2 NaI + F₂ → 2 NaF + I₂

3 AgNO₃ + Na₂PO₄ → Ag₃PO₄ + 3 NaNO₃

Ba(OH)₂ + H₂SO₄ → BaSO₄ + 2 H₂O

P₂ + 6 Cl₂ → 4 PCl₃

2 CH₃OH + 3 O₂ → 2 CO₂ + 4 H₂O

3 Sr(OH)₂ + 2 H₃PO₄ → Sr₃(PO₄)₂ + 6 H₂O

Fe₂ → Fe + I₂

CuCl₂ + Fe → FeCl₂ + Cu

Cr₂(SO₄)₃ + 3 K₂CO₃ → Cr₂(CO₃)₃ + 3 K₂SO₄

C₂H₅OH + 3 O₂ → 2 CO₂ + 3 H₂O

GaF₃ + 3 Cs → 3 CsF + Ga

Ca(OH)₂ + 2 HNO₃ → Ca(NO₃)₂ + 2 H₂O

BaCl₂ + 2 AgNO₃ → Ba(NO₃)₂ + 2 AgCl

CoBr₂ → Co + Br₂

copper(II) iodide + bromine → copper(II) bromide + iodine

CuI₂ + Br₂ → CuBr₂ + I₂

phosphoric acid + magnesium hydroxide → magnesium phosphate + water

2 H₃PO₄ + 3 Mg(OH)₂ → Mg₃(PO₄)₂ + 6 H₂O

zinc + iodine → zinc iodide

Zn + I₂ → ZnI₂

beryllium chloride → beryllium + chlorine

BeCl₂ → Be + Cl₂

iron(III) sulphate + calcium hydroxide → iron(III) hydroxide + calcium sulphate

Fe₂(SO₄)₃ + 3 Ca(OH)₂ → 2 Fe(OH)₃ + 3 CaSO₄

Types of chemical reactions
Page 111

Factors Affecting the Rate of Chemical Reactions
Cloze Activity
Rate of chemical reactions
Page 115
1. rate of reaction
2. heat; energy
3. temperature
4. concentration; collisions
5. dilute
6. surface area
7. catalyst
8. catalytic converter

Different rates of reaction
Page 116
1. (a) increases rate of reaction
   (b) decreases rate of reaction
   (c) increases rate of reaction
   (d) decreases rate of reaction
   (e) decreases rate of reaction
(f) decreases rate of reaction
(g) increases rate of reaction
(h) decreases rate of reaction
(i) increases rate of reaction
(j) increases rate of reaction

2.

<table>
<thead>
<tr>
<th>Situation X</th>
<th>Situation Y</th>
<th>Situation with a higher reaction rate (X or Y)</th>
<th>Factor affecting the rate of reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1 g of sugar (cubes)</td>
<td>1 gram of sugar (grains)</td>
<td>Y</td>
<td>surface area</td>
</tr>
<tr>
<td>(b) 50°C</td>
<td>O°C</td>
<td>X</td>
<td>temperature</td>
</tr>
<tr>
<td>(c) low number of particles = few collisions</td>
<td>high number of particles = more collisions</td>
<td>Y</td>
<td>concentration</td>
</tr>
<tr>
<td>(d) enzyme added</td>
<td>no enzyme added</td>
<td>X</td>
<td>catalyst</td>
</tr>
<tr>
<td>(e) twigs</td>
<td>logs</td>
<td>X</td>
<td>surface area</td>
</tr>
</tbody>
</table>

Applying Knowledge

Four factors affecting the rate of reactions
Page 118
1. (a) line Y
   (b) line X
   (c) line Y
   (d) line X
   (e) line Y
   (f) line X
   (g) line Y
   (h) line X
2. (a) surface area
   (b) catalyst
   (c) temperature
   (d) concentration

Assessment

Factors affecting the rate of chemical reactions
Page 119

Chapter 7 The atomic theory explains radioactivity.
Section 7.1 Atomic Theory Isotopes, and Radioactive Decay

Applying Knowledge

Isotopes
Page 123
1. different atoms of a particular element that have the same number of protons but different numbers of neutrons
2. mass number
3. mass number
4. number of neutrons
5. “13” represents the mass number; “5” represents the atomic number
6. boron-13 or B-13
7. (a) 5
   (b) 5
   (c) 8
8. (a) neon with 11 neutrons
   (b) sulphur with 16 neutrons
   (c) actinium with 141 neutrons
   (d) thorium with 144 neutrons
9.

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Standard atomic notation</th>
<th>Atomic number</th>
<th>Mass number</th>
<th>Number of protons</th>
<th>Number of neutrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbon-14</td>
<td>¹⁴C</td>
<td>6</td>
<td>14</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>cobalt-52</td>
<td>⁵⁷Co</td>
<td>27</td>
<td>52</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>nickel-60</td>
<td>⁶⁰Ni</td>
<td>28</td>
<td>60</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>nitrogen-¹⁴</td>
<td>¹⁴N</td>
<td>7</td>
<td>14</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>thallium-²⁰¹</td>
<td>²⁰¹Tl</td>
<td>81</td>
<td>201</td>
<td>81</td>
<td>120</td>
</tr>
<tr>
<td>radium-²²⁶</td>
<td>²²⁶Ra</td>
<td>88</td>
<td>226</td>
<td>88</td>
<td>138</td>
</tr>
<tr>
<td>lead-²⁰⁸</td>
<td>²⁰⁸Pb</td>
<td>82</td>
<td>208</td>
<td>82</td>
<td>126</td>
</tr>
</tbody>
</table>

Comprehension

Alpha, beta, and gamma radiation
Page 125
1. diagram labelling: alpha particle (on the first line); beta particle (on the second line); gamma ray (on the third line)
2. (a) gamma ray
   (b) beta particle
   (c) alpha particle
   (d) gamma ray