Paper Reference(s) **9CH0/03**

Pearson Edexcel Level 3 GCE

Chemistry

Advanced

PAPER 3: General and Practical Principles in Chemistry

Friday 20 June 2025 – Morning

Time: 2 hours 30 minutes

Diagram Booklet

THIS DOCUMENT MUST BE RETURNED TO PEARSON AT THE END OF THE EXAMINATION

In the boxes below, write your name, centre number and candidate number.

Surname					
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Centre Number					
Candidate Number					

Pearson

INSTRUCTIONS

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21–22 Question 6(b) – Diagram and Table – Spare copy

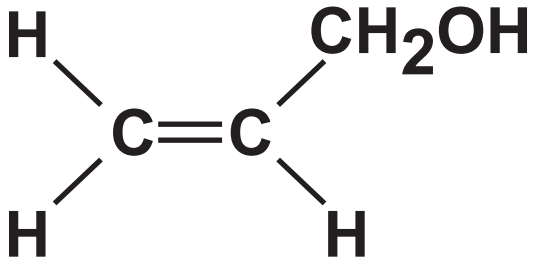
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Question 1

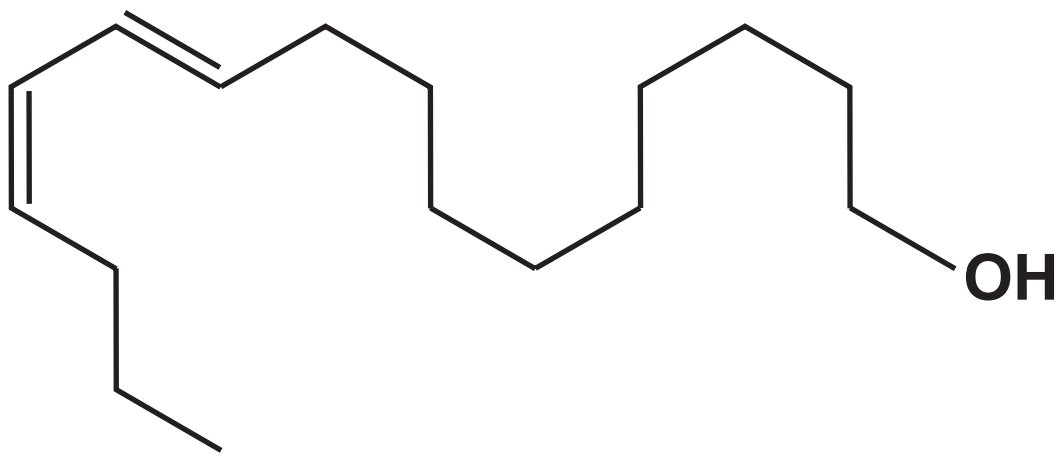
Element	First ionisation energy / kJ mol^{-1}	Second ionisation energy / kJ mol^{-1}	Third ionisation energy / kJ mol^{-1}	Fourth ionisation energy / kJ mol^{-1}
X	403	2632	3900	5080
Y	419	3051	4412	5877
Z	496	4563	6913	9544

Question 2(a)(ii)

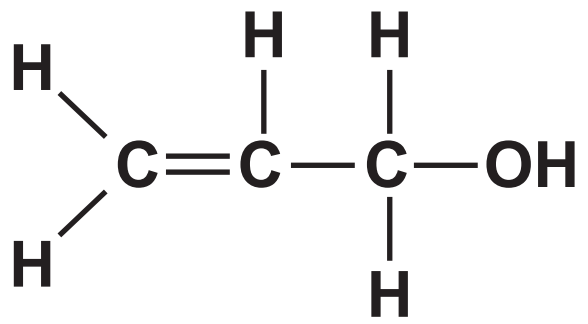


Question 2(d)

