

Fire, fuels and burning safely

Grade 8 science (Year 9 · Class 8) · Test answers (mark scheme)

The model answers show where each mark is earned. Check your working as well as your final answer, because methods are marked separately from the result.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS1-2

Question 1 Fire triangle (2 marks)

Fuel, oxygen and heat. If any one is removed the fire goes out.

Marking: 1 mark for the three names, 1 mark for the effect.

Question 2 Limewater apparatus (3 marks)

(a) It turns milky. (b) Carbon dioxide; the solid is calcium carbonate. (c) calcium hydroxide + carbon dioxide → calcium carbonate + water.

Marking: 1 mark each.

Question 3 Balance ethane burning (3 marks)

(a) $2 \text{C}_2\text{H}_6 + 7 \text{O}_2 \rightarrow 4 \text{CO}_2 + 6 \text{H}_2\text{O}$. (b) Left: C 4, H 12, O 14. Right: C 4, H 12, O 8 + 6 = 14.

Marking: 1 mark for CO_2 and H_2O coefficients, 1 mark for O_2 coefficient, 1 mark for the check.

Question 4 Carbon monoxide (3 marks)

It forms when fuel burns with too little oxygen. It has no colour or smell, and it stops the blood carrying oxygen. The risk is reduced by good ventilation, servicing appliances and installing a CO alarm.

Marking: 1 mark for how it forms, 1 for why dangerous, 1 for a precaution.

Question 5 Mass of carbon dioxide (3 marks)

(a) $6.0 + 16.0 = 22.0 \text{ g}$. (b) $9.0 \div 6.0 = 1.5$; $1.5 \times 22.0 = \mathbf{33.0 \text{ g}}$. (c) $1.5 \times 16.0 = \mathbf{24.0 \text{ g}}$.

Marking: 1 mark for each part.

Question 6 Complete or incomplete (2 marks)

Complete combustion makes CO_2 and has a blue flame; incomplete combustion makes CO and soot and has a yellow flame. Incomplete also releases less energy.

Marking: 1 mark for each correct difference.

Question 7 Candle under a jar (2 marks)

The oxygen in the jar is used up. The fuel (wax) and heat are still present, but without oxygen the triangle is incomplete, so the flame goes out.

Marking: 1 mark for oxygen used up, 1 mark for fuel and heat remaining.

Question 8 Fire at the office (2 marks)

Use carbon dioxide. Water conducts electricity and could cause electric shock, while CO_2 does not conduct and it displaces oxygen from the fire.

Marking: 1 mark for choosing CO_2 , 1 mark for the reason.