Paper Reference(s) 9CH0/02

Pearson Edexcel Level 3 GCE

Chemistry

Advanced

PAPER 2: Advanced Organic and Physical Chemistry

Monday 16 June 2025 – Morning

Time: 1 hour 45 minutes

Diagram Booklet

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Pearson

INSTRUCTIONS

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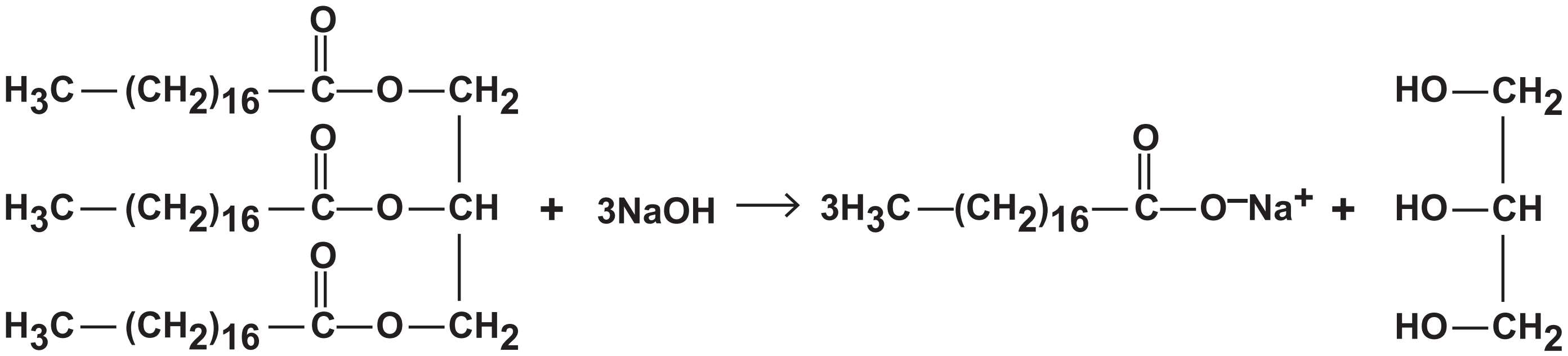
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Question 3

stearin **sodium stearate** **glycerol**



Question 3(a)

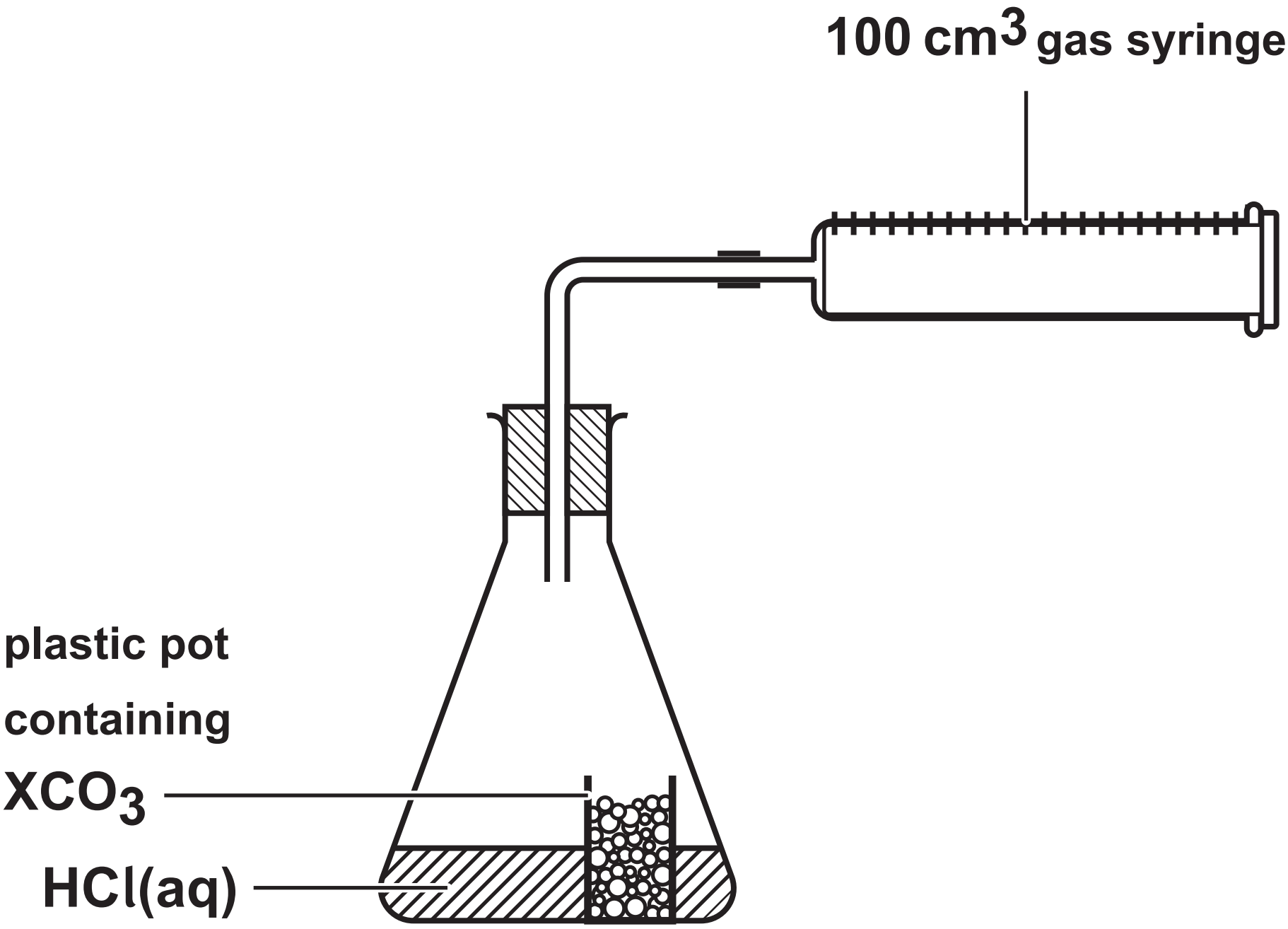
Substance	stearin	sodium hydroxide	sodium stearate	glycerol
Molar mass / g mol^{-1}	890	40	306	92