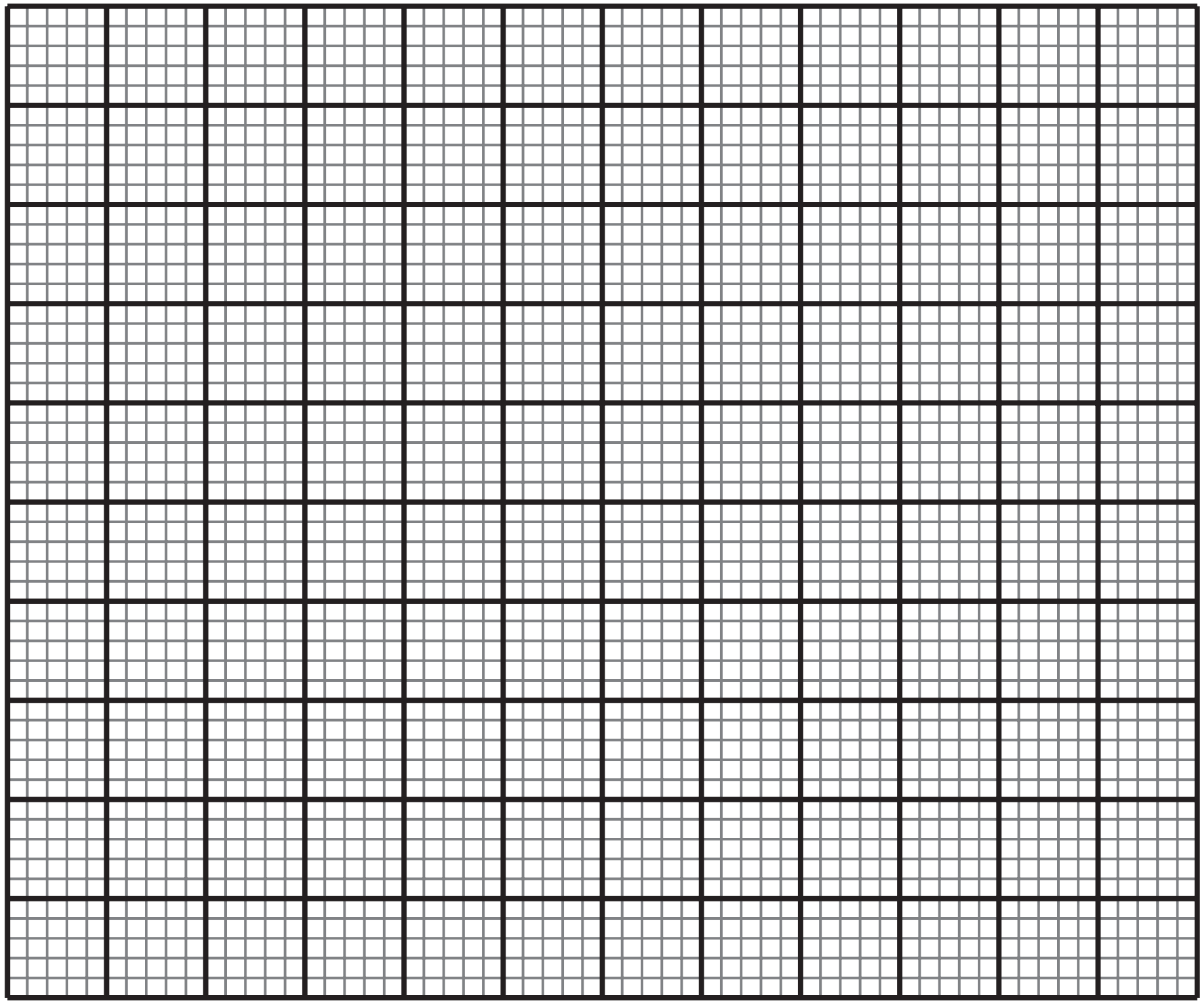
bombykol



prop-2-en-1-ol



Question 4(e)(i)



Question 5(a)

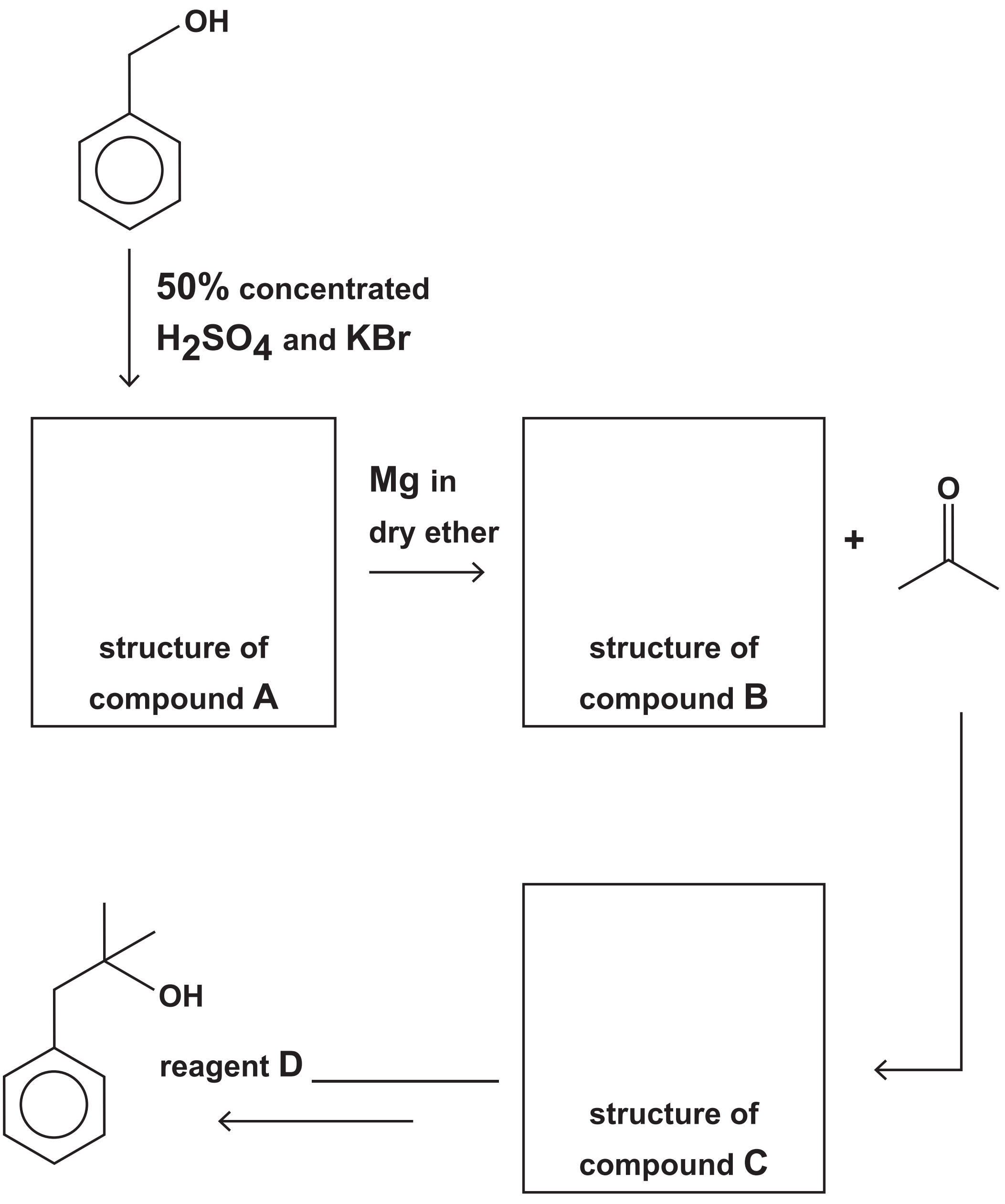
Element	Mass / g
Co	1·26
N	1·20
H	0·257
Cl	2·28

Question 5(b)

$[Co(H_2O)_6]^{2+}(aq) + 6NH_3(aq) \rightleftharpoons [Co(NH_3)_6]^{2+}(aq) + 6H_2O(l)$ $\log K_c = 4{\cdot}39$

$[Co(H_2O)_6]^{2+}(aq) + EDTA^{4-}(aq) \rightleftharpoons [Co(EDTA)]^{2-}(aq) + 6H_2O(l)$ $\log K_c = 16{\cdot}5$

