzene ring• Propylamine has greater electron density on N lone pair• Propylamine has greater ability to accept H⁺
3	ammonia $\begin{array}{c} \text{H} \\ \\ \text{H}-\text{N}:\text{:} \\ \\ \text{H} \end{array}$	phenylmethylamine 	phenylmethylamine	<ul style="list-style-type: none">• 1^o compared to ammonia• Phenylmethylamine has greater electron density on N lone pair• Phenylmethylamine has greater ability to accept H⁺

4	ammonia	cyclohexylamine	cyclohexylamine	<ul style="list-style-type: none"> • 1^o compared to ammonia • Cyclohexylamine has greater electron density on N lone pair • Cyclohexylamine has greater ability to accept H⁺
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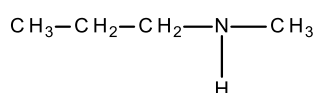
TASK 4

1



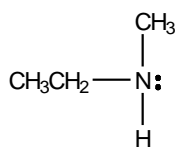
ethyltrimethylammonium chloride

2

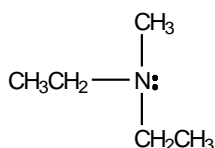


N-methylpropylamine

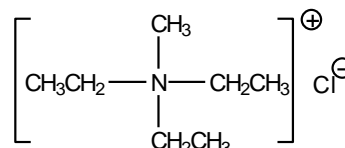
3



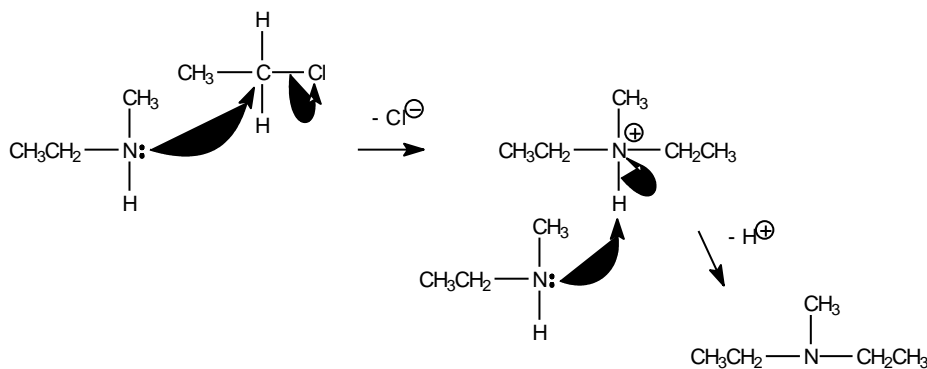
N-methylethylamine



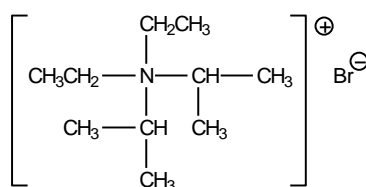
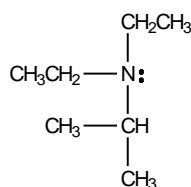
N-methyldiethylamine



N-methytriethylammonium chloride

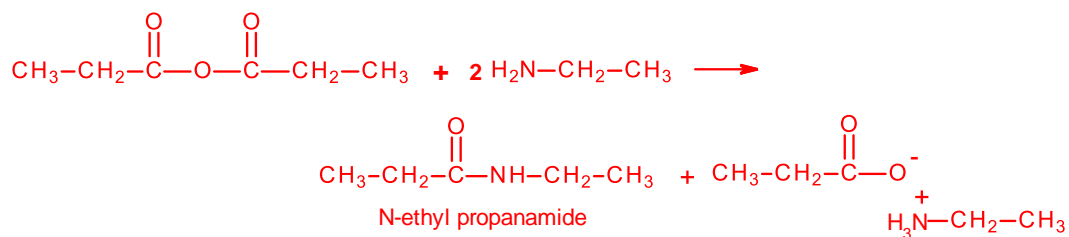


4



TASK 5

e.g. ethylamine + propanoic anhydride



e.g. propylamine + butanoyl chloride