Question 4(b)

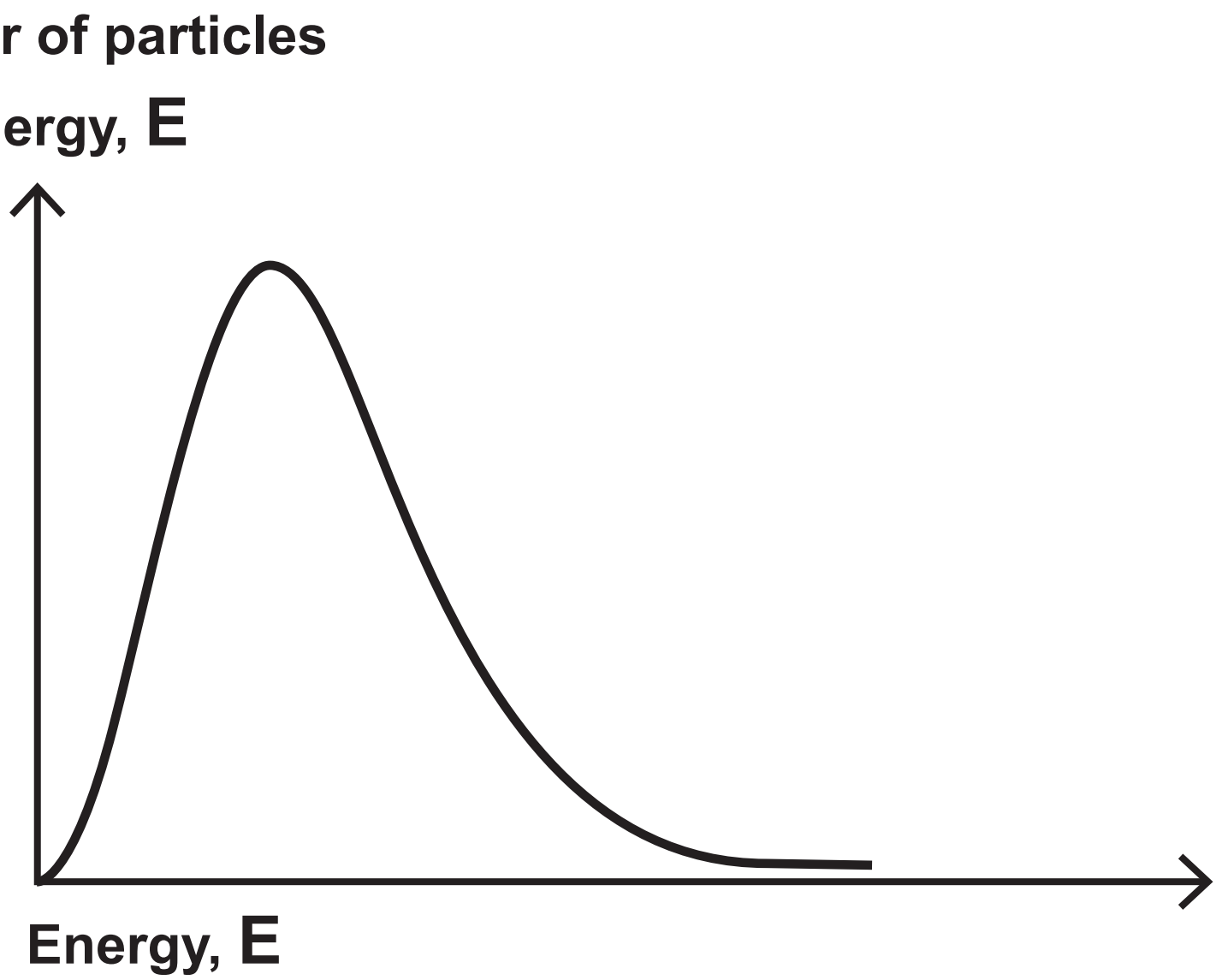
hydroxide ion

hydroxyl radical

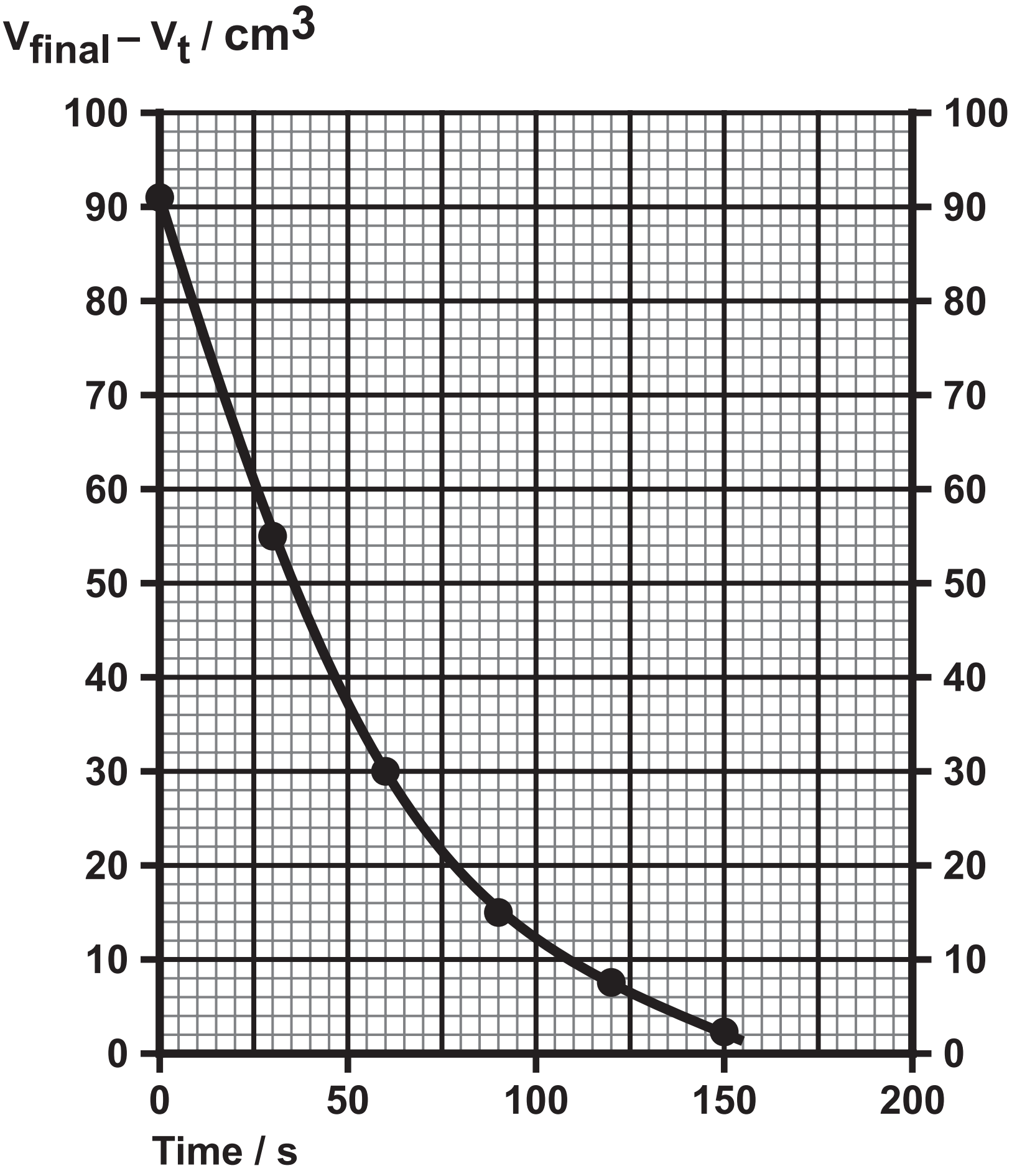
