

Mark Scheme 2812
June 2005

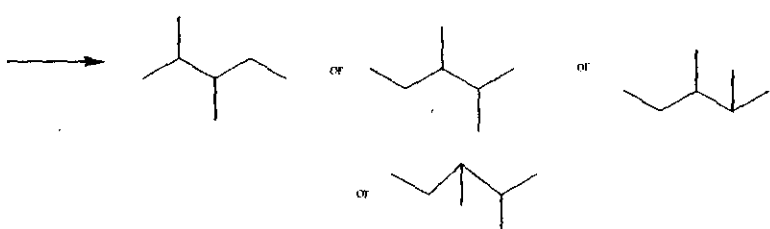
CHAINS + RINGS

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1.

(a) C_6H_{14} ✓(b) (i) boiling point increases with increase in M_R /molecular formula/ N° of carbon atoms/chain length ✓(ii) more intermolecular forces/electrons/surface area/
surface interactions/van der Waal forces ✓(iii) $120 - 130^\circ C$ ✓(c)(i) $C_9H_{20} \longrightarrow C_7H_{16} + C_2H_4$ ✓(ii) $C_2H_4 + H_2O \longrightarrow C_2H_5OH$ ✓✓
temperature $> 100^\circ C$ / steam
phosphoric acid (catalyst) ✓(d) (i)  ✓(ii) $85 - 98^\circ C$ ✓(e) $C_7H_{16} \longrightarrow C_6H_{11}CH_3 / \text{cyclohexane ring with methyl group} + H_2$ ✓✓
$$\left\{ \begin{array}{l} C_7H_{16} \longrightarrow C_7H_{14} + H_2 \\ C_7H_{16} \longrightarrow \text{cyclohexane ring} + H_2 \end{array} \right\} \begin{array}{l} \text{H}_2 \text{ as a product} \\ \text{either of these} \\ \text{scores 1 mark} \end{array}$$

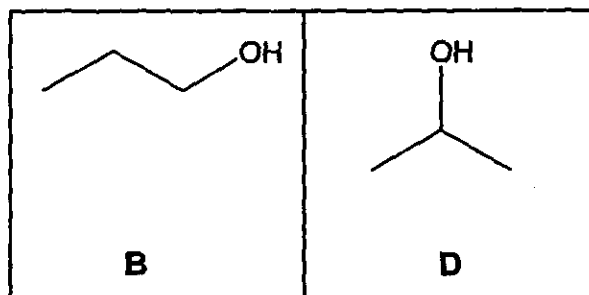
(f) more efficient fuel/better fuel/ higher octane number/reduces knocking/more volatile/lower boiling points/burn better/burn more easily/quicker ✓

[Total: 13]

Mark Scheme for Unit 2812/01, June 2005 - ERRATUM

See page 9 of the main booklet.

As part of the printing process, two boxes have become corrupted, these should be as shown below.



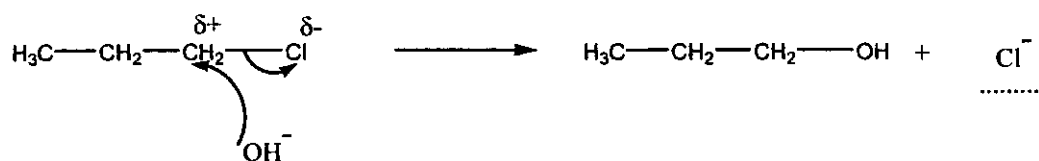
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2.
 (a) (i) reaction 1 ✓
 (ii) reaction 4 ✓
 (iii) reaction 3 ✓

- (b) (i) lone pair/electron pair donor ✓



✓ Correct dipole

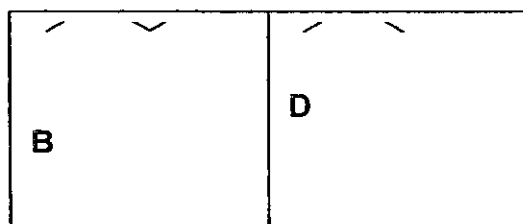
✓ Curly arrow from the O in the OH⁻ to C in the CH₂

✓ Curly arrow to show movement of bonded pair in the C-Cl bond

Cl⁻ as a product ✓

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

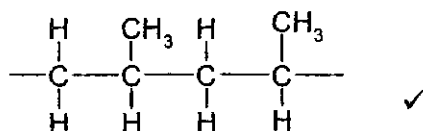
(ii)



- (d) (i) addition, (not additional) ✓

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

(iii)



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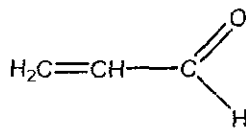
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3.