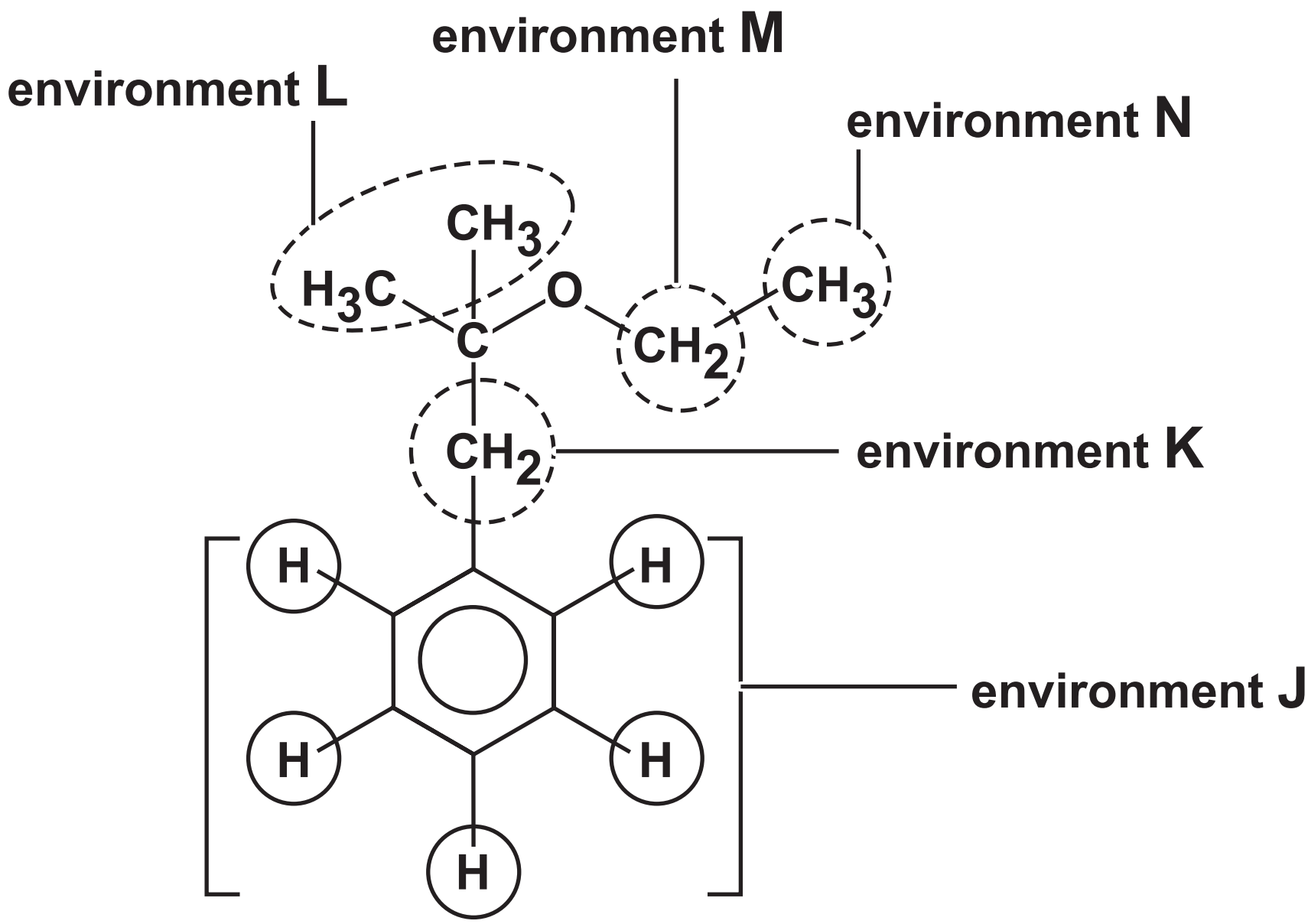
Question 6(a)


OH
50% concentrated
H2SO4 and KBr
structure of
compound A
Mg in
dry ether
structure of
compound B
+
O
OH
reagent D
structure of
compound C

Question 6(b)

DIAGRAM

COMPOUND S



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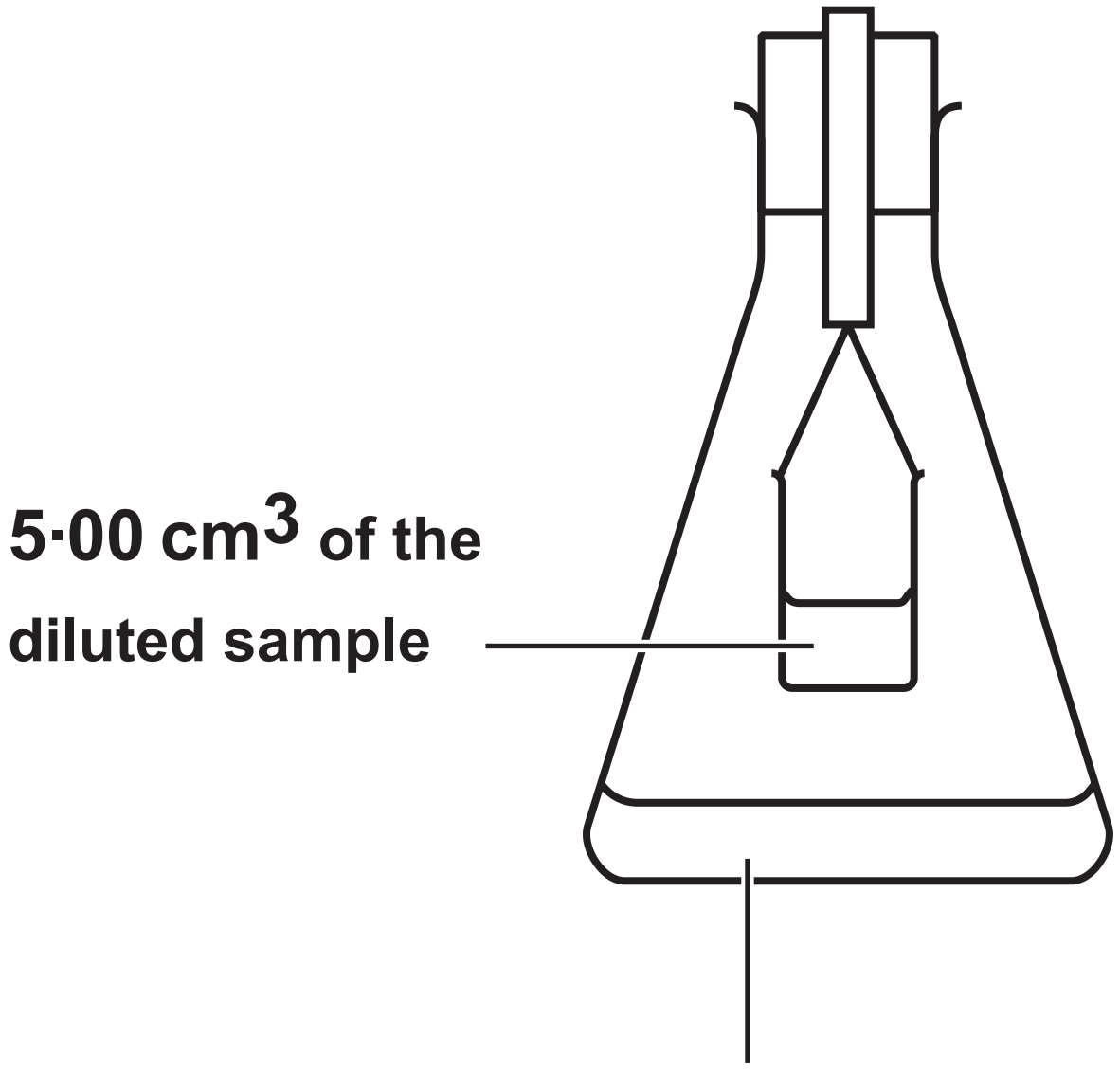
6(b) continued.