Question 5



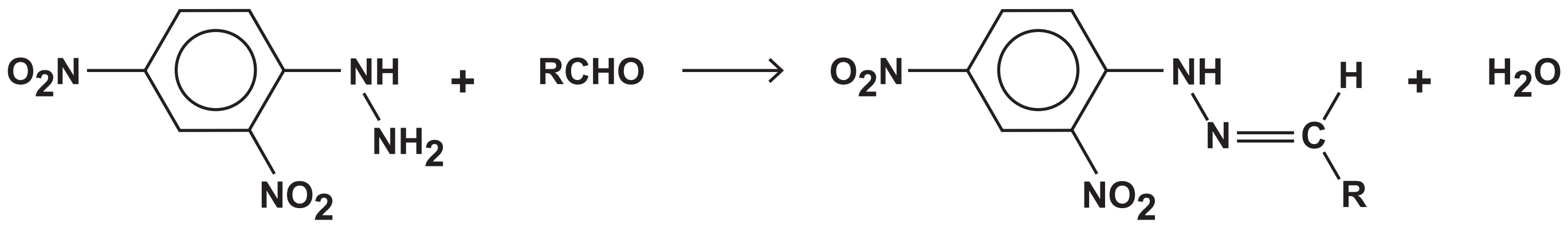
Question 5(c)(ii)



Question 5(d)

