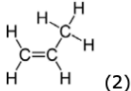


Polymers

Q1. (2018) – 5b

Question Number	Answer	Additional guidance	Mark
5(b)	 (2) one C=C bond in a three consecutive carbon atom molecule (1) all other atoms and bonds correct (1) MP2 is dependent on MP1	ignore bond angles reject CH ₃ for MP2	(2) AO 2 1

Q2. (2018) – 5c

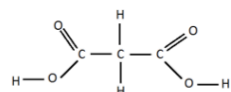
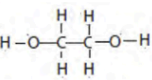
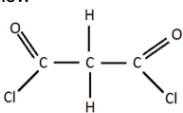
Question Number	Answer	Additional guidance	Mark
5(c)	An explanation linking - low ability to conduct electricity / does not conduct electricity/ insulator (1) - separates user from {current / electricity} / prevents shock electric / prevents electrocution (1)	allow - high flexibility/bendable (1) - less likely to break easily (than other materials) (1) OR - inert/unreactive/waterproof/weatherproof (1) - separates the wire from surrounding water (1)	(2) AO 1 1

Q3. (2018) – 5d

Question Number	Answer	Mark
5(d)	B condensation The only correct answer is B <i>A is not correct because this is not an addition reaction</i> <i>C is not correct because this is not a neutralisation reaction</i> <i>D is not correct because this is not a precipitation reaction</i>	(1) AO 1 1

Q4. (2018) – 5e

A)

Question Number	Answer	Additional guidance	Mark
5(e)(i)	 (1)  (1)	either order allow  accept -OH in place of -O-H on both structures.	(2) AO 3 2a AO 3 2b

B)

Question Number	Answer	Additional guidance	Mark
5(e)(ii)	water/H ₂ O	or hydrogen chloride/HCl if diacid chloride shown as monomer	(1) AO 1 1

Q5. (2020) – 4c

Question number	Answer	Additional guidance	Mark
4(c)	An explanation to a property with a linked reason non-toxic (1) so stops food being poisonous (1) OR unreactive (1) so it does not react with the food (1) OR flexible (1) so it can wrap all around the food (1)	MP2 depends on MP1 allow impermeable to air (1) stops food {oxidation / reaction with air} (1) ignore 'stops food going off' impermeable to water (1) stops dampening of food (1) high melting point (1) so can wrap hot food (without melting) (1) ignore: strong/ tough/ transparent/ cheap/ can seal	(2)

Q6. (2020) – 5a (ii, iii)

A)

Question number	Answer	Additional guidance	Mark
5(a)(ii)	type of polymerisation condensation (1) name of other product water / H ₂ O (1)	reject addition	(2)

B)

Question number	Answer	Additional guidance	Mark
5(a)(iii)	DNA (1)	allow RNA / deoxyribonucleic acid	(1)

Q7. (2021)

A)

Question number	Answer	Additional guidance	Mark
4(a)(i)	Any one from - need to sort polymers into different types - polymers often need to be separated from other polymers - takes time to sort by hand - containers may need to be washed before recycling - difficult to break down into their monomers - some not recyclable - requires a lot of energy		(1) AO1

B)

Question number	Answer	Additional guidance	Mark
4(a)(ii)	A description to include - polymers persist in landfill / landfill site fills up too quickly - polymers degrade very slowly or - combustion produces gases - which may be toxic	accept polymers persist in the environment / harmful to wildlife not biodegradable / hard to decompose	(2) AO1

Q8. (2021) – 4b (ii, iii)

A)

Question number	Answer	Additional guidance	Mark
4(b)(ii)	$ \begin{array}{cccccc} \text{H} & \text{Cl} & \text{H} & \text{Cl} & \text{H} & \text{Cl} \\ & & & & & \\ -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}- \\ & & & & & \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array} $ (3)	chain containing 6 C atoms (1) single bonds between C atoms (1) rest of structure complete (1) allow alternative arrangements allow max 2 for $ \begin{array}{ c c } \hline \text{H} & \text{Cl} \\ \hline & \\ -\text{C} & -\text{C}- \\ & \\ \text{H} & \text{H} \\ \hline \end{array} $ ₃	(3) A02

