

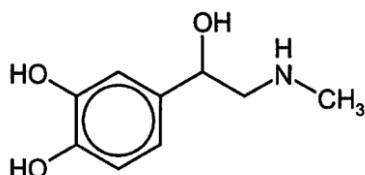


St Andrew's Junior College

H2 Chemistry 2026

Assignment: Halogen Derivatives

1. 2015/2/4(b) – Modified



adrenaline

Criteria of Success for S_N2 mechanism:

- ☐ Name of mechanism: **Nucleophile Substitution, S_N2**
- ☐ 3D representation of reactant and product
- ☐ δ+ on C, δ- on X
- ☐ Lone pair of electrons on Nu⁻
- ☐ Nu⁻ attack from the side opposite to X
- ☐ Curly arrows to show flow of a pair of electrons
- ☐ Bond breaking and bond forming in transition state
- ☐ Overall charge on transition state if Nu⁻ was used
- ☐ Inverted product

Adrenaline is formed from noradrenaline in the body by an S_N2 reaction between the amine and group of noradrenaline and a suitable methyl compound.

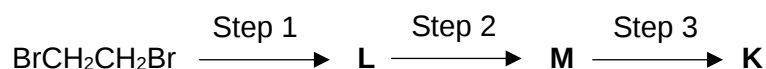
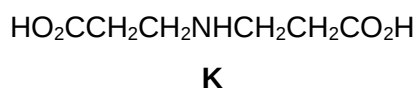
- (a) Draw a mechanism for the reaction between an amine, R-NH₂ and methyl iodide [4]
to form R-NHCH₃ and any other products. Show relevant lone pairs and dipoles,
and use curly arrows to indicate the movements of electron pairs

- (b) Explain why this reaction proceeds mainly via an S_N2 mechanism rather than an [2]
S_N1 mechanism.

- (c) State and explain how the rate of this reaction changes when methyl iodide is replaced by methyl chloride. [2]

2. 2019/3/5(c) – Modified

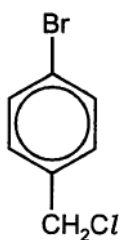
Compound **K** can be made using only dibromoethane and appropriate inorganic reagent by the following 3-step synthesis.



- (a) Suggest the structures of compounds **L** and **M** and the reagents and conditions for the three steps. [4]
- (b) Identify **one** possible organic side product of your chosen reactions in (a), and suggest one way to minimise its formation. [2]

3. 2022/1/23

Four compounds are warmed with NaOH in aqueous ethanol and then acidified with dilute nitric acid before being shaken with aqueous silver nitrate. The mixtures are then shaken with ammonia solution until there is no further change.



How many mixtures produce precipitates with silver nitrate solution and how many precipitates remain after reaction with ammonia solution?

	precipitate produced with $\text{AgNO}_3(\text{aq})$	precipitate remains with $\text{NH}_3(\text{aq})$
A	3	1
B	3	2
C	4	2
D	4	3