TABLE

	Chemical shift / ppm	Relative peak area	Splitting pattern
Environment J	6·8 – 8·2	5	complex
Environment K			
Environment L			
Environment M			
Environment N			

Question 7

DIAGRAM



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7 continued.

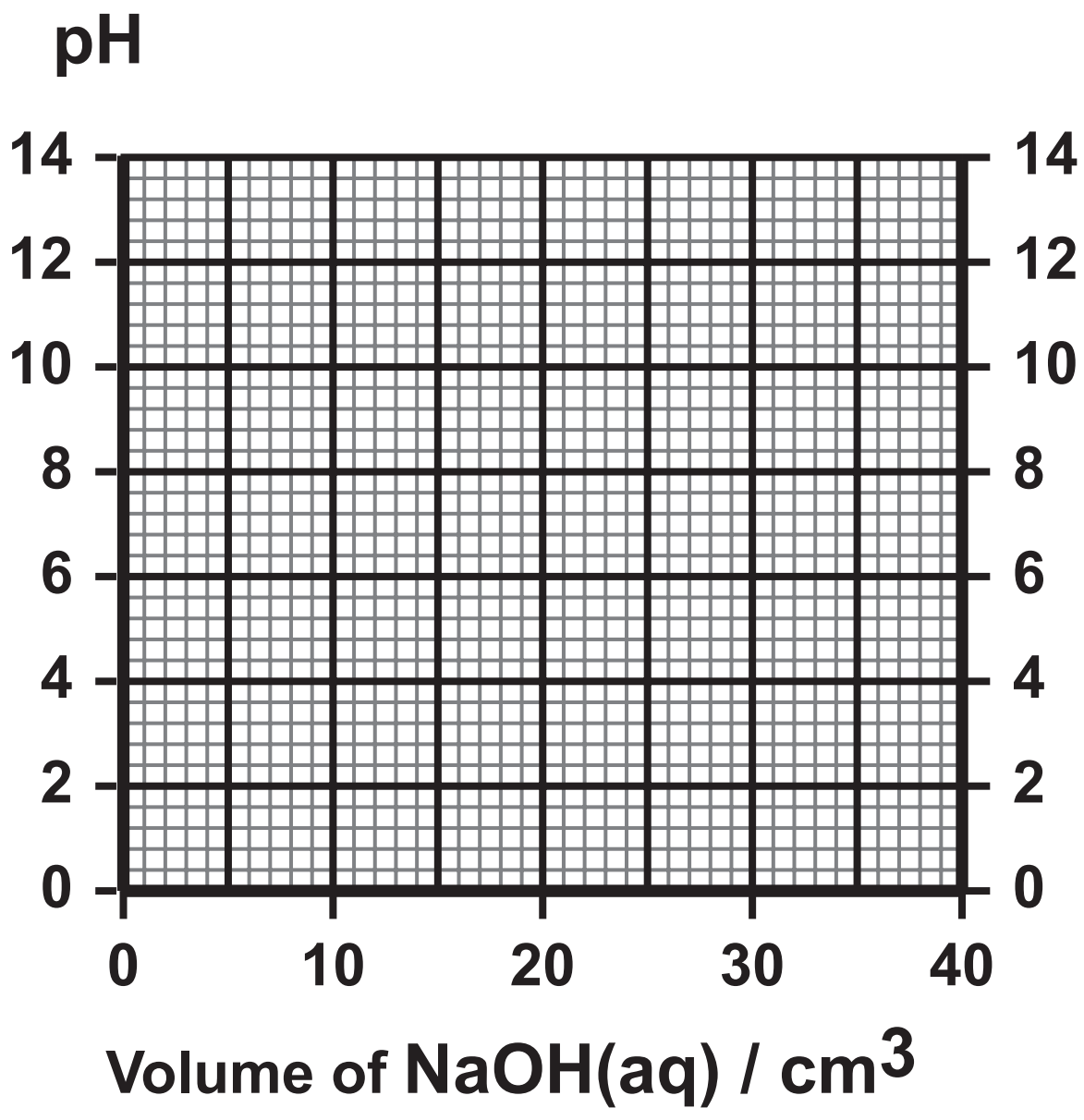
EQUATION

$$3CH_3CH_2OH(l) + 2Cr_2O_7^{2-}(aq) + 16H^+(aq) \longrightarrow 3CH_3COOH(aq) + 4Cr^{3+}(aq) + 11H_2O(l)$$

