UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

21ST CENTURY SCIENCE **0608/04**

Paper 4 **For Examination from 2009**

SPECIMEN MARK SCHEME

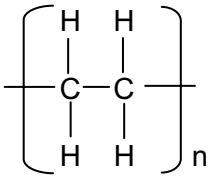
1 hour 30 minutes

MAXIMUM MARK: 60

This document consists of **4** printed pages.

UNIVERSITY of CAMBRIDGE International Examinations

[Turn over

Question				Gd	Expected Answers	Mks	Additional Guidance
Section A							
1	**(a)**	**(i)**	*	C	as a control / for comparison	1	
		(ii)		A*	a mechanism	1	
	(b)	**(i)**	*	D	to increase reliability / to account for outliers / in case of a mistake / in case conditions changed	1	
		(ii)		BA	sulfur dioxide leaves chimney high above ground; so it travels some distance before reaching the ground; so there is less sulfur dioxide in the air close to the power station;	2	Any two
		(iii)		A A*	The mean from the first day is within the range from the second day; The mean from the second day is within the range from the first day;	1 1	
2	**(a)**			BA	the way that each product is manufactured from poly(ethene) is different; the method of use of each product is different / the time for which each product is used is different;	1 1	
	(b)			A A*	 deduct one mark for each error	2	
	(c)		*	DDC	old material consistent with named article; new material consistent with named article; sensible advantage;	1 1 1	
3	**(a)**		*	DC	crops take nitrogen (compounds) out of the ground/soil; the crops are removed / nitrogen is not returned to the ground/soil;	1 1	
	(b)	**(i)**		BB	potassium; phosphorus;	1 1	either order
	(b)	**(ii)**		A A*	not readily available where they live; too expensive / they cannot afford them;	1 1	
4	**(a)**	**(i)**		BB	mother does not have the disease and so has two dominant alleles that do not give the disease, so Dalya inherits one of these alleles from her mother; father has the disease and so has two recessive alleles for the disease, so Dalya inherits one of these alleles from her father;	1 1	
		(ii)			25% / ¼ / one in four; suitable diagram showing this;	1 1	

	(b)			A A*	tested people who are carriers may decide not to have children; so fewer people pass allele for the disease on to the next generation;	1 1	
5	**(a)**		*	DC	fat builds up in coronary arteries / coronary arteries become blocked; blood supply to heart muscle is prevented / heart muscle does not get oxygen / heart muscle dies;	1 1	
	(b)		*	DC	number of people with heart disease increases with time; number of people with heart disease increases with increase in gum disease;	1 1	
	(c)	**(i)**	*	CC	Melvin next to box 2; Harry next to box 1;	1 1	
		(ii)	*	D	obesity / smoking / lack of exercise	1	
6	**(a)**			BAA*	mutation; ancestor; natural selection;	1 1 1	
	(b)			A A*	more intelligent animals are more likely to survive long enough to breed; they pass genes for higher intelligence on to their offspring;	1 1	
	(c)			BB	D E E all three correct for 2 marks any two correct for 1 mark	2	
7	**(a)**			BAA*	initially steady then increased; increase was rapid, starting in last 200 years; increase coincides with increasing use of fossil fuels; fossil fuels produce CO2 when burnt;	3	Any three
	(b)			BAA*	lower/below average temperature until 1940; temperature fell 1940 – 1980; rapid increase in temperature after 1980; year-to-year data is very variable;	3	Any three
	(c)		*	CDD	graphs show a correlation; graphs do not show that increase in temperature is caused by increase in carbon dioxide; for cause need a mechanism;	1 1 1	
	(d)			BA	evidence from computer modelling provides predictions; more recent data agrees with early prediction (e.g. melting of Greenland ice and North Polar ice cap); melting ice will raise sea levels; Many coastal cities inundated / much flooding e.g. Bangladesh; inability to grow crops;	2	Any two
8	**(a)**			BB	more penetrating; go further through packaging/into product;	2	
	(b)	**(i)**	*	DC	time taken for activity/amount of radioactive substance; to fall to half or its (original) value;	1 1	

		(ii)		A A*	Half-life of iron-59 is very much less than that of cobalt-60; source would need replacing frequently;	1 1	
9			*	CCD	each used the best knowledge available at the time; Hutton used data which showed Ussher was wrong; Thomson sgave dates based on a molten planet cooling down; Rutherford used new data/techniques to improve Kelvin's date; More modern methods give even greater age for Earth;	3	Any three