

GCSE CHEMISTRY

Topic Paper: 7.2 Reactions of alkenes and alcohols
Part 1 & 2 Mark Scheme

MARK SCHEME



46 Marks



M1. (a) (i) add bromine (water) *to the oil*
it = bromine water 1

one drop at a time / dropwise or count / record number of drops
allow shake / mix / stir 1

until the bromine (water) no longer decolourises **or** until bromine water
remains orange
ignore clear 1

(ii) A 2
both need to be correct
allow A 17 1

anomalous result **or** explanation
ignore does not fit pattern / trend
independent marking points 1

(iii) any **one** from:
ignore references to time
temperature
concentration of bromine water
allow same bromine water
(same) dropper / pipette
allow (same) drop size 1

(b) any **three** from:
comparison must be to Vegio
allow healthier or better (for you) for more unsaturated fat
ignore references to bromine water

A's oil has more unsaturated fat (than Vegio) **or** has the most unsaturated fat
B's oil has more unsaturated fat (than Vegio)
C's oil has less unsaturated fat (than Vegio) **or** has the least unsaturated fat
D's oil has less unsaturated fat (than Vegio)

Vegio is in 3rd position
*allow only A and B have more unsaturated fat than Vegio **or** only C*
and D have less unsaturated fat than Vegio for 3 marks 3

[9]

M2. (a) (i) A
allow -11 1



(ii) as the percentage of unsaturated fat decreases the melting point increases
or vice versa
ignore boiling point / temperature
ignore pattern linked to the percentage of saturated fat
ignore numerical values

1

(iii) D
allow 10

1

(b) any **one** from:
do not accept to make it less healthy or more healthy

increase the melting point
ignore boiling point

make it 'spreadable'

make it solid (at room temperature)
allow make it hard(er)
ignore density / mass / viscous / thicker

increase the % of saturated fat
allow make it saturated

or decrease the % of unsaturated fat
ignore references to double / single bonds

1

(c) stop people eating unhealthy fat

1

[5]

M3. (a) (i) in the presence of a nickel catalyst

1

at about 60 °C
allow 50 – 150 °C

1

(ii) (no) because hydrogen adds to the unsaturated fat **or** (no) because hydrogen reduces the number of (carbon–carbon) double bonds
accept (no) because hydrogen increases number of (carbon-carbon) single bonds

1

therefore there will be less unsaturated fat
accept therefore there will be more saturated fat
ignore prefixes to unsaturated e.g.trans/mono/poly
if the answer is 'yes' maximum 1 mark

1



(b) (shaking breaks up the olive oil into tiny) droplets that are unable to join up 1

because (molecules in the) emulsifier have a 'head' which dissolves in / is attracted to water **or** is hydrophilic

accept correctly drawn diagram for 2 marks

1

because (molecules in the) emulsifier have a 'tail' which dissolves in / is attracted to oil **or** is hydrophobic

if hydrophilic and hydrophobic are given the wrong way round, allow 1 mark

1

[7]

M4. (a) *students do not have to use the letters but the descriptions should be in logical order*

W the water boils **or** steam is produced

allow water vapour rises

1

X the oils / substances (in lavender) are vaporised / removed (by the steam)

1

Y (the vapours are) condensed

allow turned back to liquid

ignore cooled

1

Z the water can be run off / tapped off leaving the oil(s)

*allow oil floats on water **or** they form two layers*

1

(b) (i) *incorrect reagent = 0 marks*

add bromine water

1

(bromine water) is decolourised / goes colourless

ignore clear

if colour of bromine water given it must be yellow, orange, red or brown

1

(ii) any **one** from:

to harden the oil

to change the oil into a solid

to make the oil into a spread

to increase its melting point

ignore boiling point

1



- (iii) *incorrect process = max 2*
(olive oil is) reacted with hydrogen
accept hydrogenated 1

using a nickel catalyst 1

at a temperature of about 60 °C
allow 50°C to 160°C
if last two points not given allow 'heat with a catalyst' for 1 mark 1

[10]

- M5.** (a) (i) water and oil do not mix / are immiscible
ignore density 1

or
don't dissolve each other
ignore emulsifier alone 1

(ii) any **two** from:
emulsifier
forms an emulsion
accept description of an emulsion
holds the two components together
accept stops them separating / they mix
allow bonds / binds for holds
by lowering the surface tension
accept a description of how an emulsifier works for two marks
eg 'tadpole' diagram or dispersal of oil drops 2

(b) (i) (because they contain) a double (carbon carbon) bond
accept unsaturated
ignore poly or mono 1



(ii) results suggest sunflower oil is best

or

'the one that took the least time'

1

because (sunflower oil) has the highest amount of unsaturation /
most double bonds / least saturated

ignore uses up I₂ most quickly

second mark is dependent on first

1

(c) (i) any **one** from:

have a higher melting point than (vegetable) oil

are solid at (room temperature) / hardened / harder

accept useful as spreads or doesn't soak into bread

ignore hard / soft(er)

1

(ii) any **two** from:

hydrogen added

do not accept 'water'

to carbon carbon double bond / to saturate

(nickel) catalyst / temperature 60 – 150 °C

wrong catalyst doesn't get this mark

ignore high / warm temperature

2

[9]

M6. (i) 23 to 59

accept 36

1

(ii) decolourise **or** (orange to) colourless

ignore discolours / fades

do not allow oil decolourises

1

(because bromine reacts with the) (carbon) double bond

ignore alkenes or reference to unsaturation

1



(iii) any **one** from:

an anomalous result (11.2) / Test 2

$$\text{accept } \frac{23.2 + 24.0}{2} (= 23.6)$$

11.2 / Test 2 is ignored when averaging

accept average of tests 1 and 3

1

(iv) unsaturation 67%

average was less than it should be / only 26.8 cm³

1

(this means there is) 33% saturated fat

it should have been 28.0 cm³ to give a percentage of 70%

1

[6]