

**MARK SCHEME for the May/June 2009 question paper
for the guidance of teachers**

0608 21ST 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 must be read in conjunction with the question papers and the report on the examination.

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Key to abbreviations

ecf error carried forward
 owtte or words to that effect

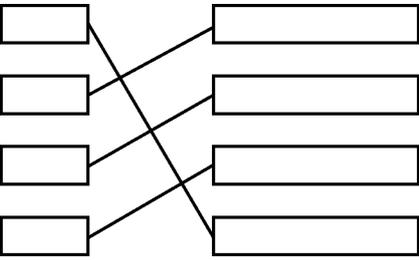
Question	Expected Answers	Mks	Additional Guidance									
1 (a)	nucleus;	[1]										
(b)	DNA proteins alleles recessive	[3]	4 correct = (3) 3 correct = (2) 2 correct = (1)									
(c) (i)	Father genotype (F)f (1); Correct offspring shown i.e. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>FF</td> <td>Ff</td> </tr> <tr> <td></td> <td>Ff</td> <td>ff</td> </tr> </table> (1);					FF	Ff		Ff	ff	[2]	ecf from incorrect Henry genotype
	FF	Ff										
	Ff	ff										
(ii)	ff;	[1]										
(d) (i)	Adelina and Carlos	[1]										
(ii)	Bay	[1]										
		[Total: 9]										

Question	Expected Answers	Mks	Additional Guidance
2 (a)	cycle to work <input checked="" type="checkbox"/> eat more fresh fruit <input checked="" type="checkbox"/> eat more full fat <input type="checkbox"/> increase alcohol <input type="checkbox"/> move away from <input type="checkbox"/> stop smoking <input checked="" type="checkbox"/>	[2]	3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
(b) (i)		[1]	Within range shown (template to be issued)
(ii)	130 to 150	[1]	ecf from line
(c)	friends <input type="checkbox"/> public <input type="checkbox"/> scientists <input checked="" type="checkbox"/> politicians <input type="checkbox"/>	[1]	
		[Total: 5]	

Question	Expected Answers	Mks	Additional Guidance										
3 (a) (i)	decreased/went down/dropped	[1]	owtte										
(ii)	680	[1]											
(b)	rabbits are main food/prey of lynx (1); rabbit population decreases/rabbits killed by virus (1); so less food for lynx (1);	[2]	Any two points										
(c)	<table border="0"> <tr> <td>More lynx ... roads.</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The lynx ... extinct.</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The population ... decrease</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The population ... increase.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>There will be more habitats...</td> <td><input type="checkbox"/></td> </tr> </table>	More lynx ... roads.	<input checked="" type="checkbox"/>	The lynx ... extinct.	<input checked="" type="checkbox"/>	The population ... decrease	<input checked="" type="checkbox"/>	The population ... increase.	<input type="checkbox"/>	There will be more habitats...	<input type="checkbox"/>	[2]	3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
More lynx ... roads.	<input checked="" type="checkbox"/>												
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The population ... increase.	<input type="checkbox"/>												
There will be more habitats...	<input type="checkbox"/>												
[Total: 6]													

Question	Expected Answers	Mks	Additional Guidance
4 (a)	C	[1]	
(b)*	gives a more reliable estimate; can be used to calculate a mean/average; can rule out outliers/anomalies; one measurement could be a mistake	[2]	Any two
(c) (i)	it is an outlier/it is an anomaly/it is far different from the other measurements	[1]	
(ii)	185/5 (1); = 37 (1)	[2]	
(d)	increases	[1]	
(e)*	they are deposited on surfaces/buildings	[1]	
[Total: 8]			

Question	Expected Answers	Mks	Additional Guidance
5 (a)	carbon (1); hydrogen (1)	[2]	one mark lost for each choice above two
(b) (i)	ring around one oxygen molecule only (1)	[1]	reject: ring around both oxygen molecules/any other molecules
(ii)	tick in third box  (1)	[1]	reject: more than one box ticked
(c) (i)	polymerisation	[1]	reject: more than one ringed
(ii)*	small molecules join together (1); to form large molecules (1)	[2]	accept clear labelled diagram
		[Total: 7]	

Question	Expected Answers	Mks	Additional Guidance
6 (a)		[3]	All correct (3); 2 correct (2); 1 correct (1) ignore any box with more than one line
(b)*	carry out risk assessments (1); determine safe levels of additives in food (1)	[2]	
		[Total: 5]	

Question	Expected Answers	Mks	Additional Guidance
7 (a)	Made up of stars (1); Very great numbers of them (1)	[2]	Accept also gas and dust (1) Accept 'millions' or any word suggesting very large numbers
(b) (i)	Moving away (from us) (1)	[1]	
(ii)	14 000 million years	[1]	
(c)	Previous theories had worked well for a long time (1); no-one else had produced this explanation yet (1); idea was too new and unexpected (1)	[2]	Any two points or one point plus a development
		[Total: 6]	

Question	Expected Answers	Mks	Additional Guidance
8 (a)	Carbon dioxide (1)	[1]	
(b) (i)	1910 (1)	[1]	
(ii)	2000 (1)	[1]	
(iii)	Trend of graph is upwards (1)	[1]	
(c) (i)	Dr Agassi and Dr Chang (1)	[1]	
(ii)	Dr Agassi and Dr Chang (1)	[1]	
(iii)	Dr Chang (1)	[1]	
		[Total: 7]	

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Question	Expected Answers	Mks	Additional Guidance
9 (a)	turbine reactor generator	[1]	
(b)	20 MJ (1)	[1]	
(c) (i)	Kill/make cancerous (1)	[1]	
(ii)	Pay is good (1); no alternative employment (1); risk small (1); good working conditions (1)	[2]	Any two points
(d)	Have regular check-ups (1); Wear dosimeters/film badges (1)/protective clothing (1)/ shielding between worker and source of radiation (1)/ remote working to keep away from source of radiation (1)	[2]	Any two points
		[Total: 7]	