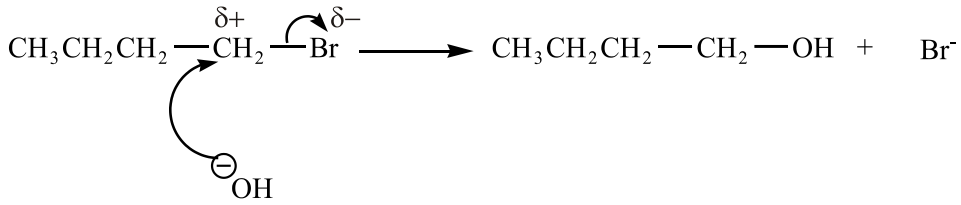
HALOALKANES MS

1. (i) substitution/hydrolysis **(1)** 1

(ii) electron pair donor **(1)** 1

(iii)



correct dipole **(1)**
curly arrow from the O in the OH- to C in the CH_2 **(1)**
curly arrow to show movement of bonded pair in the C–Br bond **(1)**
Br^- as a product **(1)** 4

[6]

2. (a) C*l* $^-$ must be shown as a product ✓ 1

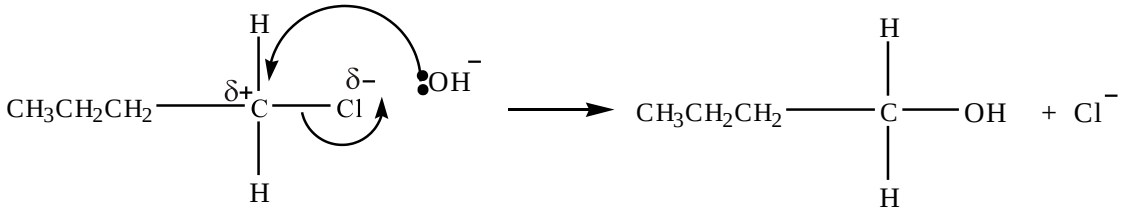
(at least 1) lone pair of electrons on the O in the OH^- with curly arrow

from the lone pair on the OH^- to the $C^{(\delta+)}$✓ 1

dipoles on the C-C*l* bond ✓ 1

curly arrow from C-C*l* bond to the $Cl^{\delta-}$ ✓ 1

The mechanism below would get all 4 marks.



(b) (i) mark for method/dividing by A_r / C, 3.15; H, 6.3; C*l*, 1.58. ✓ 1

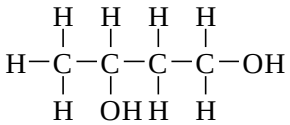
divide by smallest to get C_2H_4Cl ✓ 1

alternative method:

% of each element x 127 ÷ A_r of that
element = molecular formula, hence deduce empirical formula

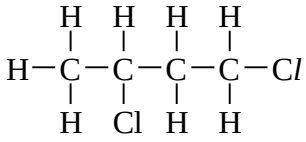
(ii) $C_4H_8Cl_2$ ✓ 1

(iii) any unambiguous form of: ✓



1

(iv) any unambiguous form of: ✓



1

ecf to (iii) provided that there are two OHs in (iii)

[9]

3. (i) M_r of 2-methylpropan-1-ol = 74 1

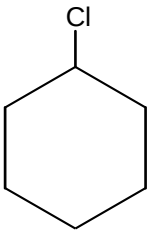
moles = 4.44/74 = 0.06 1

(ii) moles = 5.48/137 = 0.04 1

(iii) 66.7% 1

[4]

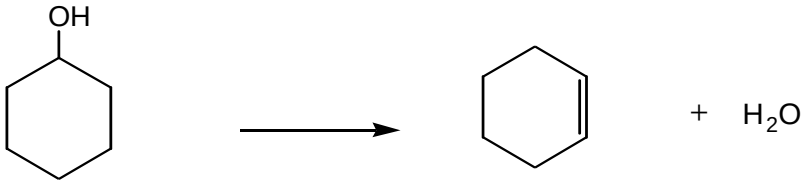
4. (a) (i) 1



(ii) H_2SO_4/Al_2O_3/(hot) pumice/H_3PO_4 1

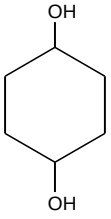
(H_2SO_4(aq) or dil H_2SO_4 loses the mark)

(iii) 1



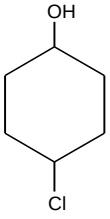
$C_6H_{11}OH$ / $C_6H_{12}O \rightarrow C_6H_{10} + H_2O$

(b) (i) 1



diol

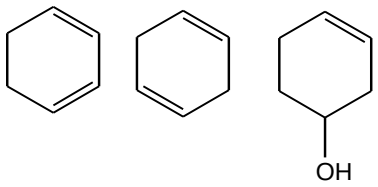
also allow



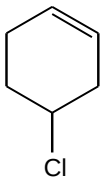
Cl-alcohol

(ii) 2

from the diol allow



from the Cl-alcohol allow



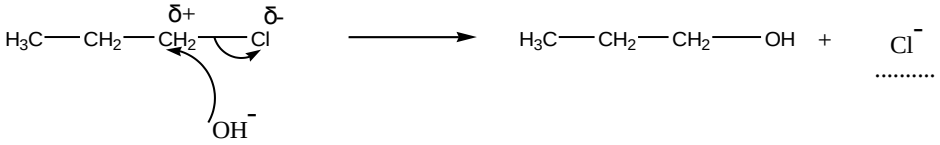
[6]

5. (a) (i) reaction 1 1

(ii) reaction 4 1

(iii) reaction 3 1

(b) (i) lone pair/electron pair donor 1



Correct dipole 1

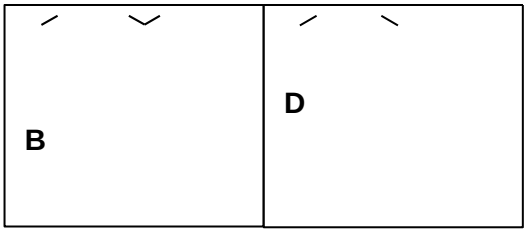
Curly arrow from the O in the OH^- to C in the CH_2 1

Curly arrow to show movement of bonded pair in the C-C*l* bond 1

C*l*$^-$ as a product 1

(c) (i) same molecular formula , different structure/arrangement of atoms. (same formula, different structure.) 2

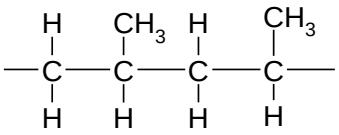
(ii) 2



(d) (i) addition, (not additional) 1

(ii) poly(propene)/ polypropene/ polypro-1-ene, polypropylene 1

(iii) 1



[15]