

## **MARK SCHEME for the May/June 2013 series**

### **0608 TWENTY FIRST CENTURY SCIENCE**

**0608/05**

Paper 5 (Analysis and Interpretation), maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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| Question           | Expected Answers   | Mks | Additional Guidance   |
|--------------------|--|-----|---|
| 1 (a)              | any two from:<br>show features of living things / what they looked like ;<br>reference to changes over time ;<br>fossils can be dated ;  | [2] |   |
| (b) (i)            | two or more species are directly descended from a common ancestor ;  | [1] | allow 'monkeys and apes both evolved from <i>Saadanisus</i> '   |
| (ii)               | have features of apes and monkeys ;  | [1] |   |
| (iii)              | any two from:<br>more fossils ;<br>fossils of different ages ;<br>fossils from different areas ;<br>different bones (other than skull) ;   | [2] | allow reference to DNA evidence   |
| (c) (i)            | 28 million years ago ;   | [1] |   |
| (ii)               | would suggest monkey and apes diverged even earlier / more than 28 million years ago ;<br>(the new skull) provides scientists with new data / makes original prediction less reliable / AW ; | [2] |   |
| (d) (i)            | Australopithecus ;   | [1] |   |
| (ii)               | any two from:<br>environmental change / specific example of environmental change ;<br>(new) predator ;<br>(new) competitors ;<br>(new) disease ;   | [2] | do not allow reference to human activities  |
| (e)                | mutation / variation ;<br><br>some better adapted (to environmental change) ;<br>pass on alleles/trait to offspring ;  | [3] | allow description of variation between individuals<br><br>allow natural selection (1) if no other marks awarded |
| <b>[Total: 15]</b> |  |     |   |

|               |                              |                 |              |
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|                    |  |     |   |
|--------------------|--|-----|---|
| <b>2 (a)</b>       | <i>two concentric circles within given circle:</i><br>inner zone labelled 'core' ;<br>mantle and crust correctly labelled ;  | [2] |   |
| <b>(b) (i)</b>     | <i>any two from:</i><br>no evidence (of movement) ;<br>no known mechanism for movement ;<br>idea proposed by an outsider ;<br>old theories worked well ;<br>reluctance to abandon accepted ideas ; | [2] |   |
| <b>(ii)</b>        | <i>any two from:</i><br>magma erupts in mid-ocean ;<br>seafloor becomes larger ;<br>pushes on continents ;<br>continents 'float' on the mantle ;<br>movements in mantle move continents ;          | [2] |   |
| <b>(c) (i)</b>     | ground shaking / earth movements lead to<br>buildings cracking / collapsing / AW ;   | [1] |   |
| <b>(ii)</b>        | build lower buildings / build buildings out of<br>stronger materials ;   | [1] | allow details of rubber<br>bearings / oscillating<br>counterweights |
| <b>(d)</b>         | <i>suggestion:</i><br>set up emergency procedures / train public in<br>safe behaviour ;<br><i>explanation:</i><br>to provide relief more rapidly / to reduce<br>casualties ;                       | [2] |   |
| <b>(e) (i)</b>     | idea of continual / regular measuring ;<br>sudden radon increase indicates rock<br>movement / earthquake imminent ;  | [2] |   |
| <b>(ii)</b>        | day 7 is the highest reading / is a big<br>increase ;<br>other readings vary considerably / don't really<br>show a trend ;<br>27 is no further from mean than 18 / 26 & 27<br>are similar ;        | [3] |   |
| <b>[Total: 15]</b> |  |     |   |

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|                    |         |   |     |  |
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| 3                  | (a) (i) | 43 ;  | [1] |  |
|                    | (ii)    | 7 ;   | [1] |  |
|                    | (b)     | as the distance increases ;<br>the acidity decreases / the alkali used decreases ;  | [2] | allow reverse argument<br>allow negative correlation (1) if no other marks awarded     |
|                    | (c)     | use indicator / pH meter ;<br>colour change / shows pH 7 ;  | [2] | allow green  |
|                    | (d) (i) | measuring cylinder with finer divisions/<br>burette ;   | [1] | allow pipette  |
|                    | (ii)    | can judge to 0.1 cm <sup>3</sup> / smaller bore gives<br>more distance for each unit of volume ;  | [1] |  |
|                    | (e)     | can identify/eliminate outliers ;<br>can calculate an average/mean/best estimate<br>of true value ;   | [2] |  |
| <b>[Total: 10]</b> |         |   |     |  |
| 4                  | (a)     | <i>any three from:</i><br>record number of counts per minute ;<br>repeat for that rock and take average ;<br>repeat for each different rock ;<br>measure background radiation (with no rock<br>present) ;<br>subtract background radiation from the<br>readings (for each rock) ; | [3] |  |
|                    | (b)     | <i>any two from:</i><br>rocks not all same size ;<br>distance from centre of block varies ;<br>some radiation will miss detector ;<br>block itself will absorb radiation ;  | [2] | allow shape  |
|                    | (c)     | E less radioactive than A ;<br>not possible to compare others ;   | [2] | allow idea that B gives out a lot<br>of radiation despite being a<br>very small sample |
|                    | (d) (i) | way of changing temperature of rock (e.g.<br>oven, water bath, freezer) / thermometer ;   | [1] | allow either   |
|                    | (ii)    | <i>any two from:</i><br>record temperature and corresponding count<br>rate ;<br>repeat count readings for that temperature (to<br>get average) ;<br>repeat at different temperatures ;  | [2] |  |
| <b>[Total: 10]</b> |         |   |     |  |

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|                    |   |     |  |
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| <b>5 (a)</b>       | <p><i>any two from:</i><br/>           (same) plastic dish ;<br/>           (same) woodlouse ;</p> <p>(same) temperature ;<br/>           (same) light ;<br/>           (same) amount/thickness / type of cotton wool ;</p> | [2] | <p>ignore reference to time</p> <p>ignore number of woodlice</p> <p>do not allow cotton wool unqualified</p>                                 |
| <b>(b)</b>         | 5.5 ;;  | [2] | <p>if incorrect:<br/>           allow <math>\frac{6+5}{2}</math> (1)<br/>           allow 4 (best estimate without removing outlier) (1)</p> |
| <b>(c)</b>         | suitable scale using more than half vertical space ;  | [1] | likely to be 1 cm (on axis) per cm travelled (by woodlouse)  |
| <b>(d)</b>         | points plotted correctly $\pm$ half square ;;;  | [3] | <p>all correct = 3<br/>           4 correct = 2<br/>           3 correct = 1</p> <p>allow ecf from part (b)</p>                              |
| <b>(e)</b>         | ruled straight line ;   | [1] |  |
| <b>(f)</b>         | correct extrapolation <u>shown on their graph</u> ;   | [1] | allow ecf if line not ruled in (e)   |
| <b>[Total: 10]</b> |   |     |  |