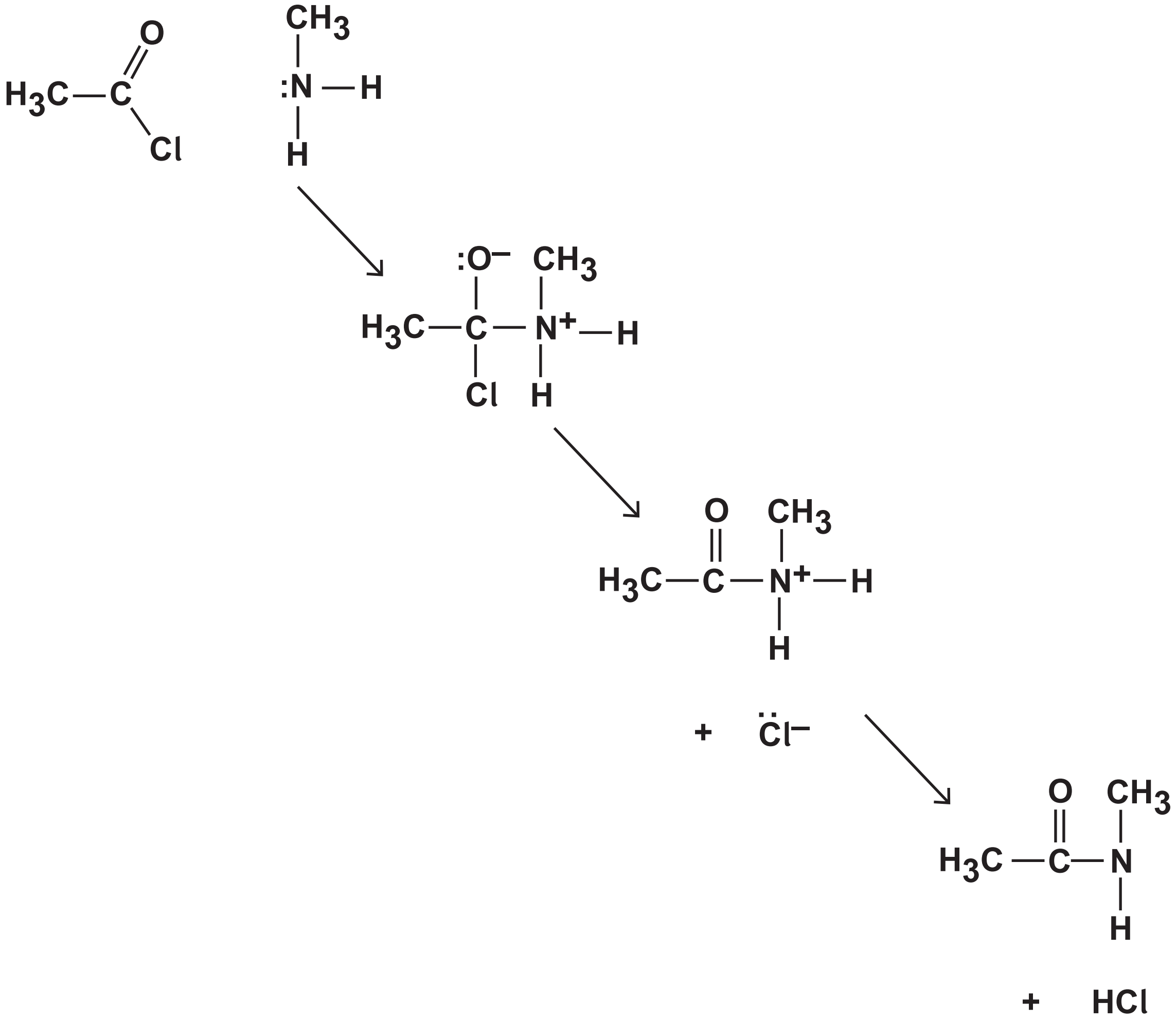

$V_{final} - V_t$ / cm^3
100
90
80
70
60
50
40
30
20
10
0
0
50
100
150
200
Time / s

Question 6(b)

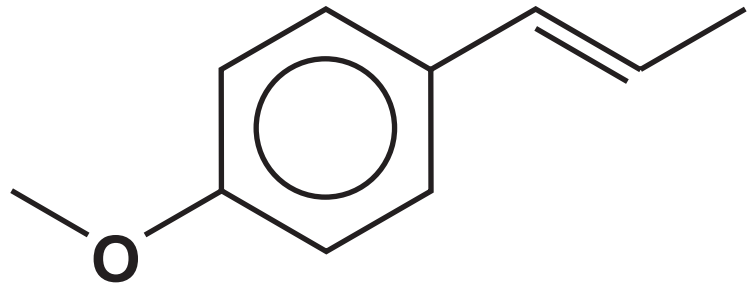


Question 7(b)(ii)

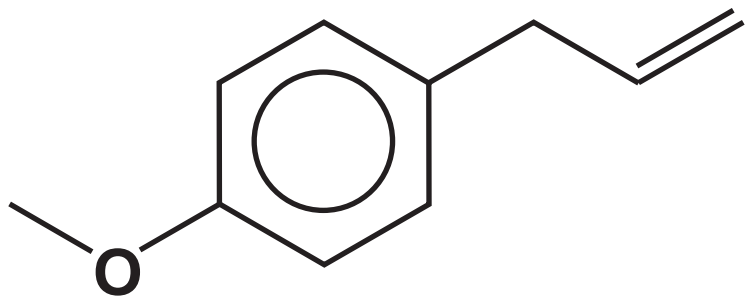
Substance	pK_{b1}
benzene-1,3-diamine	8·89
propane-1,3-diamine	3·83


O
H3C — C
Cl
CH3
:N — H
H
