MARK SCHEME for the October/November 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 October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Question		Expected Answers	Mks	Additional Guidance
1	(a)	carbon monoxide / carbon dioxide / nitrogen monoxide / nitrogen dioxide (1) causes breathing difficulties (CO/NO/NO_2) / acid rain (NO_2) / global warming or greenhouse effect (CO_2) (1)	2	allow CO / CO_2 / NO / NO_2 / NO_x reason must match pollutant gas for second mark
	(b)	is ionising (1) kills/damages cells / can cause cancer (1)	2	
	(c)	chlorofluorocarbon / CFC (1) refrigerators/aerosol sprays/spray cans (1)	2	
	(d)	ozone concentration low over S pole (1) use of correct numerical data (1)	2	allow ozone hole over south pole
	(e)	risk over-rated / benefit outweighs risk (1) want to look tanned/healthy (1) don't think it will happen to them (1) they use sunblock/suntan lotion (1)	2	any two Allow it forms vitamin D (in the skin)
	(f)	affects their companies/economy (1) cannot afford alternatives / alternatives are more expensive (1) do not trust countries wanting restriction / not convinced by the evidence (1)	2	any two
	(g) (i)	forces/pushes contents out of can (1)	1	
	(ii)	CFC: risk is damage to ozone layer (1) propane: risk is contents flammable (1)	2	
				[Total: 15]
2	(a)	as pollution/particulates increases risk of heart disease increases / more pollution the more people get heart disease	1	allow AW
	(b)	Inhaled / breathed into lungs (1) pass into blood/blood vessels (1)	2	
	(c) (i)	(coronary) artery	1	
	(ii)	to supply oxygen/glucose (1) heart muscle needs a large supply of oxygen/glucose (as working hard) (1) cannot get oxygen/glucose from the blood going through the heart (1)	2	any two allow to remove carbon dioxide
	(iii)	cause narrowing of (coronary) arteries (1) less blood/oxygen reaching the heart (1) heart muscle dies (1)	3	do not allow 'affects blood flow'

Question	Expected Answers	Mks	Additional Guidance
(d)	$\dfrac{1816 \times 100}{66000}$ (1) 2.75 (1)	2	allow both marks for correct answer without working
(e)	correlation does not mean cause/need to have a causal link (1) other factors cause heart disease / named example of other factor (1)	2	allow e.g. diet / smoking / alcohol intake / stress / genetics
(f)	*study in article is better because:* uses larger number of women (means that you have more reliable data) / uses women of age when heart attacks more likely (1) *new study better because:* carried out over a longer period of time (because heart disease takes a long time to develop) (1)	2	
			[Total: 15]
3 (a)	plant/use several seedlings (1) water each using a solution with different amount/percentage/concentration (1) keep all other conditions the same (1) measure the height/mass of each one (1)	3	Any three Allow named condition e.g. same soil
(b)	4% – 4.0 (1) 6% – 5.3 (1)	2	
(c)	higher percentage of/more fertiliser the higher/more they grow (1) at higher percentages/after 8% increase in fertiliser has no effect/causes no more increase in height (1)	2	allow positive correlation between amount of fertiliser and growth
(d) (i)	volume of solution / time seedlings left to grow / temperature / light	1	accept any valid answer
(ii)	all factors need to be kept constant except for one being investigated / so that results relate only to factor being investigated / so that amount of fertiliser is only independent variable	1	Allow varying another factor will affect/change the results reject idea of accuracy ignore fair testing
(e)	have seedling(s) to which is added water without any fertiliser	1	
			[Total: 10]

Question		Expected Answers	Mks	Additional Guidance
4	**(a)**	clock/stopwatch/timer	1	
	(b)	thin window (to Rn container)	1	allow detector next to/touching window
	(c)	58 – 22 = 36 (1); 36 / 6 = 6 (1)	2	
	(d)	reading would be too big / reading contains background as well as Rn (1); take background/answer to (c) away from each reading (1)	2	
	(e)	60 seconds (1) correct reference to data used (1)	2	e.g. from 40 to 20, or from 30 to 15
	(f)	data may have fluctuations/outliers (1) graph will smooth out irregularities / outliers can be ignored when drawing curve (1)	2	
				[Total: 10]
5	**(a)**	ruler / tape measure	1	accept any apparatus used to measure mm
	(b)	identify outliers / to make results more reliable / to calculate a best estimate/mean	1	ignore fair test/more accurate
	(c)	there is an outlier (in experiment 3) (1) Jo has excluded this in her calculation (1)	2	
	(d)	three points correctly plotted (2)	2	one mistake = 1 mark
	(e)	correct line of best fit	1	
	(f)	as concentration of tea tree oil increases, the clear area increases/more bacteria are killed	1	
	(g)	repeat experiment more times / use a greater range of concentrations / accurately measure volume of tea tree oil used / use apparatus able to measure mm more accurately / leave for longer (1) correct explanation for their choice (1)	2	Allow repeat results for 80% (1) to get results without outlier (1)
				[Total: 10]