

**NOVEMBER 2001**

**ADVANCED SUBSIDIARY LEVEL**

**MARK SCHEME**

**MAXIMUM MARK : 60**

**SYLLABUS/COMPONENT : 8701/2**

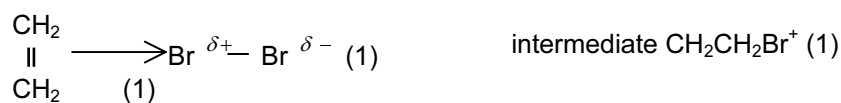
**CHEMISTRY  
(Structured Questions)**





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- 3 (a) red / brown liquid / vapour (1) [1]
- (b) Stronger van der Waals' forces between molecules (1)  
since bromine is a bigger molecule / more electrons than chlorine (1)  
and has more induced dipoles on its surface (1) Max (2) [2]
- (c) (i)  $2P + 5Cl_2 \rightarrow 2PCl_5$  (1)
- (ii)  $PCl_5 + 4H_2O \rightarrow H_3PO_4 + 5HCl$  (1)
- (iii)  $NaCl + AgNO_3 \rightarrow AgCl \downarrow + NaNO_3$   
OR  $Cl^-_{(aq)} + Ag^+_{(aq)} \rightarrow AgCl_{(s)}$  (1)
- (iv)  $AgCl + 2NH_3 \rightarrow Ag(NH_3)_2^+_{(aq)} + Cl^-$  OR to  $Ag(NH_3)_2Cl$  (1) [4]
- (d) (i)  $CH_2=CH_2 + Br_2 \rightarrow CH_2BrCH_2Br$  (1)
- (ii) Electrophilic addition (1)
- (iii) Electron-rich double bond attracts  $Br_2$  which is then polarised



Final addition of  $Br^-$  [5]

[Total: 12]

- 4 (a)  $N_2$  zero } (1)  $NO_2^-$  + 3 } (1)  
 $NH_4^+$  - 3 }  $NO_3^-$  + 5 } [2]
- (b) (i) The triple bond (high energy) needs to be broken (1)
- (ii) gives  $NH_4^+$  directly / gives soluble N to soil (1) [2]
- (c) (i)  $6.3 \times 10^{-9} \text{ mol dm}^{-3}$  (1)
- (ii) Since  $H^+$  is a product, and this is removed (1)
- (iii) lime / a base / ammonia (1) [3]
- (d) Waterlogged soils will contain very little oxygen / will discourage nitrifying bacteria (1) [1]

- (e) (i)  $H^{\oplus}$  charge (1) To include dative bond
- $$\begin{array}{c} H^{\oplus} \\ \times \times \\ H \times N \bullet H \\ \bullet \times \times \\ H \end{array}$$

- (ii) tetrahedral, 109 or  $109\frac{1}{2}^\circ$  (1) [2]

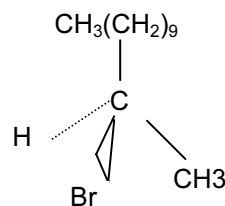
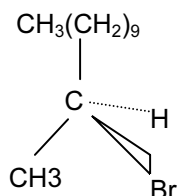
[Total: max 10]

- 5 (a) (i)  $CH_3(CH_2)_9CHBrCH_2Br$  (1)
- (ii)  $CH_3(CH_2)_9CHBrCH_3$  (1)
- (iii)  $CH_3(CH_2)_9CO_2H$  (1)
- (iv)  $CH_3(CH_2)_9CH(OH)CH_3$  (1) [4]

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(b) (i) optical isomerism (1)

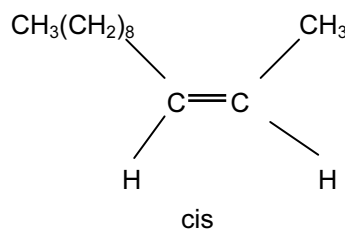
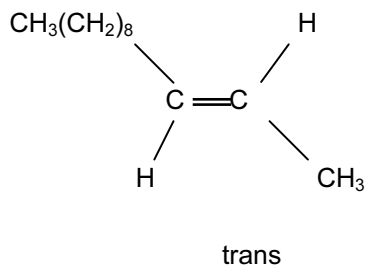
(ii)



(1) each

[3]

(c)



(1) each

[2]

[Total: 9]

6

A Only alcohol

sodium (1) – bubbles of gas / H<sub>2</sub> (1)

OR PCl<sub>5</sub> (1) misty fumes (1)

OR carboxylic acid + catalyst (1) smell of ester (1)

[2]

Not H<sup>+</sup>/Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> or H<sup>+</sup>/MnO<sub>4</sub><sup>-</sup>

B Only ketone

DNP reagent gives red precipitate (1)

does not give Tollens or Fehlings

OR H<sup>+</sup>/Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> tests (1)

[2]

C alkene and aldehyde

decolourises Br<sub>2</sub> (water) (1)

red/brown ppt with Benedicts or Fehlings

OR Ag mirror – Tollens (1)

DNP test (1) if not used elsewhere

[2]

D aldehyde only

DNP gives red ppt (1)

Benedicts/Tollens/Fehlings positive (1)

(as C)

[2]

[Total: 8]