

MARK SCHEME for the October/November 2013 series

0608 TWENTY FIRST CENTURY SCIENCE

0608/03

Paper 3 (Core Written), 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 October/November 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)	reactor (1); turbine (1)	[2]	in correct order
(b) (i)	60 (MJ)	[1]	
(ii)	$(60 \text{ MJ}/200 \text{ MJ}) \times 100\%$ (1) = 30% (1)	[2]	ecf from (i) bald 30% gets both marks
(c)	source: wind/wave/biomass/ hydroelectric/solar advantage: won't run out/no fuel cost/no radioactive waste produced	[2]	allow reasonable alternative
2 (a)	mantle	[1]	
(b) (i)	plates move against each other	[1]	any idea of rubbing, friction, or pushing. Must have the idea of interaction of two plates.
(ii)	build stronger buildings/test buildings regularly for earthquake resistance/train public how to behave in earthquakes/develop and practice emergency plans	[1]	any reasonable suggestion
(c) (i)	20 cm × 100 (1) = 2000 cm (1)	[2]	Allow conversion to 20 m if unit changed bald correct answer gets (2)
(ii)	Push from Asian mainland slowed it down (1) two plates moving together pushed up mountains (1)	[2]	
3 (a)	radio (waves) (1) ultraviolet (1)	[2]	
(b)	heat (1) ionising (1)	[2]	
(c)	for: ease of access by & to parents or friends/do not want child to be different from peers (1) against: possible risk to health (1)	[2]	allow reasonable alternatives

Question	Expected Answers	Mks	Additional Guidance
4 (a) (i)		[3]	8 lines correct = 3 marks 6/7 lines correct = 2 marks 4/5 lines correct = 1 mark if a box has more than one line that box does not count
(ii)	sulfur dioxide/nitrogen dioxide	[1]	
(b)	carbon monoxide (1) carbon (1)	[2]	
5 (a) (i)	14 to 18	[1]	allow 18 to 14
(ii)	$(15 + 17 + 17 + 14 + 15 + 18)/6$ (1) = 16 (1)	[2]	allow 96/6 bald answer of 16 gets (2)
(b) (i)	point within $\frac{1}{2}$ small square of value from (a) (ii)	[1]	
(ii)	increases increases	[1]	allow decreases ... decreases allow alternative wording
(c)	any pair of answers from: increase/add cross-linking (1) increase mp/hardness/strength (1) increase chain length (1) increase mp/hardness/strength (1) increase crystallinity (1) increase mp/hardness/strength (1)	[2]	ora allow other correct description of changes, e.g. decreased flexibility
6 (a)	improve taste (1) emulsifier/stabiliser (1) prolong shelf life/prevent decay (1)	[3]	
(b)	reduction in sugar decreases likelihood of obesity/diabetes/tooth decay (1) aspartame/additives may be harmful/does not taste as good (1)	[2]	ignore cost answers allow heart attack/stroke allow aspartame may cause cancer

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(c)	<i>any two from:</i> some countries – have better transport (1) have refrigeration (1) can package food for longer shelf life (1) are cooler (1) have population concentrated in areas far from where food is grown (1)	[2]	allow ora in each case allow reasonable alternatives
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Question	Expected Answers	Mks	Additional Guidance
7 (a)	3500	[1]	± 100
(b)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>reason</p> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">The Earth was not thought to be old enough</div> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">Darwin couldn't explain how variation occurred</div> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">Darwin couldn't explain how characteristics were passed on</div> <div style="border: 1px solid black; padding: 2px; width: 150px;">There was not much evidence that species changed over time</div> </div> <div style="text-align: center;"> <p>new data</p> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">More fossils were discovered</div> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">Mendel published his ideas about inheritance</div> <div style="border: 1px solid black; padding: 2px; width: 150px; margin-bottom: 5px;">The structure of DNA was discovered</div> <div style="border: 1px solid black; padding: 2px; width: 150px;">The solar system was found to be about 5 thousand million years old</div> </div> </div>	[2]	all correct = 2 marks 3 or 2 correct = 1 mark
(c)	number between 85 and 100 (1) chimpanzee more closely related to human (1)	[2]	
8 (a)	DNA (1) nucleus (1) proteins (1)	[3]	accept any specific protein/enzyme
(b)	one has come from each parent (1)	[1]	

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(c) (i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2"></td> <td colspan="2" style="text-align: center;">Sophie</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;">F</td> <td style="text-align: center;">F</td> </tr> <tr> <td rowspan="2" style="text-align: center;">Barney</td> <td style="text-align: center;">F</td> <td style="text-align: center;">FF</td> <td style="text-align: center;">FF</td> </tr> <tr> <td style="text-align: center;">f</td> <td style="text-align: center;">Ff</td> <td style="text-align: center;">Ff</td> </tr> </table>			Sophie				F	F	Barney	F	FF	FF	f	Ff	Ff	[2]	<p>one mark for Barney Ff</p> <p>one mark for correct completion of the grid (allow ecf from Barney's genotype)</p>
		Sophie																
		F	F															
Barney	F	FF	FF															
	f	Ff	Ff															
(ii)	0.5/½ / 50%	[1]	ecf from (c) (i)															
(iii)	there is no risk of her child having cystic fibrosis	[1]																
(iv)	unethical (1) unnatural (1) may lead to more terminations (1)	[2]	any two															
9 (a)	damage cells (1) produce toxins (1)	[2]																
(b) (i)	antibodies	[1]																
(ii)	has already made antibodies (1) can fight virus much quicker (1)	[2]																