- (a) (i) prop-2-en-1-ol $\text{CH}_2=\text{CHCH}_2\text{OH}$ must show the C=C double bond

✓

acrolein

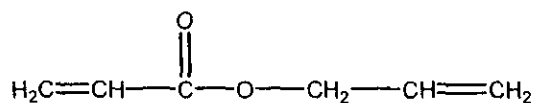


must clearly show the aldehyde group and the C=C

✓

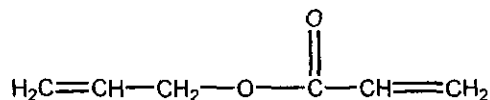
- (ii) alkene/C=C double bond ✓
- (b) (i) acidified / H^+ ✓
- dichromate/ $\text{Cr}_2\text{O}_7^{2-}$ ✓
- (ii) $\text{CH}_2\text{CHCH}_2\text{OH} / \text{C}_3\text{H}_6\text{O} / \text{C}_3\text{H}_5\text{OH} + [\text{O}] \longrightarrow \text{CH}_2\text{CHCHO} / \text{C}_3\text{H}_4\text{O} / \text{C}_2\text{H}_3\text{CHO} + \text{H}_2\text{O}$ ✓
not CH_2CHCOH
- (c) acrylic acid ✓
- approx 1700 cm^{-1} (range 1650 – 1750) indicates C=O ✓
- approx 3000 cm^{-1} (range 2500- 3300) indicates O-H ✓
- not $3230 - 3550 \text{ cm}^{-1}$
- (d) (i) $\text{CH}_2\text{CHCH}_2\text{OOCCHCH}_2$ / ($\text{C}_6\text{H}_8\text{O}_2$) ✓
- H_2O ✓

(ii)



✓✓

or



1 mark if the ester group, 1 mark for the rest of the molecule.
COO/ CO_2 without displaying the ester, they can still get 1 mark.

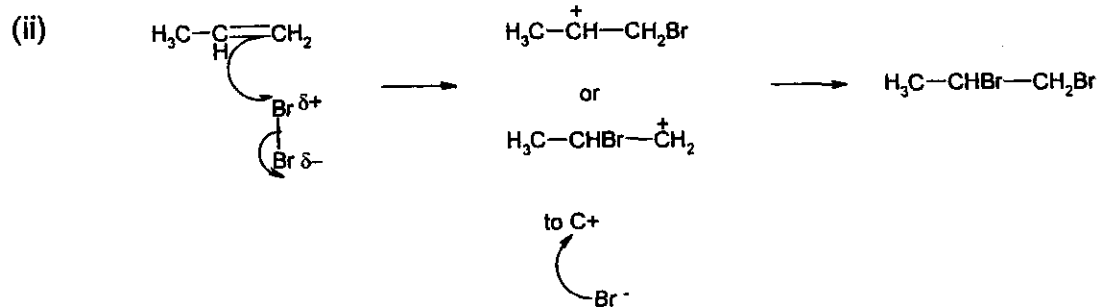
[Total: 13]

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4.

(a) (i) decolourises/not clear/not discolours ✓

curly arrow from C=C to Br^{δ+} ✓dipole on Br-Br **and** curly arrow showing movement of bonded pair of electrons ✓correct intermediate/carbonium ion/carbocation **and** curly arrow from Br⁻ to C+ ✓

1,2-dibromopropane as product ✓

(b) CH₃CB₂CH₃ ✓CH₃CHBrCH₂Br ✓CH₃CH₂CHBr₂ ✓

(CH₃CHBrCH₂Br has a chiral centre, hence optical isomers of 1,2-dibromopropane are acceptable but must be drawn with 'wedge-shape' bonds and be non-superimposable mirror images)

[Total: 8]

(a) Essential marks:

<u>Order</u>	RI>RBr>RCl /owtte	✓
<u>reason for the order</u>	C-I bond weakest/length/C-Cl bond strongest and mention/intermolc forces loses the mark	✓
<u>an equation</u>	$\text{Ag}^+ + \text{X}^- \longrightarrow \text{AgX}$ (solid or ppt) or an equation for hydrolysis/using OH^- or H_2O	✓

max = 3

Two possible methods of monitoring the reaction

Method 1AgNO₃Ethanol & Waterbath/
/hydroxide
temp 40 – 80 °C
not heat/not bunsenrelative rate of
precipitation**Method 2**AgNO₃NaOH/OH⁻
& neutralise with HNO₃relative amount of
precipitation

(b) Properties:

Non-toxic/harmless

non-flammable

any two from:

(propellant in) aerosols because it is volatile/ unreactive/ non-toxic/easily compressed

blowing polystyrene because it is unreactive

dry cleaning because it is a good solvent for organic material

degreasing agent because it is a good solvent for organic material

fire extinguishers because it is non-flammable

QWC

- reasonable spelling, punctuation and grammar throughout

[Total: 11]