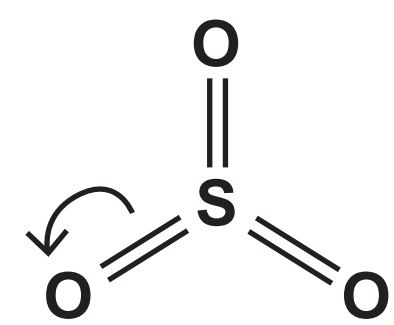
$$Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6I^-(aq) \longrightarrow 2Cr^{3+}(aq) + 3I_2(aq) + 7H_2O(l)$$

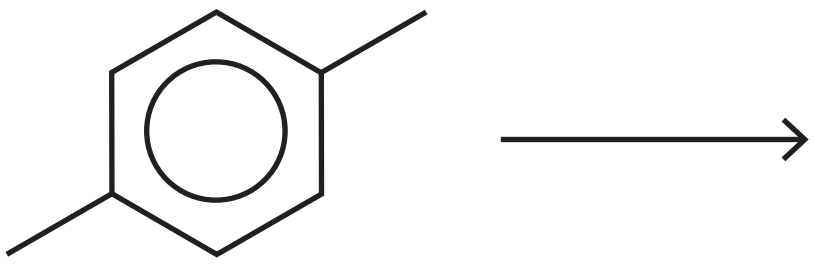
$$2S_2O_3^{2-}(aq) + I_2(aq) \longrightarrow 2I^-(aq) + S_4O_6^{2-}(aq)$$

Question 8(b)(ii)

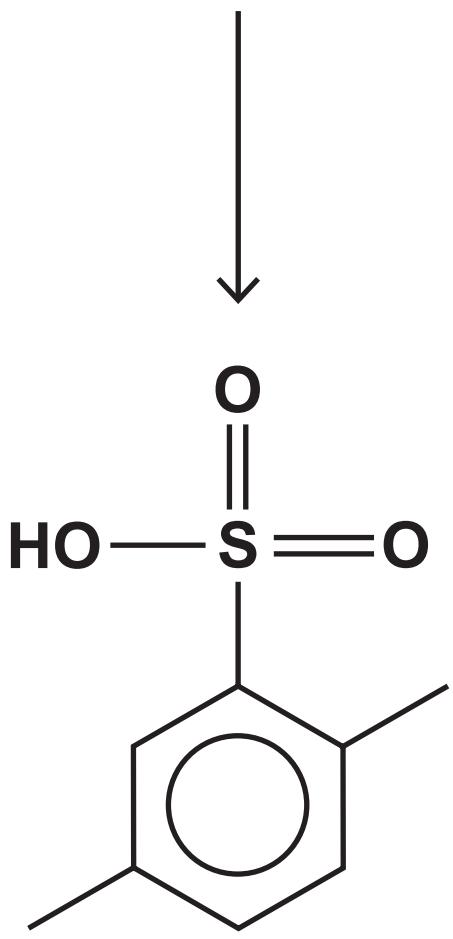


Question 9(a)

