



# **KS3 Science**

## **Combustion**

### **Mark Scheme**

**Time available: 30 minutes**

**Marks available: 44 marks**

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## Mark schemes

1.

- (a) • a ruler

*accept 'a metre rule'*

*accept 'a tape measure'*

*'cm' is insufficient 'a measuring stick' is insufficient*

1 (L3)

- (b) (i) • 30

*do **not** accept '30 seconds'*

1 (L3)

- (ii) • A to B: any number from 5 to 15

*accept a range such as '5 to 10'*

1 (L4)

- D to E: any number from 45 to 80

*accept a range such as '50 to 60'*

1 (L4)

- (c) any **one** from

- you can measure smaller intervals of time

*accept 'each section burns for a shorter time'*

*accept 'it is more precise **or** accurate'*

*'it is easier to read' is insufficient*

- the lines are closer

*accept 'the lines are close'*

*accept 'the lines are further apart on candle 1'*

*accept 'the lines are 1 cm apart on candle 1*

*and 0.5 cm apart on candle 3'*

*accept 'there are more lines **or** smaller spaces*

***or** smaller segments'*

*accept 'more sections **or** rings'*

*'the lines are smaller' is insufficient*

1 (L4)

[5]

2.

- (a) ethanol **or** alcohol

*if more than one box is ticked, award no mark*

1 (L3)

- (b) any **one** from
- burning hydrogen does not produce carbon monoxide  
*accept 'petrol **or** ethanol  
**or** alcohol produces carbon monoxide'*
  - burning hydrogen does not produce sulphur dioxide  
*accept 'petrol produces sulphur dioxide'*
  - burning hydrogen only produces water
  - burning petrol causes acid rain  
*accept 'hydrogen **or** ethanol  
**or** alcohol does not cause acid rain'*

1 (L4)

- (c) hydrogen
- accept 'H<sub>2</sub>'  
accept 'gas'*

1 (L4)

- (d) oxygen ✓
- if more than one box is ticked, award no mark*

1 (L4)

- (e) any **one** from
- it can be grown  
*accept 'it does not take long to grow'*
  - it can be replanted  
*accept 'it can be replaced'*
  - it is renewable
  - it can be reproduced  
*accept 'it produces seeds'*

1 (L4)

[5]

3.

- (a) (i) water
- accept 'H<sub>2</sub>O'*

1 (L5)

- (ii) carbon dioxide
- accept 'CO<sub>2</sub>'*

1 (L5)

- (b) (i) do not use antifreeze **or** methanol near a naked flame and do not swallow  
*accept 'it catches fire easily and it is poisonous'*  
*accept 'wash hands after use' for do not swallow*  
*accept 'it is flammable **or** inflammable and it is poisonous'*  
**both** answers are required for the mark

1 (L5)

- (ii) any **one** from

- water froze
- the mixture froze
- the contents froze

*accept '10% antifreeze is not enough to stop the water freezing'*  
*'not enough antifreeze used' is insufficient*  
 do **not** accept 'it froze'

1 (L6)

and expanded

1 (L6)

[5]

4.

- (a) tar

1 (L5)

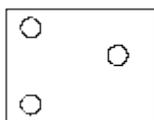
- (b) (i) any **one** from

- to cool the vapour
- to condense the vapour

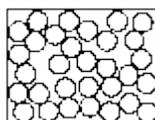
*accept 'energy is transferred from the water vapour to the ice'*

1 (L5)

- (ii)



a random arrangement of particles most of which do not touch



a random arrangement of particles most of which touch each other

2 (L6)

- (c) carbon dioxide

*accept 'CO<sub>2</sub>'*

1 (L5)

[5]

5.

(a) chemical

*accept 'potential' or 'stored'*

1 (L6)

any **two** from

- sound

- thermal

*accept 'heat'*

- kinetic

*accept 'movement'*

- light

2 (L6)

(b) any **two** from

- they gained energy

*accept 'they move more quickly'*

- they hit the lid with greater force

*accept 'they hit the lid harder'*

- they hit the lid more often

*accept 'the pressure inside the tin increased'*

*accept 'the molecules are closer together'*

*accept 'more molecules are present'*

2 (L6)

(c) (i) oxygen

*accept 'O<sub>2</sub>'*

1 (L6)

(ii) any **one** from

- carbon dioxide

*accept 'CO<sub>2</sub>'*

- water vapour

*accept 'H<sub>2</sub>O'*

*accept 'carbon monoxide'*

1 (L6)

(d) any **one** from

- it was quieter
- the lid didn't move as high  
*accept 'the lid was not pushed off'*
- less energy released  
*accept 'it does not work'*

1 (L5)

[8]

6.

(a) (i) any **two** from

- CO<sub>2</sub>  
*do not accept 'carbon dioxide'*
- H<sub>2</sub>O  
*do not accept 'water'*
- CO  
*do not accept 'carbon monoxide'*
- C  
*do not accept 'carbon'*

2 (L7)

(ii) any **two** from

- water droplets form on the inside of the bell-jar  
*accept 'condensation'*
- thermal energy is released  
*accept 'heat or energy is given off'*
- light is released  
*accept 'there is a flame'*
- soot is produced
- smoke is produced  
*accept 'the wick is used up'*  
*do not accept 'carbon dioxide is formed'*  
*or 'carbon monoxide is given off'*

2 (L7)

- (b) (i) answers may be in either order
- oxygen increases 1 (L7)
  - carbon dioxide decreases 1 (L7)
- (ii) photosynthesis stops 1 (L7)
- respiration continues to take place  
do **not** accept 'respiration takes place' 1 (L7)
- (c) (i) chloroplast 1 (L7)
- (ii) nucleus 1 (L7)

[10]

7.

- (a) any **one** from
- used up in burning  
accept 'oxygen burned'  
do **not** accept 'used up'
  - it reacted with fuel **or** petrol
  - formed carbon dioxide **or** carbon monoxide  
accept 'it has been turned into carbon dioxide' 1 (L6)
- (b) (i) water 1 (L6)
- accept 'steam' **or** 'hydrogen oxide'  
do **not** accept 'hydroxide'
- (ii) it is poisonous **or** toxic 1 (L6)
- accept a reference to its being carried  
by the blood in preference to oxygen  
accept 'it can form an explosive mixture with air'  
do **not** accept 'it damages the lungs' **or** 'it is harmful'

[3]

8.

(a) any **one** from

- more air **or** oxygen

*accept 'gas reaching the flame*

*already has air **or** oxygen mixed in it'*

- better mixing gives more combustion **or** more efficient burning

*accept 'better **or** faster combustion'*

*accept the converse i.e. arguments applied  
to a Bunsen with a closed air-hole*

1 (L6)

(b) oxygen

*do **not** accept 'air'*

1 (L6)

carbon dioxide + water

***both** products are required for the mark*

*products may be in either order*

*accept 'carbon monoxide + water'*

*disregard any reference to heat **or** energy*

*accept correct formulae for words*

*the equation need not be balanced*

1 (L6)

[3]