

Name:

Edexcel Style

Combined Science GCSE

Fuel and Earth Science Test
(Levels 4–9)

Date:

Time Allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total Marks Available
1	8.1, 8.4, 8.7, 8.8		16
2			6
3	8.18, 8.19		11
4	8.10, 8.11, 8.12		10
5	8.16, 8.17		7
Total			50

Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

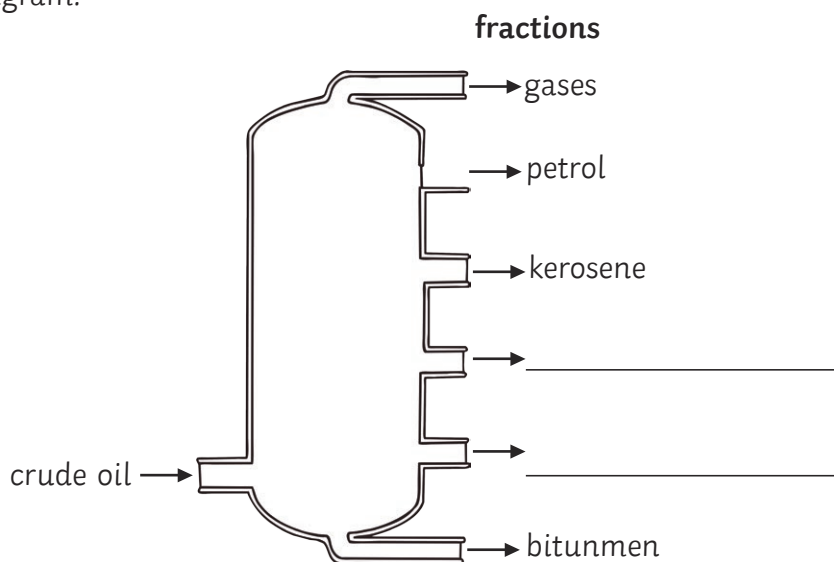
1. Crude oil is a mixture of hydrocarbons.

(a) What does the term hydrocarbon mean?

(1)

(b) Fractions of crude oil are separated using fractional distillation as shown in the diagram below.

Complete the diagram:

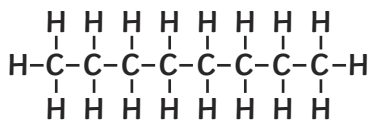


(2)

(c) Complete combustion of a hydrocarbon fuel will produce carbon dioxide and water vapour. However, when a hydrocarbon fuel incompletely combusts there are products which can cause problems. Describe what problems products from incomplete combustion can cause.

(6)

(d) Petrol, which contains octane C_8H_{18} , is one of the fractions obtained during fractional distillation. The structure of octane C_8H_{18} is shown below.



(i) Octane is a hydrocarbon which is saturated. Explain what a saturated hydrocarbon is.

(3)

(ii) If bromine water is shaken up with octane what can be observed? Choose the correct answer.

(1)

- ☐ **A** - Changes from clear to orange
- ☐ **B** - Changes from orange to colourless
- ☐ **C** - Stays colourless
- ☐ **D** - Stays orange

(e) Match the correct fraction with its use. The first one is done for you

(3)

- | | |
|----------|----------------------------|
| gases | fuel for jet engines |
| kerosene | fuel in gas form for homes |
| petrol | surfacing roads |
| bitumen | fuel for cars |

(Total for Question 1 = 16 marks)

2. Alternatives to fossil fuels can be used. A gas called bio-methane can be made from plants that are specifically grown for this reason. Describe advantages and disadvantages of using such fuels as an alternative to natural gas or fossil fuels.

(6)

(Total for Question 2 = 6 marks)

3. (a) Early Earth's atmosphere was very different to how it is now.

(i) How did cooling change the atmosphere of early Earth?

(1)

(ii) How did photosynthesis change the atmosphere of early Earth?

(2)

(iii) How is the atmosphere changed when we burn fossil fuels?

(2)

(b) The atmosphere in early Earth is thought to have been formed from: choose the correct answer. (1)

- ☐ **A** - Gases from volcanoes
- ☐ **B** - Oceans cooling
- ☐ **C** - Animals breathing
- ☐ **D** - Plants photosynthesising

(c) Carbon dioxide levels have reduced when compared to those found in the atmosphere of early Earth. The approximate percentage today is: choose the correct answer. (1)

- ☐ **A** - 78%
- ☐ **B** - 21%
- ☐ **C** - 18%
- ☐ **D** - Less than 1%

(d) Name one human activity that increases the amount of carbon dioxide in today's atmosphere. (1)

(e) What is the formula for carbon dioxide? (1)

(f) How can you test for the presence of carbon dioxide? (2)

(Total for Question 3 = 11 marks)

4. (a) Incomplete combustion can produce carbon monoxide, balance the equation by putting numbers in the spaces provided.



- (b) Carbon monoxide can cause death as it is a toxic gas. Explain how this can happen.

(2)

- (c) Some fossil fuels contain sulfur which is given off when they are burned. Sulfur is an impurity and can have harmful effects on the environment. Explain what effects sulfur in fossil fuels can have.

(6)

(Total for Question 4 = 10 marks)

5. Cracking is used to break down larger alkanes into shorter ones.

(a) When an alkane is cracked, what other type of hydrocarbon is produced?

(1)

(b) When $C_{18}H_{38}$ is cracked, a molecule of ethene is produced. What other molecule is produced? Complete the equation.

(1)



(c) Draw the structure of a molecule of ethene, C_2H_4 .

(2)

(d) Look at the table below.

(3)

Explain, using the information in the table above, why it is necessary for cracking to happen.

Fraction	Demand for fraction	% composition
bitumen	1	3
fuel oil	28	21
diesel oil	5	37
kerosene	14	20
petrol	3	15
gases	1	4

(Total for Question 5 = 7 marks)

TOTAL FOR PAPER = 50 MARKS