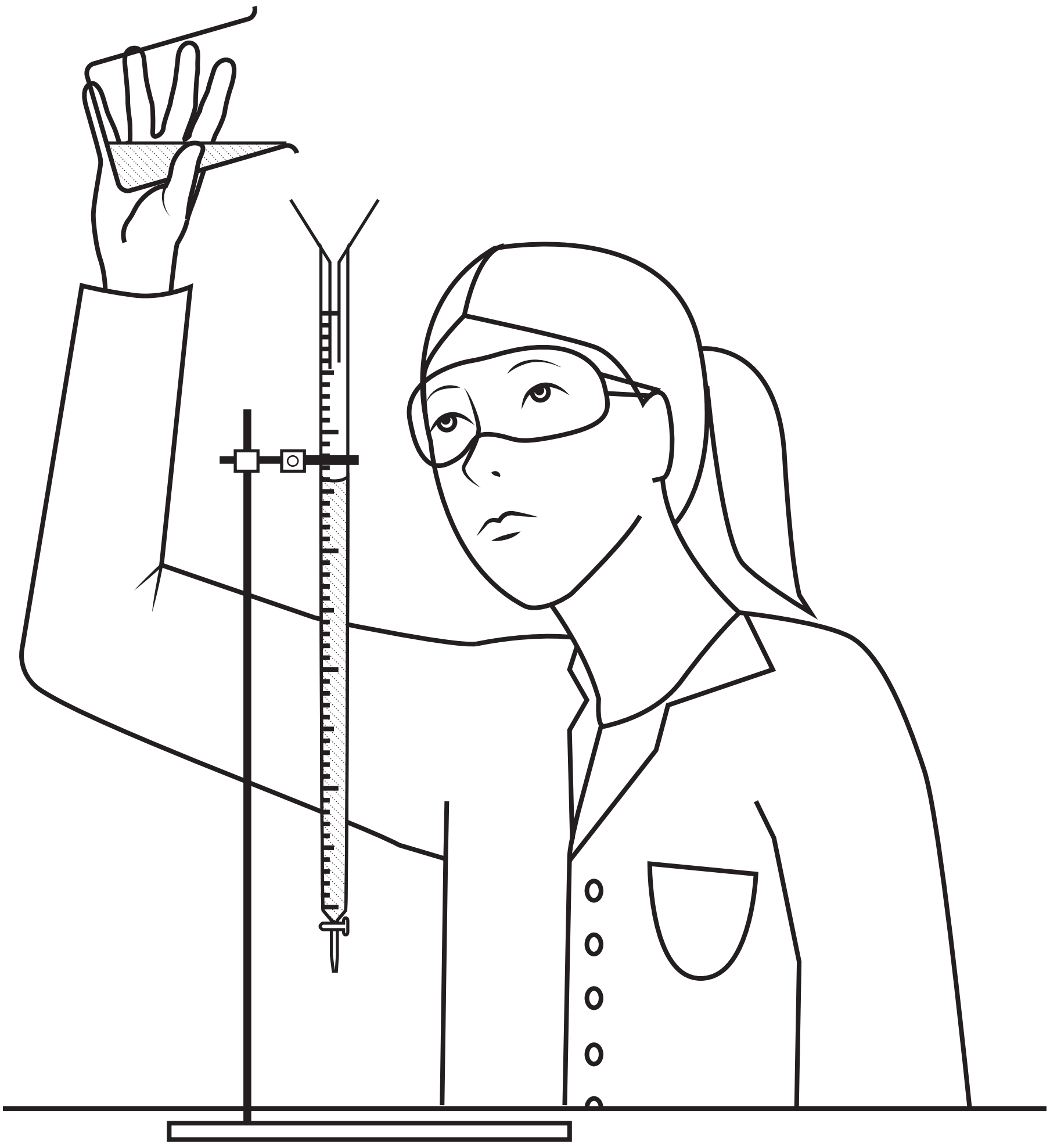




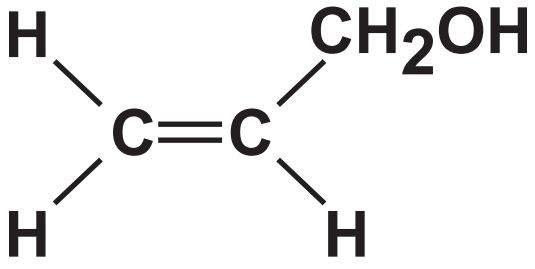
structure of intermediate



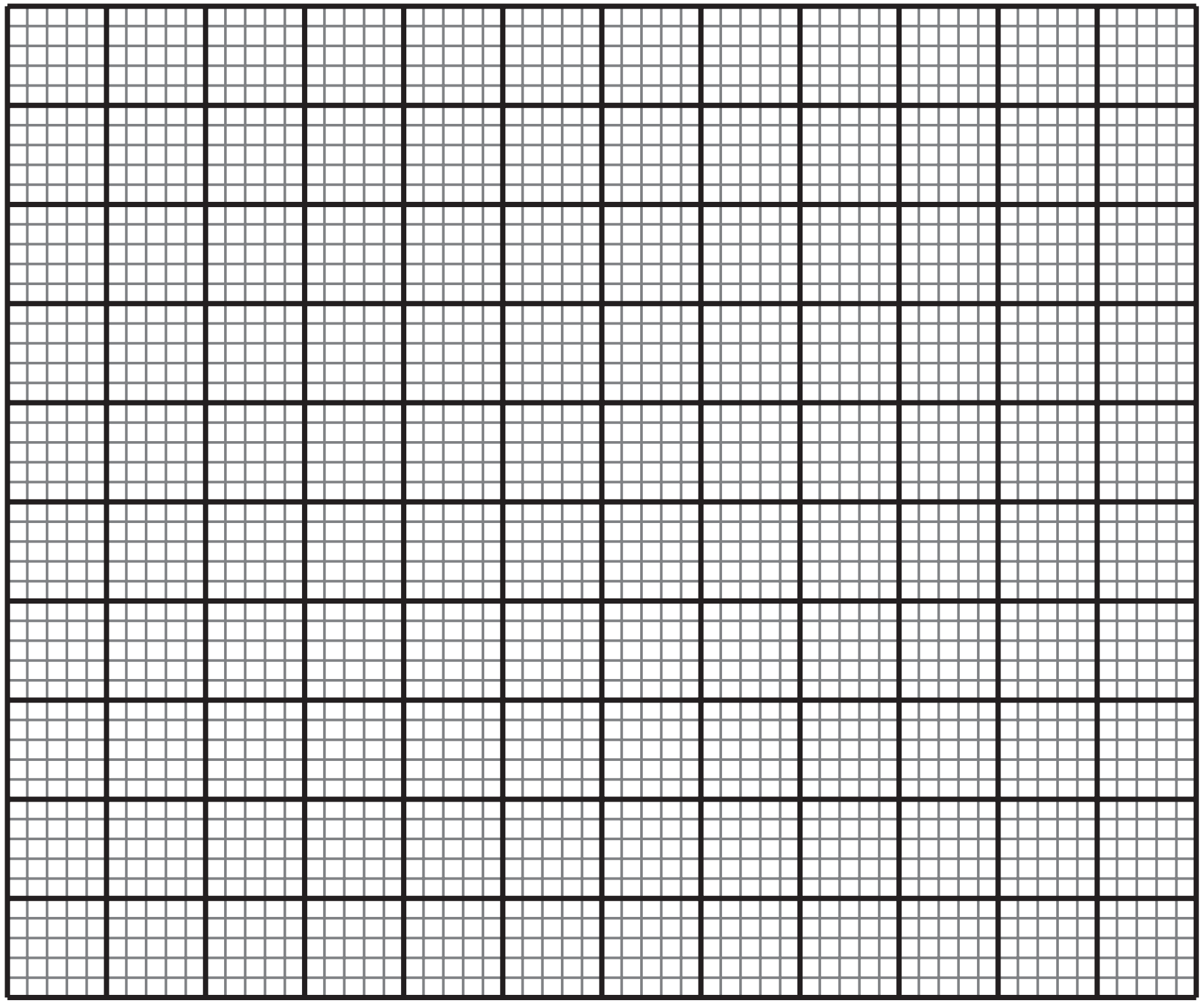
Question 9(d)



