

M1.(a) hydrocarbons **or** hydrocarbon 1

(b) (i) distillation 1

(ii) evaporation 1

(iii) condensation 1

(c) (i) bond 1

(ii) $(C_6H)_{14}$ 1

(iii) cracking 1

(d) (i) poly(butene)
allow with or without brackets 1

(ii) Advantage = energy is released
*do **not** accept more than one tick in the advantage column* 1

Disadvantage = carbon dioxide is produced

do **not** accept more than one tick in the disadvantage column

1
[10]

M2.(a) (i) (1)

5

3

(6)

4

2

all numbers in the correct order gains both marks

any two numbers in the correct position gains 1 mark

2

(ii) Water

ignore formula if correct name given

accept hydrogen oxide

allow H₂O

1

carbon dioxide

allow CO₂

accept carbon monoxide / CO or carbon / C

1

- (b) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a **best-fit** approach to the marking.

0 marks

No relevant content.

Level 1 (1-2 marks)

There is a **basic** description of at least one advantage **or** one disadvantage caused by using plastic shopping bags made from poly(ethene)

Level 2 (3-4 marks)

There is a **clear** description of both an advantage **and** a disadvantage, caused by using plastic shopping bags made from poly(ethene).

Level 3 (5-6 marks)

There is a **detailed** description of both advantages **and** disadvantages caused by using plastic shopping bags made from poly(ethene)

examples of the chemistry/social points made in the response:

ignore cost unqualified

Advantages:

- Simple properties eg strong / low density / water resistant
- Bags can be reused (for shopping) **or** another specified use eg bin liners
- Money charged for bags can go to good causes **or** encourage reuse
- Poly(ethene) bags can be recycled eg made into milk bottle crates
- Poly(ethene) bags can be burned to provide heat for buildings/generation of electricity
- New bags are now made that can biodegrade

Disadvantages:

- (Older) bags can take many years to biodegrade
- There is a shortage of landfill space
- Bags are made from (crude) oil which is a non-renewable resource/running out
- Large amounts of energy/fuel are used for the production of poly(ethene)
- Production of poly(ethene) releases carbon dioxide/causes global warming
- Specified issue caused by litter eg visual pollution or effect on wildlife
- Burning bags release carbon dioxide / causes global warming

6

[10]

M3.	(a)	(i)	hydrocarbons <i>accept alkanes</i>	1
		(ii)	distillation	1
	(b)	(i)	vaporising	1
		(ii)	cracking	1
	(c)		B	1
	(d)	(i)	new plastic products are made from the used plastic bags	1
		(ii)	not biodegradable <i>accept does not decompose</i> <i>allow does not rot</i>	1
		(iii)	advantage – energy is released	1
			disadvantage – carbon dioxide is produced	1

[9]

M4. (a) (i) carbon 1

hydrogen

accept in either order

ignore number eg 2 carbons

4 hydrogens

1

(ii) (a carbon carbon) double (bond) 1

(b) poly(ethene) 1

(c) any **two** from:

ignore pollution / cost / global warming / harms environment / recycling

- made from crude oil
- non-renewable resources
accept resources are running out
- litter
accept go to landfill
- not biodegradable
- use energy to make
- when burned or biodegraded carbon dioxide is released
- encourage customers to reuse bags / use their own bags
accept reduces carbon emissions / footprint

2

[6]

M5. (a) (i) any **one** from:

- bond / join (together)
ignore polymerisation / heat
- double bond opens

1

(ii) any **one** from:

- heat / energy
ignore many processes / distillation / cracking / polymerisation
- cost of fuels / the crude oil
- construction of the factory / plant
- wages / salaries

1

(iii) any **two** from:

ignore gases released / burning / habitats

- non-biodegradable
accept remains a long time
- landfill sites are filling up / limited
accept land / space used up
- waste of a resource / could be recycled / reused
accept crude oil is running out

2

(b) any **two** from:

- renewable / sustainable
ignore recycling
ignore crude oil is running out
- less fuel burned

accept less energy / heat needed

- biodegradable
- natural resource
- plants absorb carbon dioxide

2

[6]

- M6.** (a) (i) C_2H_4 1
- (ii) poly(ethene) 1
- (b) (i) is not biodegradable 1
- (ii) not enough landfill sites / space
*accept landfill sites are filling up or plastics remain for years or
plastics not broken down
ignore cost / waste of resources / not biodegradable / wildlife* 1
- (iii) less (crude) oil / fuels / energy used
accept (crude) oil is a non-renewable resource 1

[5]

- M7.** (a) (i) hydrogen
must be name 1
- (ii) a line of four or more ethene molecules joined to the original two with single bonds
at least two other ethene molecules joined to the original two in a chain gains 1 mark 2
- (b) (i) any **two** from:
- non-biodegradable
accept remains a long time
 - landfill sites are filling up / limited
accept land / space used up
 - waste of a resource / could be recycled / reused
ignore references to tablets / animals 2
- (ii) any **one** from:
- (two) different polymers / plastics / materials
 - need to be separated
 - limited collection points / many need to be collected
 - tablets may still be present 1
- [6]**