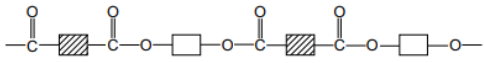


Question 33 (Answer: B)

- An alcohol contains the –OH group, with the oxygen bonded to one carbon and one hydrogen.
- So look for a structure ending in C–O–H.
- A C–O–C arrangement is an ether and a –COOH is a carboxylic acid.

Question 37 (Answer: D)

- Fermentation uses a renewable feedstock at low temperature, but is slow, batch-wise and gives impure ethanol.
- The ethene route is fast, continuous and gives pure ethanol, but its feedstock is finite crude oil.
- Each process has one clear advantage and one clear disadvantage – match them the right way round.

5(a)(i)	$C_nH_{2n+1}OH$						
5(a)(ii)	(same) functional group						
5(b)(i)	<table border="1"> <tr> <td>M1 25–35</td><td>M2 300</td></tr> <tr> <td>M3 yeast</td><td>M4 acid</td></tr> <tr> <td>M5 absence of oxygen</td><td>M6 60 atm</td></tr> </table>	M1 25–35	M2 300	M3 yeast	M4 acid	M5 absence of oxygen	M6 60 atm
M1 25–35	M2 300						
M3 yeast	M4 acid						
M5 absence of oxygen	M6 60 atm						
5(b)(ii)	$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$ M1 $C_6H_{12}O_6$ as the only reactant on left M2 correct equation						
5(b)(iii)	$C_2H_4 + H_2O \rightarrow C_2H_5OH$ M1 both $C_2H_4 + H_2O$ only on left M2 correct equation						
5(c)(i)	$C_4H_{10}O_2$						
5(c)(ii)	2						
5(d)(i)	$C_2H_3O_2$						
5(d)(ii)	hydrogen						
5(e)(i)	 M1 any one correct fully displayed ester link between any two blocks M2 three fully displayed inter-block ester links with correct orientation M3 fully correct diagram showing two complete repeat units of polyester including continuation bonds						
5(e)(ii)	condensation (polymerisation)						

Question 17 (Answer: B)

- Acidified manganate(VII) is an oxidising agent, so the ethanol is oxidised to ethanoic acid.
- The manganate(VII) is itself reduced to Mn^{2+} .
- So the purple colour fades to colourless.

Question 35 (Answer: C)

- Fermentation uses yeast at about 30 °C on a renewable sugar feedstock, as a batch process.
- Hydrating ethene uses a catalyst at about 300 °C and high pressure, continuously, from crude oil.
- So the low temperature and the enzyme belong to fermentation, the high temperature to the ethene route.

Question 32 (Answer: D)

- Butan-2-ol has four carbons in a chain, so the skeleton is $CH_3CH_2CH_2CH_3$.
- The "2" means the –OH is on the second carbon.
- That gives $CH_3CH_2CH(OH)CH_3$.

Question 36 (Answer: B)

- Hydrating ethene is a continuous process, so it runs without stopping to re-charge a vessel.
- It is also much faster, and gives pure ethanol directly rather than a dilute aqueous mixture.
- Fermentation's advantage is its renewable feedstock, which is not what this question asks for.

Question 37 (Answer: D)

- Using a renewable resource is an advantage, not a disadvantage.
- Fermentation is slow and gives dilute, impure ethanol that must then be distilled – real disadvantages.
- It runs at only about 30 °C, so the high-temperature claim is wrong.