:O−
CH3
H3C — C — N+ — H
Cl
H
O
CH3
H3C — C — N+ — H
H
+ :Cl:−
O
CH3
H3C — C — N
H
+ HCl

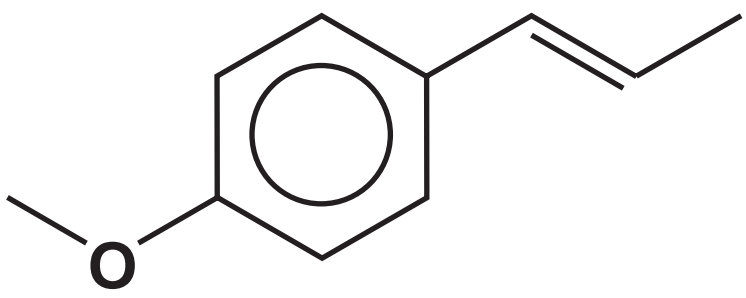
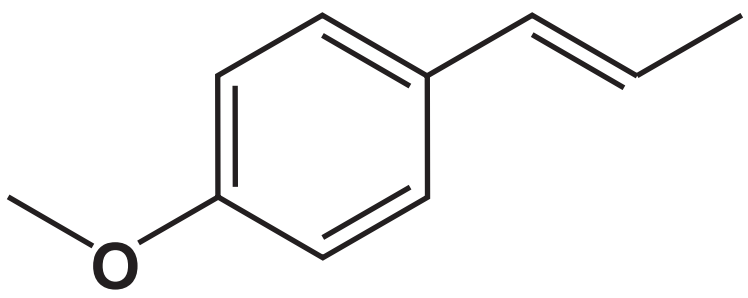
Question 8



Question 8(c)

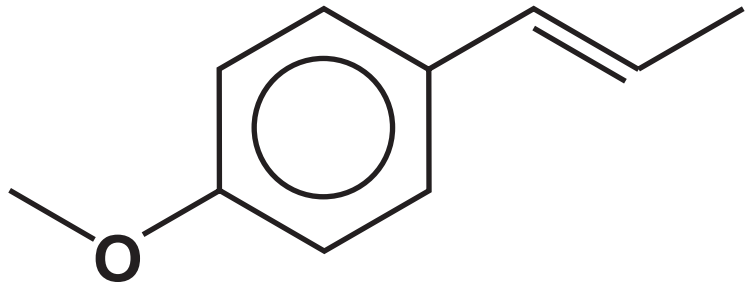


Question 8(e)

delocalised model	Kekulé structure
	

Question 8(f)

anethole



Question 9(a)(i)

