Rewarding Learning

General Certificate of Secondary Education
2010–2011

# Science: Double Award (Modular)

## Using Materials and Understanding Reactions
## End of Module Test

Higher Tier

**[GDB02]**

**THURSDAY 24 FEBRUARY 2011, MORNING**

# MARK SCHEME

| | | | AVAILABLE MARKS |
|---|---|---|---|
| **1** | **(a)** 4 | [1] | |
| | **(b)** 8 | [1] | |
| | **(c)** 15 | [1] | 3 |
| **2** | **(a)** $^{18}O$ has 10 neutrons [1] $^{16}O$ has 8 neutrons [1]<br>allow [1] for idea of different number of neutrons<br>[1] for fact that one has 2 extra neutrons unless wrongly qualified | [2] | |
| | **(b)** just as reactive as | [1] | 3 |
| **3** | **(a)** **(i)** $CuSO_4$ [1] $H_2O$ [1] | [2] | |
| | **(ii)** green [1] ⟶ blue [1] | [2] | |
| | **(b)** $CO_2$/carbon dioxide | [1] | 5 |

**4** **(a)**

| Water sample | Observation with soap | Observation with detergent |
|---|---|---|
| **A** temporary hard | | Lather |
| **B** soft | Lather | |
| **C** permanent hard | No lather | Lather |

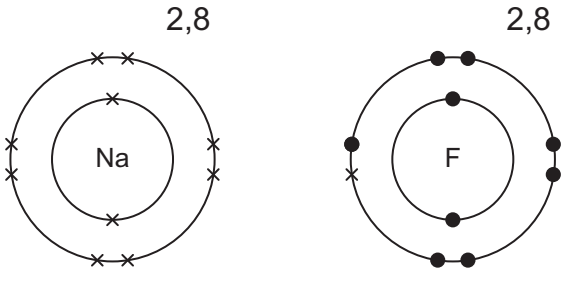
4 correct = [2] 2 or 3 correct = [1] 1 correct = [0] [2]

**(b)** water which has hardness which can be removed by boiling [1]

**(c)** good for teeth or bones/reduces risk of heart disease/tanning leather/brewing beer/idea of better taste [1]

scale in pipes or boilers/scum with soap/wastes soap/cost/allow idea of blocked pipes [1] 5

**5** **(a)** correct ion structure [2]

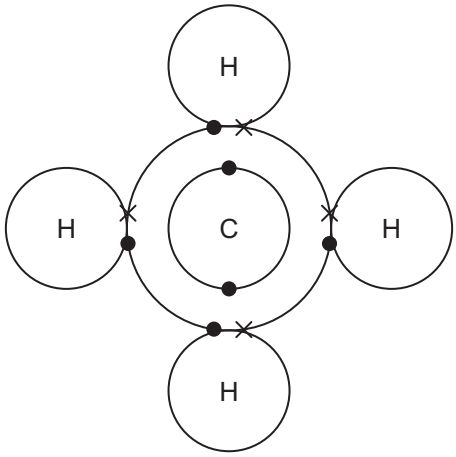



Charge +1 Charge −1 [1]

**(b)** electrostatic [1] 4

| | | | | AVAILABLE MARKS |
|---|---|---|---|---|
| **6** | **(a)** | electrode connected to the negative terminal/negative electrode | [1] | |
| | **(b)** | carbon/graphite | [1] | |
| | **(c)** | oxygen | [1] | 3 |

**7** **(a)**




correct sharing [1]
correct total number of electrons [1] [2]
second mark depends on first

**(b)** covalent [1]

**(c)** sulphur dioxide [1] 4

**8** $\frac{P_1\ V_1}{T_1} = \frac{P_2\ V_2}{T_2}$ [1]

$\frac{9240 \times 50}{280} = \frac{16000 \times V_2}{320}$

up to [2] method marks
[1] for formula substitution
[1] for computation

$V_2 = \frac{9240 \times 50 \times 320}{280 \times 16000}$ [1]

$= 33\,cm^3$
correct answer [3]
correct units [1] [4] 4

**9** **(a)** hydrated [1] iron(III) oxide [1] [2]

**(b)** **(i)** idea of coated with zinc [1]

**(ii)** zinc corrodes first [1]
is more reactive than iron [1] [2] 5
**not** zinc rusting **not** zinc reacts quicker

| | | | | AVAILABLE MARKS |
|---|---|---|---|---|
| **10** | **(a)** | D | [1] | |
| | **(b)** | C | [1] | |
| | **(c)** | B | [1] | |
| | **(d)** | diamond/quartz [1] high melting point<br>no (electrical) conductivity [1]<br>second mark dependent on first | [2] | 5 |
| **11** | **(a)** | all points correctly plotted [2]<br>5/6 correct points [1]<br>curve joining points not drawn with ruler [1] | [3] | |
| | **(b)** | $\pm 5$<br>202 g/100 g water | [1] | |
| | **(c)** | $45 \pm 3$<br>e.g. $205 - 45 = 160$ g all correct [2], 1 error [1]<br>allow [1] for a correct method mark<br>check graph | [2] | 6 |
| **12** | **(a)** | sulphuric acid | [1] | |
| | **(b)** | $2H^+ + 2e^- \longrightarrow H_2$<br>[1] [1] | [2] | 3 |
| | | | **Total** | **50** |