

- | | | | | |
|----|-----|-------|---|-----|
| 1. | (| (i) | correct repeat unit | [1] |
| | | | COND evidence of polymer chain | [1] |
| | | (ii) | glucose or maltose | [1] |
| | | (iii) | addition (polymerisation) or no other product
except polymer | [1] |
| | | | condensation (polymerisation) or polymer
and water | [1] |
| | (b) | | sodium hydroxide | [1] |
| | | | COND ammonia or alkaline gas or litmus red to blue
If aluminium added wc =0 | [1] |
| | | (ii) | measure pH | [1] |
| | | | more than 1 and less than 7 or
correct colour eg orange or yellow NOT red
NOT green | [1] |
| | | | OR add magnesium or calcium carbonate
weak acid reacts slowly | [1] |
| | (c) | | ethyl acrylate | [1] |
| | | | ester or alkene | [1] |
| | | (ii) | <u>brown to colourless</u> (NOT clear) | [1] |
| | | | correct formula for acid NOT ester | [1] |

TOTAL = [13]

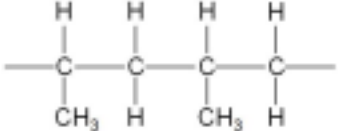
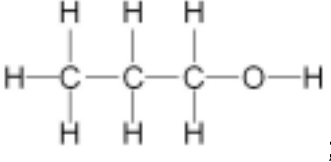
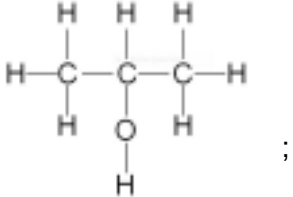
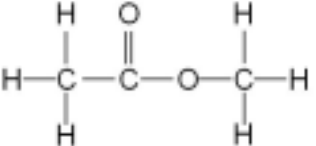
- 2 (a) (i) in which something dissolves [1]
(ii) correct formula [1]
 $\text{CH}_3\text{COOC}_2\text{H}_5$ **or** full structural formula

NOT $\text{C}_4\text{H}_8\text{O}_2$
- (iii) steam **or** water **or** hydration [1]
heat **or** catalyst [1]
- OR** bubble into (concentrated) sulphuric acid [1]
add water [1]
- oxidised [1]
by air **or** dichromate **or** manganate(VII) [1]
- (iv) ethanoic acid and butanol [1]
- (b) (i) CH_2OH [1]
 CHOH
 CH_2OH
- (ii) soap **or** detergent [1]
- (c) (i) polyester **or** condensation polymer **NOT** terylene [1]
- (ii) $\text{HOOC} - \boxed{\phantom{\text{R}}} - \text{COOH}$ [1]
- $\text{HO} - \boxed{\phantom{\text{R}}} - \text{OH}$ [1]
- If wrong way around [1] Point of attachment of functional group to “box” not important
- (d) (i) protein **or** poly peptide **or** polyamide [1]
(ii) peptide **or** amide [1]
(iii) amino acids are colourless **or** become visible/coloured **or** to develop it [1]
(iv) using colour **or** from position **ONLY** [1]
OR discussion of Rf [2]
OR compare with known amino acids [2]

TOTAL = 17

- 3 (a) molecular formula [1]
 Must be able to give isomers, need not be alkenes
 two corresponding isomers [2]
 If do not correspond then MAX [2] out of [3]
- (b) (i) ethanol [1]
 structure [1]
- (ii) ethane [1]
 structure [1]
- (c) (i) many simple molecules **or** monomers [1]
 form one large one **or** macromolecule or chain [1]
- (ii) addition polymer only one product- the polymer [1]
 condensation - polymer and water etc [1]
- (iii) correct unit [1]
COND evidence of polymer in structure eg shows
 continuation such as terminal bonds [1]
- (d) (i) water proof **or** impervious **or** flexible **or**
 good adhesion **or** non-biodegradable **or** unreactive [1]
- (ii) steel in contact with water **or** air [1]
- (iii) zinc more reactive
 oxygen /water reacts with zinc not iron
 sacrificial protection
 zinc anodic
 steel receives electrons from zinc
 zinc forms cations
 cell
TWO valid points [3]

TOTAL = 17

Question	Answer	Marks
4(a)	fractional distillation; cracking;	2 1 1
(b)(i)	add	1
(b)(ii)	2;	1
(b)(iii)	 <p>M1 chain of 4 carbon atoms with single bonds and continuation bonds; M2 correctly positioned CH₃ side chains;</p>	2
(c)	 ;  ;	2
(d)(i)	(concentrated) sulfuric acid;	1
(d)(ii)	ethanoate;	1
(d)(iii)	 <p>M1 ester link; M2 rest of molecule;</p>	2
(d)(iv)	te	1

Question	Answer	Marks
5(a)(i)	more than enough to react (with all the hydrocarbon); OR (some) oxygen remaining;	1
5(a)(ii)	cm ³ ;	1
5(a)(iii)	2 : 15 : 10;	1
5(a)(iv)	2 : 15 : 10 : 10; C ₅ H ₁₀ ;	2 1 1
5(b)(i)	₇ H ₁₆ ;	1
5(b)(ii)	contains a double bond/triple bond/multiple bond; OR not all bonds are single bonds;	1
5(b)(iii)	test: aqueous bromine/bromine (water)/Br ₂ ; result: (orange/yellow/brown) to colourless/decolourised/colour disappears;	2 1 1
5(c)(i)	add	1
5(c)(ii)	(kg);	1
5(c)(iii)	propene: CH ₂ ; polypropene: CH ₂ ;	2 1 1