Temperature (T) / K	1 / Temperature (1 / T) / K^{-1}	Rate constant (k) / $dm^3 mol^{-1} s^{-1}$	ln k
298	$3{\cdot}36 \times 10^{-3}$	$1{\cdot}36 \times 10^{-4}$	–8·9
	$3{\cdot}29 \times 10^{-3}$		–8·4
308	$3{\cdot}25 \times 10^{-3}$	$3{\cdot}04 \times 10^{-4}$	–8·1
318	$3{\cdot}14 \times 10^{-3}$	$6{\cdot}76 \times 10^{-4}$	–7·3
328	$3{\cdot}06 \times 10^{-3}$	$1{\cdot}23 \times 10^{-3}$	–6·7

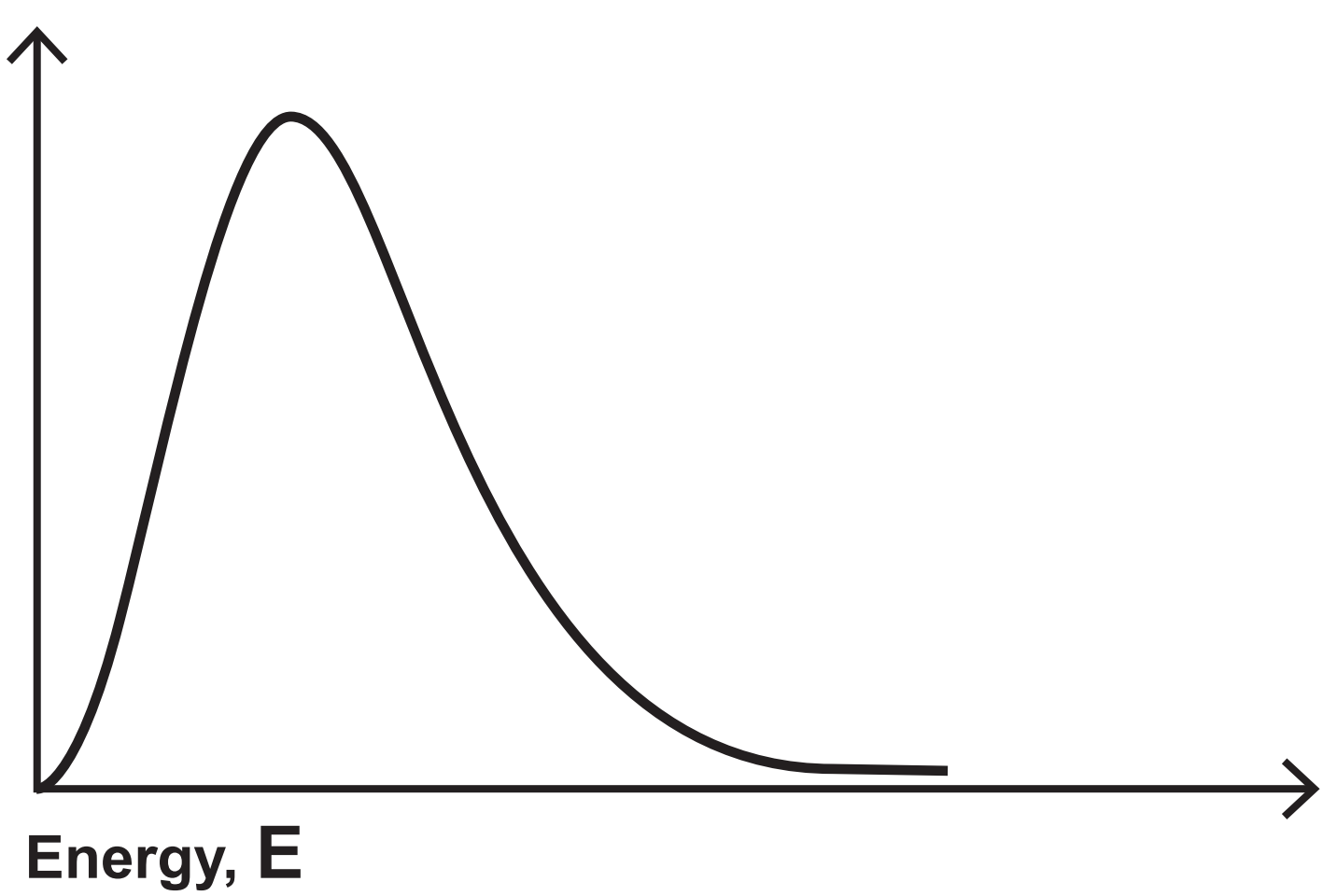
Question 9(a)(ii)

