UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2006 question paper

0652 PHYSICAL SCIENCE

0652/02 Paper 2, maximum raw mark 80

This mark scheme is published as an aid to teachers and students, 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2006 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

General Rules.

+ marks can only be scored if the previous mark has been scored.

In calculations, if the working/equation has not been asked for, and the answer is correct, then **all** the marks for that section must be scored.

Words in brackets preferable but not obligatory.

1	**(a)**	**(i)**	–OH or –O—H (do not accept HO)	1	
		(ii)	24 + 6 +16	1	
			= 46	1	
		(iii)	═ O	1	
			— OH	1	**5**
	(b)	**(i)**	2 (CO_2) + 3 (H_2O) (both)	1	
		(ii)	test - (bubble through) limewater	1	
			result - (from clear) to cloudy [necf]	1	
		(iii)	test - use (anhydrous) copper sulphate/cobalt chloride	1	
			result - from white to cloudy/blue to red [necf]	1	**5**
			(no need for white/red if anhydrous used in test)		
	(c)		rises/increases	1	
			from <7 to >7 (accept any corresponding figures)	1	**2**
					Total 12
2	**(a)**	**(i)**	Cs … 1	1	
		(ii)	At … 7	1	**2**
	(b)		transfer of electron(s)	1	
			from Cs to At or to form Cs^+ and At^-	1	**2**
			(accept At loses an electron and Cs gains an electron for 2)		
			diagram showing shared pair of electrons	1	
			both shells with 8 electrons	+1	**2**
					Total 6
3	**(a)**		brass expands (more than steel)	1	
			making entry gap smaller	1	**2**
	(b)	**(i)**	energy is passed from molecule to molecule	1	
		(ii)	hot air from the bottom (of the oven) rises	1	
		(iii)	waves or (better) infra red	1	
			some correct reference to the example somewhere	1	**4**
					Total 6
4	**(a)**	**(i)**	kinetic	1	
		(ii)	mention of gravity	1	
			either Earth's gravity or gravity pulls it	1	**3**
	(b)	**(i)**	anywhere from where the rate of increase of the curve's gradient starts to decrease to the vertical line	1	
		(ii)	work is done (any mention of work)	1	
			against friction (any mention of friction) / air resistance	1	
		(iii)	kinetic energy is converted to heat/ (any mention of heat)	1	**4**
					Total 7

5	**(a)**	**(i)**	wavelength correctly marked	1	
		(ii)	amplitude correctly marked	1	
	(b)	**(i)**	move the hand further (up and down)	1	
		(ii)	move the hand up and down faster	1	
			clear that it means more times per second	+1	**3**
	(c)		string vibrates	1	
			causing the air molecules to vibrate	1	**2**
					Total 7
6	**(a)**		hydrogen is flammable/explosive	1	
			helium is inert or equivalent	1	**2**
	(b)		in air the (hot) tungsten/filament would oxidize/burn/react	1	
			argon is inert or equivalent	1	**2**
	(c)		number of protons in argon nucleus – 18	1	
			number of neutrons in helium nucleus – 2	1	
			arrangement of electrons in argon – 2,8,8	1	**3**
					Total 7
7	**(a)**		V = IR or R = V/I or R = 12/2	1	
			= 6	1	
			Ω	1	**3**
	(b)	**(i)**	top pole on top pin south	1	
			remainder all correct	1	
		(ii)	fall off	1	
			one by one	1	
			because the iron loses its magnetism	1	**5**
					Total 8

8	**(a)**	high density high melting point coloured compounds good conductor (of either heat or electricity) catalysts	*ANY TWO*	1+1		**2**
	(b)	increase the concentration of the acid increase the temperature decrease the size of the pieces of iron use a catalyst	*ANY TWO*	1+1		**2**
	(c)	coating with: grease/oil paint plastic zinc or galvanising	*ANY TWO*	1+1		**2**
	(d)	*oxidation:* carbon monoxide gains oxygen OR is oxidized *reduction:* iron loses oxygen OR is reduced		1 1		**2**
						Total 8
9	**(a)**	remaining points correctly plotted (-1 for each incorrect) good curve going through all points		2 1		**3**
	(b)	38 s +/- 2s (38 s +/- 4s……..1)		2		**2**
	(c)	top line 23 & 0 lower line 11 & -1		1 1		**2**
						Total 7
10	**(a)**	work must be done to overcome the attractive forces OR to separate the particles (accept bond breaking (is exothermic) for one mark maximum)		1 1		**2**
	(b)	energy is needed to escape (from the surface) comes from the liquid itself (OR the fastest/most energetic molecules tend to escape 1 the slower/less energetic molecules are left behind 1)		1 1		**2**
	(c) **(i)**	**P** is a single substance **Q** is a mixture		1 1		
	(ii)	any valid example; e.g. crude oil, fermented liquor, liquid air		1		**3**
						Total 7
11	**(a)**	rub it (with a cloth)		1		**1**
	(b) **(i)**	repel		1		
	(ji)	attract		1		
	(iii)	attract		1		
	(iv)	attract		1		**4**
						Total 5