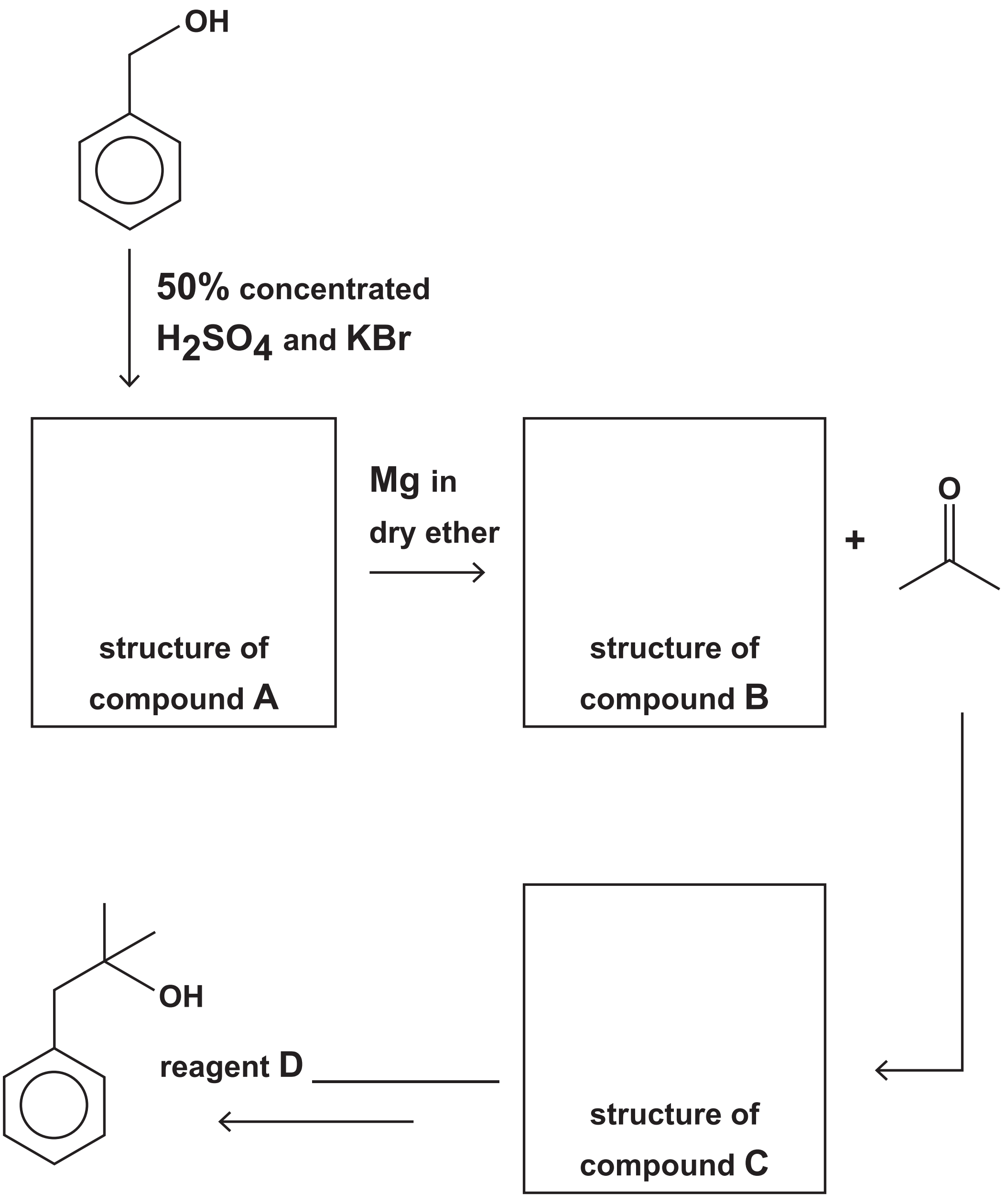
Question 2(a)(ii) – Spare copy



Question 4(e)(i) – Spare copy



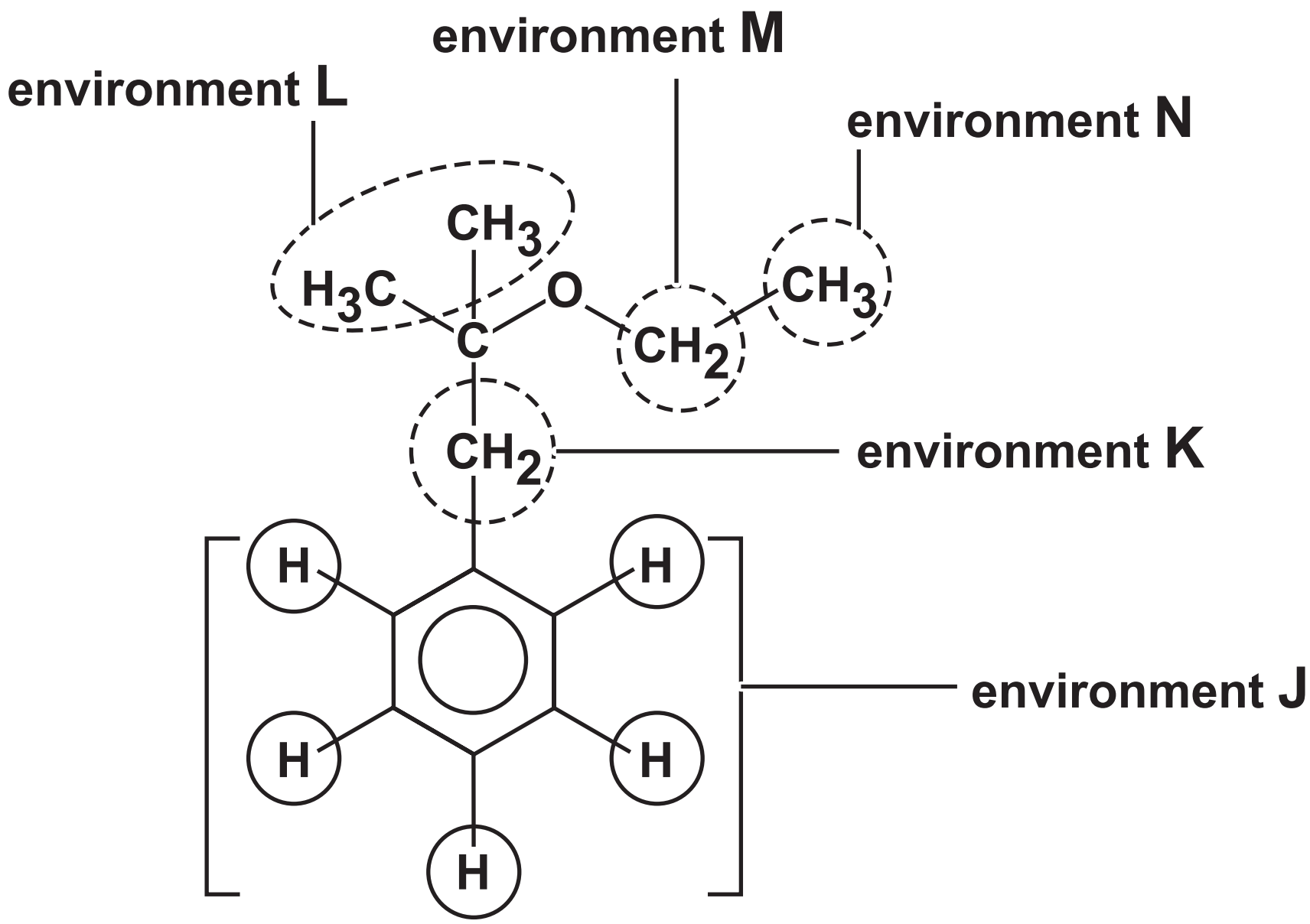
Question 6(a) – Spare copy



Question 6(b) – Spare copy

DIAGRAM

COMPOUND S



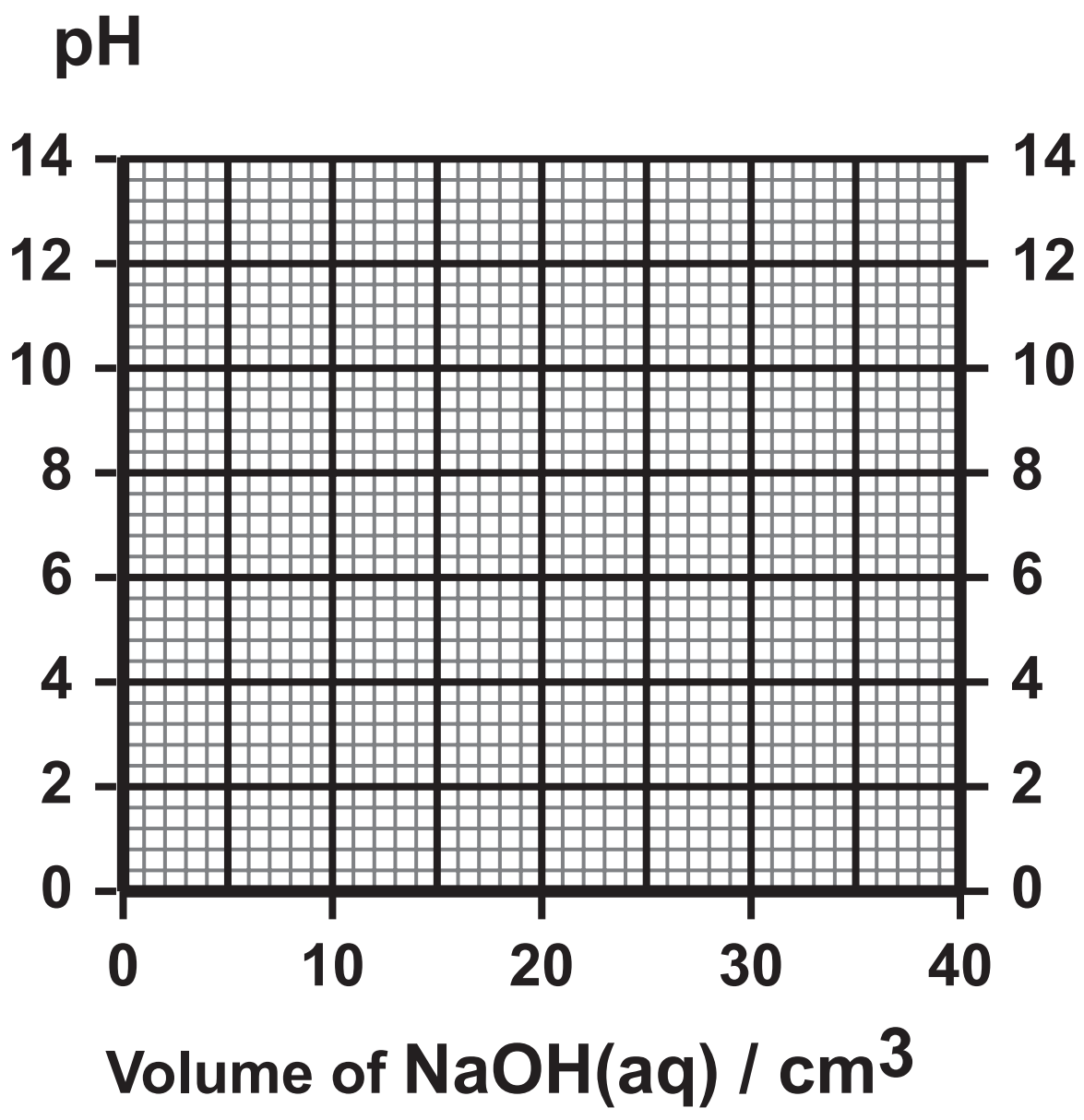
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6(b) – Spare copy continued.