Question 4(b) – Spare copy

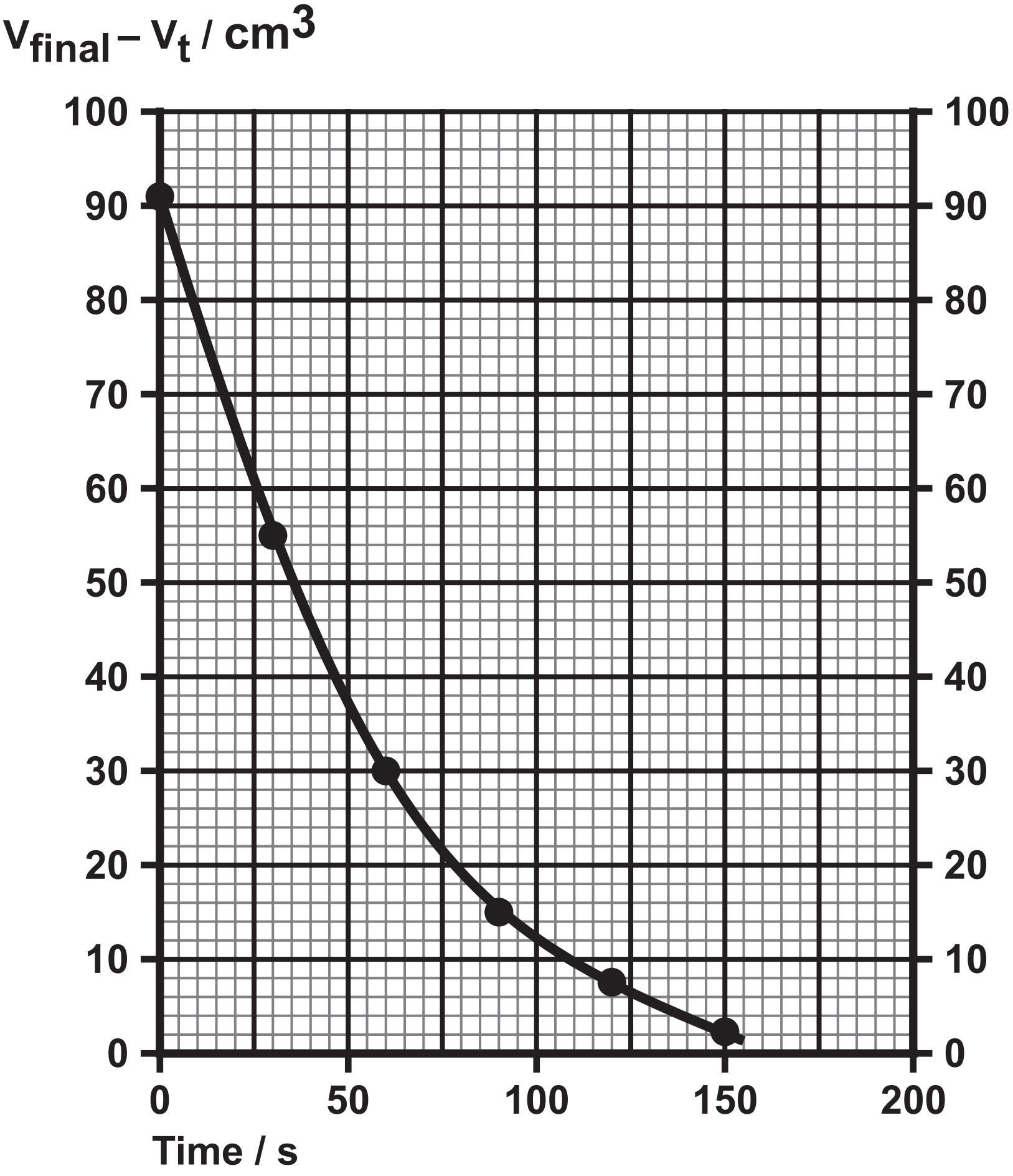
hydroxide ion

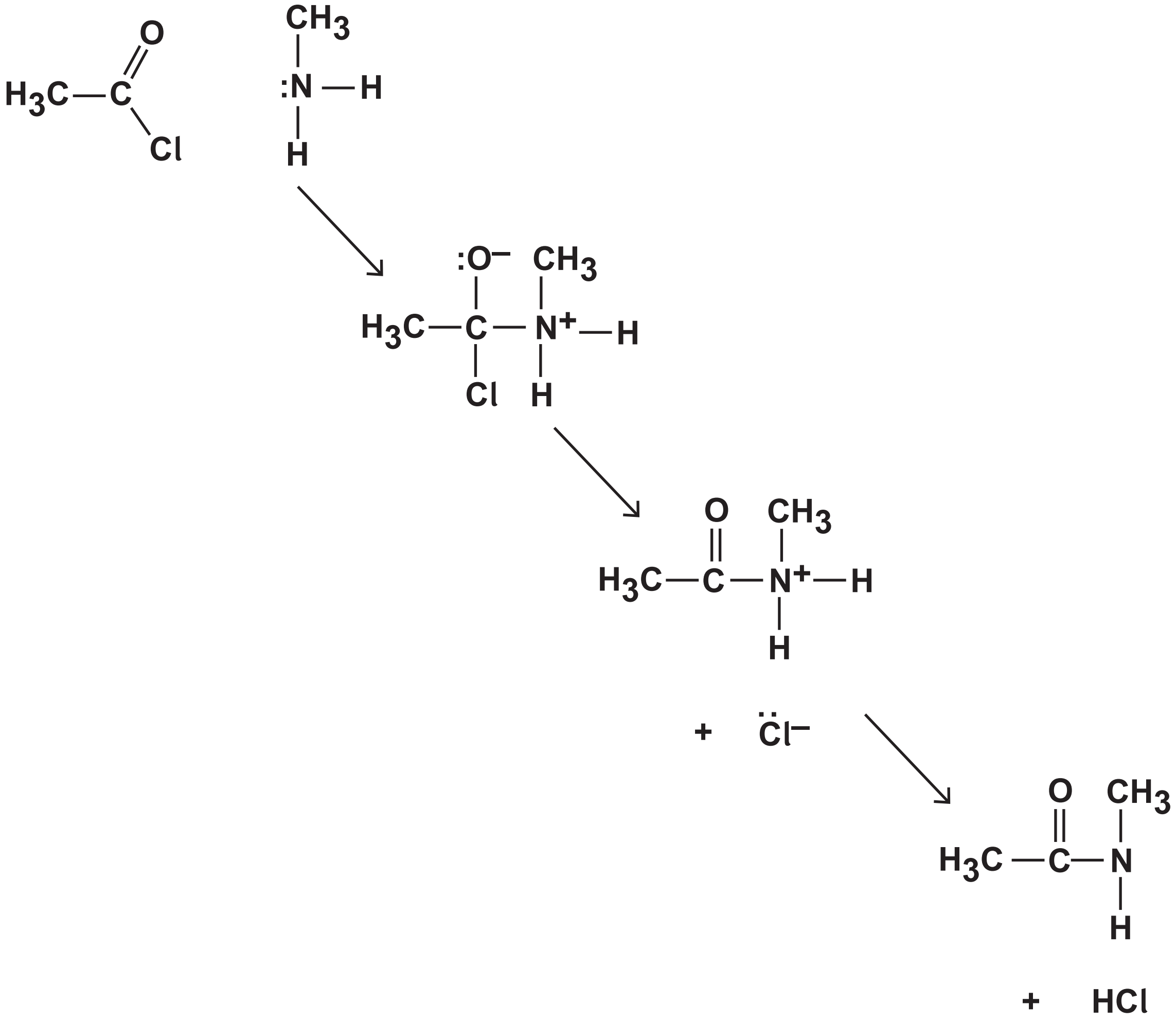
hydroxyl radical

Question 5(c)(ii) – Spare copy



Question 5(d) – Spare copy




O
H3C — C
Cl
CH3
:N — H
H
:O−
CH3
H3C — C — N+ — H
Cl
H
O
CH3
H3C — C — N+ — H
H
+ :Cl:−
O
CH3
H3C — C — N
H
+ HCl

Question 9(a)(i) – Spare copy

Temperature (T) / K	1 / Temperature (1 / T) / K^{-1}	Rate constant (k) / $dm^3 mol^{-1} s^{-1}$	ln k
298	$3{\cdot}36 \times 10^{-3}$	$1{\cdot}36 \times 10^{-4}$	–8·9
	$3{\cdot}29 \times 10^{-3}$		–8·4
308	$3{\cdot}25 \times 10^{-3}$	$3{\cdot}04 \times 10^{-4}$	–8·1
318	$3{\cdot}14 \times 10^{-3}$	$6{\cdot}76 \times 10^{-4}$	–7·3
328	$3{\cdot}06 \times 10^{-3}$	$1{\cdot}23 \times 10^{-3}$	–6·7

Question 9(a)(ii) – Spare copy

