**Physical and chemical change (answers)**

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| Instructions to students  • You have 50 minutes to complete the test.  • Please answer all questions in the spaces provided.  • There is to be no talking during the test. | Marks  Section I: Multiple-choice questions: 5 marks  Section II: Short-answer questions: 14 marks  Section III: Extended-response questions: 6 marks  Total: 25 marks |

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| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Score: /25  Grade: % |
| Comments: | |

Section I: Multiple-choice questions

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| For each question, circle or highlight the correct answer.  1 Rust is formed by a chemical reaction between iron, water and oxygen. What is the product of this reaction? | |  |
| A | Rust |
| B | Water |
| C | Iron |
| D | Oxygen |
| 2 Which one of the following would NOT speed up a chemical reaction? | | |
| A | Increased temperature | |
| B | Increased concentration | |
| C | Increased size of particles | |
| D | Adding a catalyst | |
| 3 The burning of methane can be written by the chemical equation: CH4 + 2O2 🡪 CO2 + 2H2O The reactants of this reaction are: | | |
| A | 2O2 and 2H2O | |
| B | CH4 and CO2 | |
| C | CH4 and 2O2 | |
| D | CO2 and 2H2O | |

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| 4 Melting chocolate is an example of: | |
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| A | a new product being formed. |
| B | a chemical change. |
| C | sublimation. |
| D | a physical change. |
| 5 The change of state from a solid directly to a gas without first turning into a liquid is known as: | |
| A | solidification. |
| B | condensation |
| C | vaporisation. |
| D | sublimation. |

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|  | Section I  Total marks:  /5 marks |

Section II: Short-answer questions

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| 6 Classify each of the following as a physical or chemical change.  1 mark for each correct:   |  |  | | --- | --- | | Change | Chemical or physical? | | A nail rusting | Chemical | | Ice cream melting | Physical | | An apple rotting | Chemical | | A piece of wood burning | Chemical | | A glass breaking | Physical | | | |
|  | | /5 marks |
| 7 How can a chemical reaction take place during cooking? Use an example to illustrate your answer. | | |
| Chemical reactions occur when cooking because a new product is formed that we can eat (1 mark).  Student answers will vary but should identify a technique of cooking (1 mark) and describe how a chemical change is involved (1 mark). | | |
|  | /3 marks | |
| 8 What is the difference between a physical and a chemical change? | | |
| A physical change occurs when the substances look different, but still consist of the same particles (1 mark). A chemical change occurs when new substances are formed, and the particles are different from what they were before the change (1 mark). | | |
|  | /2 marks | |
| 9 In chemistry, equations are often written using symbols. Carbon (C) and oxygen (O2) can join to make carbon dioxide. How would you express this as a chemical equation, using symbols? | | |
| C + O2 🡪 CO2 | | |
|  | /1 mark | |
| 10 Sarah heated some orange-coloured crystals in a test tube. The crystals turned green and fizzed. After the fizzing stopped, the test tube was allowed to cool. A green powder was left in the tube. Determine whether a chemical or a physical reaction has occurred. Identify two observations that support your decision. | | |
| This is a chemical change (1 mark).  Any two appropriate observations (award 1 mark each), for example:  • A permanent colour change from orange to green.  • The production of a gas (fizzing). | | |
|  | /3 marks | |
|  | Section II  Total marks:  /14 marks | |

Section III: Extended-response questions

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| 11 Explain how the size of particles in a substance affects the rate of a chemical reaction. | |
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| The smaller the particles within a substance, the faster the rate of reaction (1 mark). This is because smaller particles have a larger total surface area than larger particles (1 mark) and therefore collide with other reactants more frequently (1 mark). | |
|  | /3 marks |

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| 12 The first natural dye was purple and was used to dye Roman emperors’ clothes. Give an example of what natural dyes were made from. Identify two advantages of synthetic dyes over natural dyes. | |
| Natural dyes were made from animals such as sea snails / scale insects (1 mark).  1 mark for each appropriate advantage of synthetic dyes. For example: The colours are longer lasting (1 mark) and the process does not harm living things (1 mark). | |
|  | /3 marks |
|  | Section III  Total marks:  /6 marks |