

C1a answers

Remember:

Check which grade you are working at.

Page 26 Elements and the periodic table

- 1 a** Potassium (1)
b Magnesium (1)
c Boron (1)
d Iodine is now in same group as bromine / chlorine / named halogen / other halogens (1);
 with other elements with similar properties (1)

Page 26 Atomic structure 1

- 2 a** 35 (1); 35 (1); 45 (1)
b Electrons have no / negligible mass (1)
c i Kr (1)
ii F Cl (1)
3 a i A (1)
ii 2 electrons in the outer shell (atom B is helium – a Noble Gas) (1)
b i B / D (1)
ii Full outer shell (1)
c 2,1 (1)

Page 27 Bonding

1

1	2	3	4
D	B	C	A

(4)

2 2 (1)

Page 27 Extraction of limestone

- 3 a** (Any 2:) Making concrete; making cement; (allow one mark for 'building materials'); making glass; making iron; used by farmers to treat soil
b (Any 3:) Eyesore / scarring to landscape; damage to habitats / loss of wildlife; dust / noise problems; traffic problems
c Employment / jobs/ income for local shops / better road system / money for local health care / closed quarries provide leisure facilities (1)

C1a answers

Page 28 Thermal decomposition of limestone

- 1 a Calcium oxide (1); carbon dioxide (1); CO_2 (1)
 b B (1)
- 2 a H_2O (1)
 b Due to CaCO_3 being formed (1); which is a solid (1)

Page 28 Uses of limestone

- 3 a Concrete contains sand and gravel (1)
 b (Any 2:) Concrete is stronger; cement is smoother to use; due to the added sand and gravel
- 4 C (1)

Page 29 The blast furnace

- 1 Carbon monoxide (1); oxygen (1); reduction (1)
- 2 D (1)

Page 29 Using Iron

- 3 a i C (1)
 ii Steel contains different elements (1); atoms are different sizes (1)
- b A (1)

Page 30 Using steel

- 1 a (Any 3:) Wrought iron contains the same type of atoms; atoms in wrought iron are in regular rows; atoms in steel are of different elements; sizes of atoms are different; rows are not regular in steel
- b (Any 2:) steel is harder; does not rust; steel is stronger; steel has a shinier finish

Page 30 Transition metals

- 2 a Positive ions / cations (1); electrons (1)
 b Electrons are involved in conduction (1); they move (1)
- 3 a Iron (1); cobalt (1)
 b D (1)

C1a answers

Page 31 Aluminium

- 1 a Reactive (1); negative (1); gain (1)
 b i 4 (1)
 ii Oxidation (1); electrons are lost (1)
- 2 D (1)

Page 31 Aluminium recycling

- 3 a (Any 2:) Spoiling of habitats / tree felling / ecosystem damage; burning trees leads to climate change; loss of living area for local people; health problems due to mining e.g. dust; use of old mines as dumps
 b (Any 2:) Thrown away with other waste; difficulty of sorting / collecting; attitude of people to recycling

Page 32 Titanium

- 1 a (Any 3:) Lower density; this means that the bikes will be lighter; corrosion resistant; this means that the frame will not rust / corrode
 b i Aluminium oxide is an ionic compound and titanium oxide is a covalent compound (1); ionic compounds conduct electricity when they are molten, covalent compounds do not (1)
 ii Titanium has a melting point above 900 °C / much higher melting point (1)

Page 32 Copper

- 2 a B (1)
 b C (1)
- 3 C (1)

Page 33 Smart alloys

- 1 a (Similar because:) Contain mainly metal atoms (1); contain mixture of elements (1); can be bent and stretched into different shapes (1)
 (Different because:) Save a shape memory (1)
 b Heating (1); then cooling (1)

Page 33 Fuels for the future

- 2 a C (1)
 b D (1)
- 3 a (Any 2:) Buses burn petrol / fossil fuels; which produces pollutant gases; for example, carbon monoxide / sulphur dioxide / other named pollutant
 b Electricity is produced by burning fossil fuels (1); named effect on the environment e.g. produces climate change / acid rain / produces named pollutant gas (1)

C1a answers

Page 34 Crude oil

1

1	2	3	4
C	B	D	A

(4)

b B (1)

Page 34 Alkanes

2 a A (1)

b B; D

Both correct = (1)

c C (1)

d C (1)

Page 35 Pollution problems

1 a hydrocarbon + **oxygen** → **carbon dioxide** + **water**
 sulfur + **oxygen** → **sulfur dioxide** (4)

b (Any 2:) Smaller fish die due the acid rain; older ones survive with less competition; additional information: older fish are often deformed / fish stocks will die out

2 a C (1)

b C only (2)

Page 35 Reducing sulfur problems

3 B and D (2)

4 a More carbon dioxide formed (1); leading to increased climate change (1)

b Acid rain (1); caused by sulphur in ship fuel (1)

C1b answers

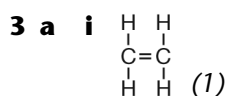
Remember:

Check which grade you are working at.

