

# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

## MARK SCHEME for the November 2005 question paper

### 0652 PHYSICAL SCIENCE

0652/02

Paper 2

maximum raw mark 80

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the November 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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|     |  |  |                                       |                |   |
|-----|--|--|---------------------------------------|----------------|---|
| 1   | (a)  | (i)  | Convection                            | 1              |   |
|     |  | (ii)   | Air expands<br>becomes less dense     | 1<br>1         | 3 |
|     | (b)  | Condensation   | 1                                     | 1              |   |
|     | (c)  | (i)  | Acceleration<br>constant              | 1<br>1         |   |
|     |  | (ii)   | Constant speed/velocity               | 1              | 3 |
|     |  |  |                                       | <b>Total 7</b> |   |
| 2   | (a)  | diffusion  | 1                                     | 1              |   |
|     | (b)  | molecules of the (coloured) gas collide<br>With molecules of air/nitrogen,/oxygen<br>(an answer based on densities can score 1 mark) |                                       | 1<br>1         | 2 |
|     |  |  |                                       |                |   |
| 3   | (a)  | <i>mild steel:</i>   | car bodies, machinery etc.            | 1              |   |
|     |  | <i>Stainless:</i>  | cutlery, chemical plant etc.          | 1              | 2 |
|     | (b)  | mild steel rusts (in damp air)<br>stainless does not rust  |                                       | 1<br>1         | 2 |
|     |  |  |                                       | <b>Total 4</b> |   |
| 4   | (a)  | chemical (potential)   |                                       | 1              |   |
|     |  | thermal  |                                       | 1              |   |
|     |  | electrical (potential)   |                                       | 1              | 3 |
|     | (b)  | (i)  | geothermal                            | 1              |   |
|     |  | (ii)   | non polluting/renewable etc.          | 1              | 2 |
| (c) | Mention of gravitational or strain potential energy<br>good without spurious energies such as kinetic energy |  | 1<br>+1                               | 2              |   |
|     |  |  |                                       | <b>Total 7</b> |   |
| 5   | (a)  | (i)  | chromatography                        | 1              |   |
|     |  | (ii)   | to make colourless components visible | 1              | 2 |

| Page 2 | Mark Scheme           | Syllabus | Paper |
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|   |     |  |   |                |
|---|-----|--|---|----------------|
|   | (b) | fractional distillation (both words)                   | 1 |                |
|   |     | Bitumen is the fraction with the highest boiling point |   |                |
|   |     | OR   |   |                |
|   |     | residue left after all others have boiled off          | 1 | 2              |
|   |     |  |   | <b>Total 4</b> |
| 6 | (a) | Ultra violet   | 1 | 1              |
|   | (b) | Remains the same                                       | 1 | 1              |
|   | (c) | X-ray  | 1 | 1              |
|   | (d) | 20 000 – 30 000 (Hz)                                   | 1 | 1              |
|   |     |  |   | <b>Total 4</b> |
| 7 | (a) | (i) ethane   |   | 1              |
|   |     | (ii) correct structure shown                           |   | 1 2            |
|   | (b) | (i) ethanol  |   | 1              |
|   |     | (ii) correct structure shown                           |   | 1 2            |
|   | (c) | (i) poly(e)thene                                       |   | 1              |
|   |     | (ii) correct structure shown                           |   | 1 2            |
|   |     |  |   | <b>Total 6</b> |

| Page 3 | Mark Scheme           | Syllabus | Paper |
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|   |     |  |   |          |
|---|-----|--|---|----------|
| 8 | (a) | <b>Either</b> iron filings method <b>OR</b> plotting compass   |   |          |
|   |     | place magnet <u>under</u> paper<br>sprinkle iron filings<br>finely<br>tap paper<br>other good detail                             | place magnet <u>on</u> paper<br>place compass near one pole<br>mark tip and move tail to mark<br>repeat and join<br>repeat for more lines |          |
|   |     | Any four points 1+1+1+1  |   | <b>4</b> |
|   | (b) | Good shape and minimum of three good lines from each end   | 1   |          |
|   |     | Minimum of five good lines from each end <u>none</u> touching  | 1   |          |
|   |     | Correct field direction  | 1   | <b>3</b> |
|   |     |  | <b>Total 7</b>  |          |
| 9 | (a) | 17   | 1   |          |
|   |     | 18   | 1   |          |
|   |     | 2,8,7 & 2,8,7 ( <u>both</u> correct)   | 1   | <b>3</b> |
|   | (b) | one shared pair of electrons   | 1   |          |
|   |     | Correct outer shells of electrons  | 1   | <b>2</b> |
|   | (c) | (i) transfer of one electron from Na to Cl<br>to form Na <sup>+</sup> and Cl <sup>-</sup><br>( <i>accept labelled diagrams</i> ) | 1<br>1  |          |
|   |     | (ii) opposite charged ions attract   | 1   | <b>3</b> |
|   | (d) | liquid contains ions that are free to move   | 1   |          |
|   |     | solids contains ions that are held in a lattice  | 1   | <b>2</b> |
|   | (e) | <i>TEST:</i> add (dilute nitric acid then) aqueous silver nitrate  | 1   |          |
|   |     | <i>RESULT:</i> white precipitate (both words)  | 1   | <b>2</b> |
|   |     |  | <b>Total 12</b>   |          |

| Page 4 | Mark Scheme           | Syllabus | Paper |
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|     |                  |   |  |                |   |
|-----|------------------|---|--|----------------|---|
| 10  | (a)              | (i)   | Atom has 8 electrons in outer shell<br>(accept full outer shell)                         | 1              |   |
|     |                  | (ii)  | Any two of:<br>He nucleus<br>2 protons and 2 neutrons<br>fast moving/coming from nucleus | 1 +1           | 3 |
|     | (b)              |   | Top line correct (216 and 4)   | 1              |   |
|     |                  |   | Bottom line correct (84 and 2)   | 1              | 2 |
|     | (c)              |   | Evidence of halving in equal time periods  | 1              |   |
|     |                  |   | Clearly 3 events   | 1              |   |
|     |                  |   | 1 (minute)   | 1              | 3 |
|     |                  |   |  | <b>Total 8</b> |   |
| 11  | CARBON MONOXIDE: |   |  |                |   |
|     |                  | incomplete combustion (of fuels)<br>that contain carbon (compounds) | 1<br>1   |                |   |
|     | NITROGEN OXIDES: |   |  |                |   |
|     |                  | Combustion processes in car engines<br>emitted through exhausts     | 1<br>1   |                | 4 |
|     |                  |   |  | <b>Total 4</b> |   |
| 12  | (a)              | (i)   | heat or roast (in a kiln)  | 1              |   |
|     |                  | (ii)  | CaO  | 1              |   |
|     |                  |   | CO <sub>2</sub><br>(either order)  | 1              |   |
|     |                  | (iii)   | endothermic or energy is required  | 1              |   |
|     | (iv)             | TEST: bubble gas through lime water<br>RESULT: goes cloudy or milky | 1<br>1   | 6              |   |
| (b) | neutralisation   | 1   | 1  |                |   |
|     |                  |   |  | <b>Total 7</b> |   |
| 13  | (a)              |   | Mention of water/ damp   | 1              |   |
|     |                  |   | Water is a conductor   | 1              |   |
|     |                  |   | Clear that a large current could pass through consumer                                   | 1              | 3 |
|     | (b)              | (i)   | R = V/I or 240/0.25<br>= 960<br>ohm  | 1<br>1<br>1    |   |
|     |                  | (ii)  | 0.5  | 1              | 4 |
|     |                  |   |  | <b>Total 7</b> |   |