



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/42

Paper 4 Extended Theory

October/November 2018

MARK SCHEME

Maximum Mark: 80

Published

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 International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **8** printed pages.

Question	Answer	Marks
1(a)(i)	Z	1
1(a)(ii)	2000 (N) ; constant speed / no acceleration, (so forces must balance) ;	2
1(b)(i)	C on any point on graph line between 50 and 60 s ;	1
1(b)(ii)	distance travelled 20–50 s = speed $\times$ time = $30 \times 3.5 = 105$ m ; distance travelled 50–60 s = $\frac{1}{2} \times 10 \times 3.5 = 17.5$ m ; total distance = $46 + 105 + 17.5 = 168.5$ m ;	3
1(c)(i)	work done = force $\times$ distance / $F \times d$; = $1500 \times 50 = 75\,000$ (J) ;	2
1(c)(ii)	$E = Pt / E = 25\,000 \times 15$; = $375\,000$ (J) ;	2
1(c)(iii)	efficiency = work out / work in ($\times 100$ to give %) / $75\,000 \div 375\,000$ = $0.20 / 20\%$;	2

Question	Answer	Marks
2(a)(i)	(remove MgCO_3) filtration / filtering / filter ; (obtain solid salt) evaporation / crystallisation ;	2
2(a)(ii)	decreases ;	1
2(a)(iii)	(effect) increases ; (explanation) particles collide more frequently / more chance of collisions ;	2
2(b)	exothermic ; chemical (energy changes) to heat / thermal (energy) ;	2

Question	Answer	Marks
2(c)(i)	$(\text{MgCO}_3) + 2(\text{HCl}) \rightarrow \text{MgCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$; formula of magnesium chloride ; all else correct ;	2
2(c)(ii)	(test) (dil. nitric acid and) aqueous silver nitrate / AgNO_3 ; (result) white precipitate / solid;	2

Question	Answer	Marks
3(a)	contains half the full number of chromosomes / half the full amount of genetic material ; the controlling centre of the cell / contains genetic material ;	2
3(b)	<i>tick next to</i> small green or brown flowers ; stigma outside the flowers ; light, smooth pollen grains ;	3
3(c)	<i>any two of</i> A might have a larger (overall) leaf area than B ; A might have more stomata (per leaf) than B ; B might have a thicker / waxy cuticle ; Max 2	2
3(d)(i)	similar line to B drawn below it with a gentler gradient ;	1
3(d)(ii)	rate of transpiration is reduced when the humidity increases ;	1

Question	Answer	Marks
4(a)	P and S ;	1

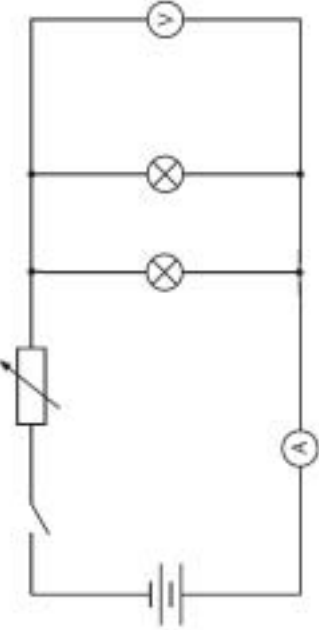
Question	Answer	Marks
4(b)	right ; lower ; left ; shorter ;	3
4(c)(i)	X umbilical cord ; Y amniotic fluid ;	2
4(c)(ii)	reference to the loss of protection (of fetus) ; higher risk of physical damage / infection / premature birth ;	2
4(c)(iii)	oxygen / glucose / any named dissolved nutrient ; carbon dioxide ;	2

Question	Answer	Marks
5(a)(i)	covalent ;	1
5(a)(ii)	$\begin{array}{c} \text{H} & \text{H} \\ & \\ \text{H} - \text{C} - & \text{C} - \text{H} \\ & \\ \text{H} & \text{H} \end{array}$ C – C single bond ; six correctly located C-H single bonds ;	2
5(b)(i)	<u>fractional</u> distillation ;	1
5(b)(ii)	gasoline molecules • are smaller ; • have lower boiling points ; • have weaker intermolecular attractive forces ;	3
5(c)	cracking ;	1
5(d)	2,4 ;	1

Question	Answer	Marks
6(a)	In liquids: in liquids molecules further apart / not tightly packed / in solids molecules are tightly packed ; in liquids attractive forces are low / in solids attractive forces are high ; in liquids molecules are able to move around / slide past each other / in solids molecules (only) vibrate (around a fixed point) ;	3
6(b)	thermometer ;	1
6(c)	ticks in first, second, and fourth box, cross in 3rd box ;	2
6(d)(i)	Conduction and convection require a medium / can't travel though a vacuum / radiation can travel through a vacuum ;	1
6(d)(ii)	highest frequency ;	1

Question	Answer	Marks
7(a)	glucose / starch / sugar ;	1
7(b)	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ 1 mark for formulae ; 1 mark for balanced ;	2
7(c)(i)	<i>any two from</i> not all of the rabbit is eaten ; not all of the rabbit is digested / absorbed by the fox / egestion in fox ; excretion / production / loss of urine in fox ; some energy wasted as heat / respiration / carbon dioxide in fox ; Max 2	2
7(c)(ii)	decomposers / named type of decomposer e.g. bacteria / fungi ; feed on / break down (carbon compounds in the fox's) body ; carbon dioxide released by respiration (of decomposers) ; Max 2	2

Question	Answer	Marks
8(a)	lead bromide is solid / needs to be molten / liquid ; so that ions are mobile / can move ;	2
8(b)(i)	high density / high melting point / (element or compound) act as catalysts ;	1
8(b)(ii)	(to the anode) bromide / Br^- ; (to the cathode) copper(II) / Cu^{2+} ;	2
8(c)(i)	carbon / C / coke ;	1
8(c)(ii)	carbon monoxide / CO / carbon / C ;	1

Question	Answer	Marks
9(a)	to control / vary the current through / voltage across the lamp ;	1
9(b)	the idea that lamp less bright because lower power / energy output ; use of power = $V \times I$ e.g. $V \times I$ reduces in value from expt. 1 to expt. 4 ;	2
9(c)(i)	 lamp in parallel as shown ;	1
9(c)(ii)	0.38 A ; because lamps are identical current divides equally / they have the same / equal resistance ;	2