B)

Question number	Answer	Additional guidance	Mark
4(b)(iii)	addition (polymer)		(1) A01

Q9. (2022) – 10a (iii)

Question number	Answer	Additional guidance	Mark
10(a)(iii)	$ \begin{array}{cc} \text{H} & \text{CH}_3 \\ & \\ -\text{C} & -\text{C}- \\ & \\ \text{CH}_3 & \text{H} \end{array} $ 2 neighbouring carbon atoms with single bond and continuation bonds shown (1) rest of repeating unit correct (1)	allow CH ₃ or $\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}- \\ \\ \text{H} \end{array}$ ignore brackets and n MP2 depends on MP1	(2) A02 1

Q10. (2022) – 10c

A)

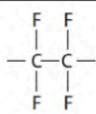
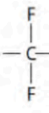
Question number	Answer	Mark
10(c)(i)	H ₂ O	(1) A01 1

B)

Question number	Answer	Additional guidance	Mark
10(c)(ii)	$ \begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \\ & & & & \\ \text{H}-\text{O} & -\text{C} & -\text{C} & -\text{C}-\text{O}-\text{H} \\ & & & & \\ & \text{H} & \text{H} & \text{H} & \end{array} $ fully correct diagram scores (2) if not scores (1) for 3 single bonded carbon atoms / 2 OH groups	allow OH or O-H reject any double bonds	(2) A02 1

Q11. (2023) – 4c

A)

Question number	Answer	Additional guidance	Mark
4(c)(i)	 (2) OR repeat unit including: - no double bond (1) - rest of repeat unit with linking bonds (1)	allow lowercase f allow diagram to show 1, 2, 4 or 6 carbon atoms eg  2 marks ignore brackets around repeat unit and n	(2) AO2-1

B)

Question number	Answer	Additional guidance	Mark
4(c)(ii)	Use (1) Property (1) Reason (1) (Property & reason MUST depend on use) Examples: - for coating (frying) pans (1) - because it is {slippery/non stick} (1) - food will not stick to the (frying) pan (1) OR - clothing /carpets (1) - because it is non-stick (1) - easy to clean / will not stain (1) OR - bottom of skis (1) - because it is slippery (1) - less friction on snow (1)	USES allow: pans / saucepans / tennis rackets / named kitchen equipment / piping / skis ignore: sports equipment (in general) / 'kitchenware' / windows / window ledge / toothpaste PROPERTIES allow: slippery / smooth / non-stick / unreactive / does not conduct electricity / non-toxic / high melting point ignore: strong / lightweight / high boiling point other reasonable uses include: lubricants - reduces friction graft material in surgery – inert/non-reactive prevent insects from climbing surfaces - slippery insulation of wiring & electrical circuits – does not conduct electricity/high melting point plumbers' tape – flexible/waterproof bottles – inert/non-reactive raincoat / rainjacket – waterproof Goretex™ clothing - waterproof Umbrella – water repellent flame retardant material (2) – high melting point hair straighteners – non-stick/no hair damage allow any reasonable use	(3) AO1-1

Q12. (2024) – 4a (iii)

Question number	Answer	Additional guidance	Mark
4(a)(iii)	inert/ unreactive/ does not corrode / does not break (if dropped)	allow can be moulded into shape / waterproof / non-brittle ignore durable / strong/ malleable/ rigid/ flexible/ transparent/ cost reject 'is not corrosive'/ non-corrosive	(1) AO2 1

Q13. (2024) – 10c

Question number	Answer	Additional guidance	Mark
10(c)	a description to include ADDITION MONOMER – Max 2 - only one monomer (1) - monomer is {an alkene / unsaturated / has C=C} (1) CONDENSATION MONOMER – Max 2 - two/different monomers (1) - one monomer is (di)alcohol (1) - one monomer is (di)carboxylic acid (1) - each monomer molecule has (two) functional groups (at each end) (1)	allow monomers are identical allow (2x) -OH allow (2x) -COOH	(3) AO1 1