Page 37 Cracking

1 C (1)

2 D (1)



ii Ethane (1)

Page 37 Alkenes

4 a C_5H_{10} (1)

b C (1)

5 a Ethene speeds up the ripening of fruit (1)

b Petals and leaves fall off flowers (1)

Page 38 Making ethanol

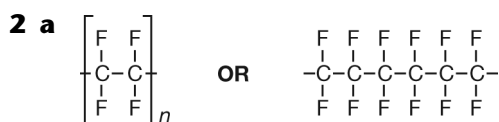
1 a Fermentation (1); using yeast (1)

b Renewable means that the supply will not run out (1); more sugar beet can be grown to produce more fuel (1); it is called a biofuel because it is made from living things (1)

c i $\text{C}_2\text{H}_4 + \text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_5\text{OH}$ Left hand side correct = (1) right hand side correct = (1)

ii Ethanol contains oxygen atoms (as well as carbon and hydrogen) (1)

Page 38 Plastics from alkenes



All single bonds shown with bonds coming out of each end of polymer = (1)

at least three repeating units shown, or 'n' after brackets to imply 'many' = (1)

b Does not have a double bond (1)

3 A (1)

C1b answers

Page 39 Polymers are useful

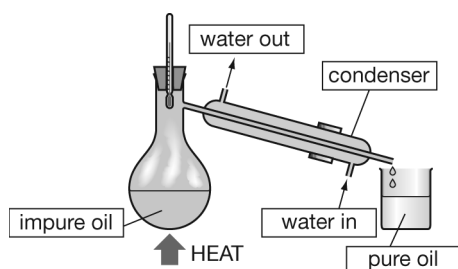
- 1 a B (1)
 b D (1)
 c (Any 2:) A has shorter chains; and so is more runny; molecules can move over each other more easily
 2 C (1)

Page 39 Disposing of polymers

- 3 (Burning:) saves using fossil fuels to produce electricity (1);
 (Recycling:) Saves the use of crude oil as a raw material to produce new polymers (1)
 4 (Any 2:) Polymers are non-toxic / metals might rust; (some) polymers can be made biodegradable; so that the polymer rots away naturally / the metal is permanent

Page 40 Oil from plants

1



Water connections labelled correctly = (1) condenser label = (1) impure and pure oil labelled correctly = (1)

2 D (1)

Page 40 Green energy

- 3 a (Any 1:) Mixed with other oils / fuels; fuels that are mixed in are usually petrol / fuels from crude oil
 b (Any 2:) Saves fossil fuels; idea that fossil fuels are not renewable / will run out; biofuels are renewable; they are 'greenhouse neutral'
 c Petrol is non-renewable / will run out (1); when it becomes scarce it will be more expensive (1)
 d (Any 2:) Produces less greenhouse gases / less CO₂; non-toxic; biodegradable

C1b answers

Page 41 Emulsions

1 a

Type of emulsion	Dispersed phase	Continuous phase
Shaving foam	Air/gas	Liquid
After shave cream	Water/liquid	Oil/liquid

Correct words in correct lines, in the correct order = (2)

b Do not mix together

2 C (1)

Page 41 Polysaturates

3 a Contains all single bonds / contains no double bonds (1)

b Contains lots of / many double bonds (1)

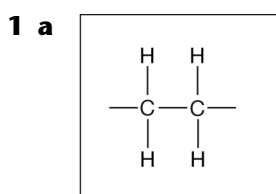
c

Type	Olive oil	Saturated fat	Polyunsaturated oil
Observations	Orange to colourless	No change	Orange to colourless

(2)

4 A (1)

Page 42 Making margarine



Important points: two more hydrogens shown; molecule is now straight not V shaped

b Oil is heated (to 60 °C) (1); nickel catalyst used (1)

2

1	2	3	4
D	C	B	A

(4)

Page 42 Food additives

3 a (Any 3:) E220 is a preservative; E340 is an antioxidant (need both); preservatives help foods to keep for longer/longer shelf life; antioxidants stop loss of quality due to reacting with oxygen in the air

b Links to illness (1); (specific example:) cancer/hyperactivity/allergies/asthma (1)

C1b answers

Page 43 Analysing chemicals

1 a A contains two ingredients (1); the one that is also in D is not harmful (1); the second ingredient is also in the sweet (1)

b Measure the distance travelled by the solvent front (1); measure the distance travelled by the spot (1); use the formula:

$$\text{Retention factor} = \frac{\text{distance moved by spot}}{\text{distance moved by solvent}} \quad (1)$$

c 3 cm (1)

Page 43 The Earth

2

1	2	3	4
B	D	A	C

(4)

3 C (1)

Page 44 Earth's surface

1 a

1	2	3	4
A	C	B	D

(4)

b A (1)

Page 44 Earthquakes and volcanoes

2 a

1	2	3	4
D	C	A	B

(4)

b Continental is less dense because it rises on top of the oceanic (1)

c Rock is being pushed down as one plate moves under the other (1)

C1b answers

Page 45 The air

1 D (1)

2 a 3; 2

b Nitrogen; sodium

c Due to the nitrogen (1); which is a gas (1)

Both correct = (1)

Both correct = (1)

Page 45 Evolution of the air

3 a i The volcano is at over 1000 °C / at a very high temperature (1)

ii The Earth cooled (1); water vapour condensed (1); to form the seas (1)

b i Carbon dioxide (1)

ii Dissolving in sea water (1); photosynthesis (1)

c (Any 2:) Does not contain oxygen; does not contain carbon dioxide; contains large amounts of sulphur dioxide / hydrogen / carbon monoxide

4 Earth has an atmosphere and moon does not (1); greenhouse effect warms earth's surface (1); due to carbon dioxide in the air (1)

Page 46 Atmospheric change

Activity	Decreases amount of carbon dioxide in air	Increases amount of carbon dioxide in air	Does not affect amount of carbon dioxide in air
Using CFCs			✓
Planting more trees	✓		
Burning biofuels			✓
Burning fossil fuels		✓	

(4)

2 a Crude oil (1); limestone (1)

b Short lived plants decay and return carbon dioxide to the air (1); trees live a long time and the carbon dioxide is 'locked up' in the wood for a long time while it rots away slowly (1)

c If the seas warm up, not as much carbon dioxide will dissolve in them (1); therefore, more carbon dioxide would be released into the air (1)

3 C (1)