

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C7 - TEST 5

ORGANIC CHEMISTRY

Advanced

Mark schemes

- 1.** (a) hydrocarbon 1
- (b) thermal decomposition / cracking 1
- (c) (i) making polymers / poly(e)thene
accept plastic (bags) 1
- (ii) fuel 1
- 2.** (a) (i) heat / evaporate the crude oil / change to gas or vapour
do not accept heat with catalyst 1
- cool / condense (hydrocarbons)
allow small molecules at top and / or large molecules at bottom 1
- at different temperatures / boiling points
if the answer describes cracking ' no marks 1
- (ii) C₄H₁₀ 1
- (b)
- $$\begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \\ & | & | & | & \\ \text{H} & -\text{C} & - & \text{C} & - & \text{C} & -\text{H} \\ & | & | & | & \\ & \text{H} & \text{H} & \text{H} & \end{array}$$
- 1

[4]

- (c) (i) C_5 to C_8 fraction are fuels **or** easier to burn or petrol (fraction)
accept C_{21} to C_{24} fraction not useful as fuels
do not accept produce more energy 1
- (ii) C_2H_4
do not accept C_4H_8 1
- (iii) any **three** from:
- use different / lighter crude oils
 - develop markets for low demand fractions
 - develop new techniques / equipment to use low demand fractions as fuels
 - cracking
 - convert low demand fractions to high demand fractions or bigger molecules to smaller molecules
 - develop alternative / bio fuels
do not accept price 3

[10]

3.

- (a) they have different boiling points
allow evaporate at different temperatures
ignore different melting points 1

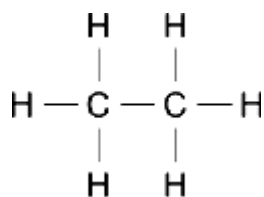
and will therefore condense at different temperatures (after evaporation)

*allow smaller molecules **or** molecules with lower boiling points will condense at top of column where cooler* 1

- (b) C_nH_{2n+2}
C and H must be upper case
allow n_{2+2} for $2n+2$
allow $H_{2n+2}C_n$ 1

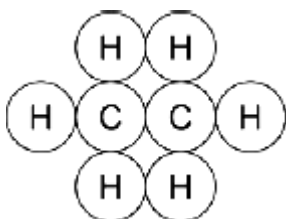
(c) for 2 marks:

2



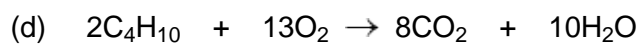
allow 1 mark for 6 hydrogen and 2 carbon atoms shown in an incorrect attempt at a displayed formula

allow for 1 mark:



ignore C_2H_6

ignore circles drawn around symbols



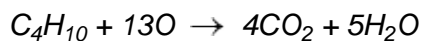
1 mark for correct formulae on left hand side

1 mark for correct formulae on right hand side

1 mark for correct balancing of correct symbol equation

allow correct multiples for balancing

allow for 2 marks:



accept formulae in either order on each side

3

[8]

4.

(a) 40 (%)

allow 1 mark for evidence of $\frac{18}{45} (\times 100)$

or

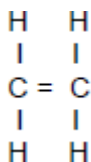
incorrect calculation $\times 100$

45

and percentage correctly calculated

2

(b) (i)



1

(ii) many monomers / small molecules

1

join together

1

to form very large molecules

or

polymers

1

[6]

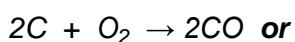
5.

(a) carbon / diesel / it reacts / burns in oxygen / air

1

limited supply (of oxygen / air)

accept incomplete combustion



1

(b) any **four** from:

accept converse statements for fossil diesel.

ignore cost / ease of manufacture / usage issues

for biodiesel:

- less global dimming (because fewer carbon particles)
- less acid rain (because less sulfur dioxide)
if neither point awarded, fewer carbon particles and less sulfur dioxide = 1 mark
- renewable resource / sustainable
accept fossil fuel / diesel supplies are limited
- use waste vegetable oils / fats
- vegetables / plants absorbed carbon dioxide / carbon neutral
accept fossil fuel / diesel releases locked up carbon / is not carbon neutral
- uses land which could be used to produce food
- third world countries can produce bio diesel
- biodegrades easily
- more NO_x released

4

justified conclusion

1

[7]