Section A

1. Poly(butene) is a polymer. What monomer would be used to make poly(butene)?
   Tick (✓) **one** box.

   A. Butane ☐

   B. Butene ☐

   C. Butanol ☐

2. Bromoethene molecules can be added together to make a polymer. What would this polymer be called?

   Tick (✓) **one** box.

   A. poly(ethene) ☐

   B. poly(bromoethane) ☐

   C. poly(bromoethene) ☐

3. Describe what happens during addition polymerisation.

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_____

4. Poly(ethene) is made through addition polymerisation of ethene molecules.

   a. Complete the displayed formula for ethene.

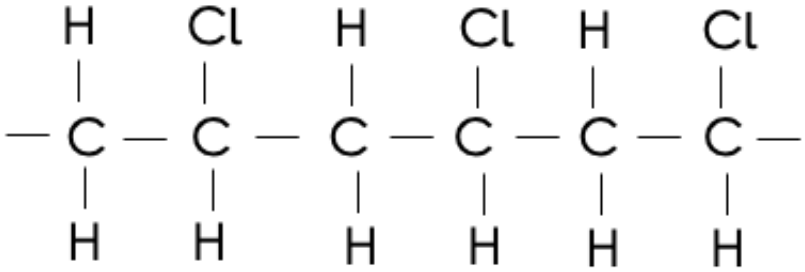
   C C

   b. Complete the displayed formula for a section of poly(ethene).

   C C C C C C

Section B

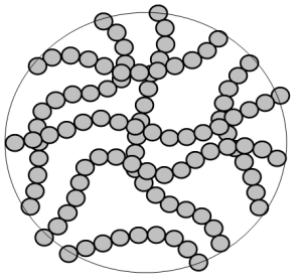
5. Polyvinyl chloride (PVC) is a non-biodegradable polymer. The displayed formula below shows a section of a PVC molecule.



a. Draw the displayed structure of the monomer used to make PVC.

b. Explain why being non-biodegradable is a disadvantage of PVC.

The diagram below represents some PVC molecules.



c. Suggest whether PVC is likely to melt when heated.

6. Poly(chloroethene) and high-density polyethene (HDPE) are different polymers that can be used to make window frames. The table below gives some information about these polymers.

Polymer	HDPE	Poly(chloroethene)
Relative strength	70	24
Density (g/cm^3)	1.5	0.9

a. Use the table to give **one** advantage of using HDPE compared with poly(chloroethene) as a material for window frame.
Give a reason for your answer.

b. Use the table to give **one** advantage of using poly(chloroethene)compared with HDPE as a material for window frame.
Give a reason for your answer.

c. Polymers are used as an alternative material to wood for window frames.
Give **one advantage** and **one disadvantage** of using wood for window frames.

Advantage:

Disadvantage:

d. HDPE is one form of poly(ethene). Explain how different forms of poly(ethene) can be produced from ethene.

Section C

7. HDPE and LDPE are both types of poly(ethene) but they have different densities.

a. Define density.
b. HDPE has a density of 1.5 g/cm^3. Calculate the volume that 1.5 kg of HDPE would occupy.
c. Describe a method that could be used to calculate the density of an irregularly shaped piece of LDPE.