

M1.(a) oxygen

allow correct answer shown in box if answer line blank

1

(b) vinegar

allow correct answer shown in box if answer line blank

1

(c) C

1

(d) Ester

1

(e) pleasant smell

1

volatile

allow low boiling point / evaporates

1

[6]

- M2. (a) (i) fermentation 1
- (ii) cloudy 1
accept milky / white
- there is carbon dioxide / CO₂ 1
accept calcium carbonate forms
- allow a (white) solid / precipitate forms*
- (b) (i) (the amount of ethanol used) increases (from 1970) to 1989 1
if no year(s) or incorrect year(s) indicated then max 1
correct year(s) only needs to be indicated once to gain full marks
accept values in range 1987-1992
- then it decreases from 1989 (to 2000) 1
- (ii) any **one** from: 1
- Brazil had more oilfields
 - cost of crude oil had decreased
 - cost of ethanol / sugar (cane) had increased
 - demand for ethanol / sugar (cane) had increased
 - availability of ethanol / sugar (cane) had decreased
accept availability of land to grow sugar (cane) had decreased
 - climate change affects growing sugar (cane)

M3.(a) 6

1

oxygen

1

(b) (i) heating the hydrocarbon to a high temperature

1

the presence of a catalyst

1

(ii) all bonds correct

four C—H bonds **and**

one C=C bond

1

(iii) water

accept hydrogen oxide/steam

allow H₂O

1

(c) (i) carbon dioxide

allow CO₂

1

(ii) by filtering/decanting/centrifuging (to remove yeast)

ignore sieving

1

(fractional) distillation (to separate ethanol from water)
accept a description of (fractional) distillation

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]