UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

0608 21ST CENTURY SCIENCE

0608/05 Paper 5 (Comprehension and Practical), 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.

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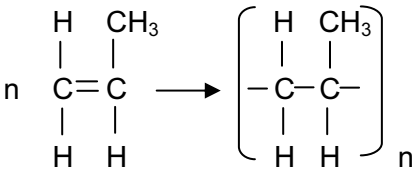
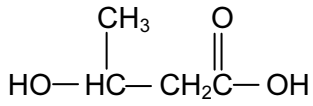
UNIVERSITY of CAMBRIDGE International Examinations

Key to abbreviations
ecf error carried forward

Question			Expected Answers	Mks	Additional Guidance
Section A					
1	**(a)**		a substance can be broken down by the activities of living organisms/bacteria	1	
	(b)	**(i)**	raw material ethene is from crude oil; crude oil is non-renewable/will run out; these bags are not easy to recycle	2	Any two
		(ii)	raw material for poly(hydroxybutyrate) comes from plants; more plants can be grown; raw material for poly(propene) comes from crude oil	2	Any two
		(iii)	for: they will decompose (quickly); (most) decomposition products are non-polluting; they will not cause litter / will not fill landfill sites / will not harm animals; against: they may not decompose quickly enough / they may decompose slowly in landfill; they may produce some harmful breakdown products; their use may lead to shortage of/increase price of food crops; they are not easy to recycle	4	any two from for and any two from against
	(c)		they may have an interest that results in bias / they may be employed by polymer manufacturers; they may use the same data in a different way; they may have fixed ideas that they are reluctant to change	2	Any two
	(d)	**(i)**	 one mark deducted for each error	3	allow three or more monomers joined allow full structural formulae

		(ii)	 one mark deducted for each error	2	allow full structural formula
		(iii)	energy used to make polymer; environmental impact of making polymer; environmental impact of disposal	2	Any two allow detailed descriptions
	(e)	**(i)**	polymers have long chains; chains are held together by strong forces; strong forces need a lot of energy to break them;	3	
		(ii)	change/increase/decrease chain length; cross-link/change/increase/decrease cross-linking; add/increase/decrease plasticizer; change/increase/decrease crystallinity	2	Any two
	f	**(i)**	so that the force measured was not affected by the size of the plastic sample; so that the only variable was the type of plastic	2	
		(ii)	83 to 87	1	
		(iii)	5	1	accept 135
		(iv)	450/5; = 90	2	allow one mark for 97.5
		(v)	the mean for poly(ethene) does not lie within the range for the new plastic / the mean for the new plastic does not lie within the range for poly(ethene)	1	do not allow: the ranges do not overlap
			Total	**30**	

Section B					
2	**(a)**		use tongs to handle sources; ensure sources are replaced in box when not in use; do not point at anyone; hold well away from any person	2	Any two
	(b)		perform with no absorber and then repeat with different absorbers in position; record count in a certain time / measure background / repeat measurements for each material	2	If ratemeter rather than scaler-timer is used, candidate should record range of readings and estimate average (take median)
	(c)	**(i)**	virtually all absorbed by paper; this was alpha radiation; small 'residue' due to contaminated source/background count	2	Any two
		(ii)	small amount absorbed by paper, and most by aluminium; this was beta radiation; small 'residue' due to contaminated source/background count if not credited in **(ii)**	2	Any two
	(d)		radioactive sources get weaker with time/nuclei get 'used up' as they change; has halved twice, so half-life is 5 years.	2	
			Total	**10**	
3	**(a)**		further it travels means slower reaction time	1	
	(b)		position of ruler at start; distance from fingers to ruler; size / mass / shape of ruler; lighting in room	2	accept any reasonable suggestion
	(c)	**(i)**	11.9; 11.2;	2	
		(ii)	gives a more reliable estimate / rules out outliers/anomalies / one measurement could be a mistake;	1	reject answers based on accuracy
	(d)		difficult to have clear start point; ruler may not fall straight; person may not be ready when ruler dropped; fingers move on ruler so difficult to read measurement; ruler scale is not easy to read	2	Any two accept any reasonable suggestion

	(e)	**(i)**	there is reaction time involved in starting and stopping the clock	1	
		(ii)	light gate / computer / video	1	
			Total	**10**	
4	**(a)**		ruler / clamp / stand	1	
	(b)	**(i)**	4.8	1	
		(ii)	it is an outlier / it is far different from the others; using this result will give an unreliable estimate of the stretch	1 1	
	(c)	**(i)**	all plots within +/- ½ small square = 2 one incorrect plot = 1	2	≥ 2 errors = 0 ecf for their values
		(ii)	smooth straight (rulered) line within +/- ½ small square of all points	1	
	(d)	**(i)**	read from candidate's graph, expect 3.2	1	allow ecf for poor graph in **(c)**
		(ii)	read from candidate's graph, expect 1.5	1	
	(e)		as amount/% of additive rises amount that polymer stretches rises / positive correlation between amount/% of additive and stretch of polymer	1	
			Total	**10**	