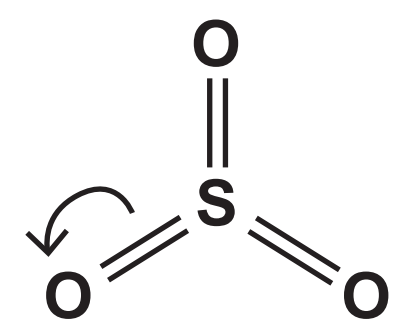
TABLE

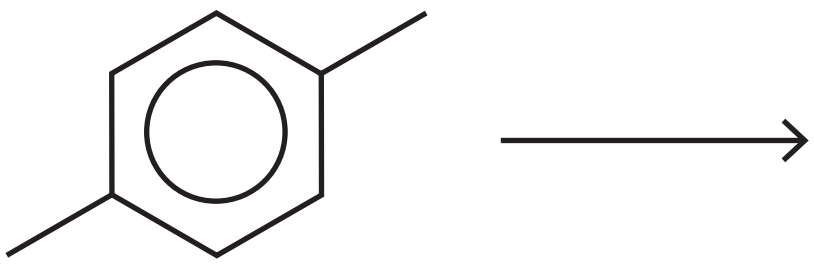
	Chemical shift / ppm	Relative peak area	Splitting pattern
Environment J	6·8 – 8·2	5	complex
Environment K			
Environment L			
Environment M			
Environment N			

Question 8(b)(ii) – Spare copy



Question 9(a) – Spare copy





structure of intermediate

