Cambridge Secondary 1 Progression Test

Mark scheme

Cambridge Secondary 1

Science

Stage 9

DC (SJF/SW) 93623/3RP

CAMBRIDGE International Examinations

This table gives general guidelines on marking answers involving units of length. For questions involving other quantities, correct units are given in the answers. The table shows acceptable and unacceptable versions of the answer 1.85 m.

	Correct answer	Also accept	Do not accept
Units are not given on answer line and the question does not specify a unit	1.85 m	Correct conversions provided the unit is stated, e.g. 1 m 85 cm 185 cm 1850 mm 0.00185 km	1.85 185 m
If the unit is given on the answer line, e.g. .....m	.....1.85.....m	Correct conversions, provided the unit is stated unambiguously, e.g. .....185 cm ..... m	.....185.....m .....1850.....m etc
If the question states the unit that the answer should be given in. e.g. “Give your answer in metres”	1.85 m	1.85 1 m 85 cm	185; 1850 Any conversions to other units.

Stage 9 Paper 1 Mark Scheme

Question	1		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	11 / eleven	
(b)	2	11 electrons drawn electrons correctly arranged on shells	**Accept** 11 identical particles drawn anywhere outside the nucleus but not outside outer shell particles could be dots, crosses or letter “e” 2 on inner shell 8 on middle shell 1 on outer shell accept electrons drawn anywhere on the shells second mark is dependent on the first
(c)	2	**Any two from:** produces hydrogen / gas / fizzes produces an alkaline solution / lithium hydroxide / alkali reaction slower than with sodium floats / moves (on the surface)	 **Accept** produces a red flame **Accept** melts
Total	**5**		

[Turn over

<table>
<tr><td>Question</td><td>2</td><td colspan="2"></td></tr>
<tr><td>Part</td><td>Mark</td><td>Answer</td><td>Further Information</td></tr>
<tr><td>(a)</td><td>3</td><td>choose horses that are fast

breed / mate / cross them

idea that these processes are repeated over generations</td><td>Accept other valid traits e.g. long legs, strong heart

Accept choose horses with desired traits

this marking point must be in context of choosing parents</td></tr>
<tr><td>(b)</td><td>2</td><td>
<table>
<tr><th>characteristic</th><th colspan="3">how it is developed</th></tr>
<tr><th></th><th>inherited only</th><th>acquired only</th><th>inherited and acquired</th></tr>
<tr><td>length of tail</td><td></td><td></td><td>✓</td></tr>
<tr><td>scars on skin</td><td></td><td>✓</td><td></td></tr>
<tr><td>eye colour</td><td>✓</td><td></td><td></td></tr>
<tr><td>strength of muscles</td><td></td><td></td><td>✓</td></tr>
</table>
</td><td>three correct rows = 2 marks

one or two correct rows = 1 mark

two ticks in same row = incorrect</td></tr>
<tr><td>Total</td><td>5</td><td colspan="2"></td></tr>
</table>

Question	3		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	clockwise moment(s) equal to anticlockwise moment(s) clockwise moment(s) equal to anticlockwise moment(s) for a system to be balanced	this idea clearly described = 1 mark this idea = 2 marks **Accept** in equilibrium for balanced **Ignore** reference to forces
(b)(i)	2	15 (N m) 50 × 0.3	**Accept** correct answer with no working for 2 marks correct working but no answer or wrong answer = 1 mark
(b)(ii)	2	the force or push can be exerted further from the pivot (so) increasing the moment (with the same force)	**Accept** idea that the distance between the pivot or nut or bolt and the force will be greater **Accept** worked example for 2 marks, e.g. 50 multiplied by a number bigger than 0.3 and the correct result (units not required)
Total	**6**		

Question	4		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	calcium carbonate + hydrochloric acid → calcium chloride + carbon dioxide + water	**Accept** reactants in any order and products in any order **Accept** = in place of → **Accept** correct use of symbols $CaCO_3$, HCl, $CaCl_2$, CO_2 and H_2O
(b)	2	volume of gas collected time taken to collect gas	**Accept** examples such as time to collect 25 cm^3 of gas / volume of gas collected in 10 seconds for 2 marks if both quantities are referred to on one answer line
(c)	2	**Any two from:** same mass of calcium carbonate same volume of acid same surface area of calcium carbonate same temperature collect same volume of gas / collect gas for same time	 **Accept** same amount / keep mass 1 g of calcium carbonate **Accept** still use 25 cm^3 acid / same amount of acid **Accept** same size pieces of calcium carbonate **Accept** either statement but if both given on separate answer lines then award 1 mark
Total	**5**		

Question	5		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	**Any two from:** insects visit flowers / attracted to flowers pollen sticks to insects insects transfer pollen to other flowers / pollination	 **Accept** insects feed on nectar **Accept** named body part **Accept** insects transfer pollen between plants / flowers for 2 marks
(b)(i)	1	float on water / stick to (fur or feathers of) animals / eaten (in fruit) by animals / buried by animals / explosive release	**Accept** any correct description of one method
(b)(ii)	1	**Any one from:** plants can grow in more places offspring not competing with parents (for minerals / water / light)	 **Accept** idea that the species can spread out **Accept** idea of reduced competition between members of same species
Total	**4**		

Question	6		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	particles (in gas) collide with walls (the collisions) cause a force	**Accept** molecules / atoms for particles **Accept** collide with tyre or surface **Accept** bounce off for collide
(b)	2	increase *no mark* **Any two from:** particles moving faster / have more energy more frequent collisions (with tyre surface or wall) causes greater force	no mark for increase but each mark for explanation dependent on it no marks if state pressure decreases **Ignore** reference to change on outside of tyre
Total	**4**		

[Turn over

Question	7		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	particles with greatest energy escape = 1 mark lowering the (average) energy of the liquid / particles left = 1 mark **OR** water changes from liquid to a gas = 1 mark which absorbs energy = 1 mark	**Accept** molecules instead of particles **Accept** particles overcome force of attraction = 1 mark which absorbs energy = 1 mark **Do not accept** warmer particles / cooler particles / particles changing state
(b)	2	**Any two from:** particles on inside or warmer side vibrate more vibrating particles collide with neighbouring ones idea of vibrations transferred through the solid	
Total	**4**		

Question	8		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	*white fur:* camouflage to help catch prey *small ears* reduce surface area (to volume ratio) to reduce heat loss	**Accept** idea that white fur blends in with the snow and helps in hunting **Ignore** camouflage unqualified ignore answers referring to fur generally **Ignore** reference to hearing
(b)	1	energy is lost along the food chain / not enough energy to sustain as many of them / less energy available	**Accept** less food available
(c)	1	less affected by changes in seal population / can obtain more energy	**Accept** can get more food
Total	**4**		

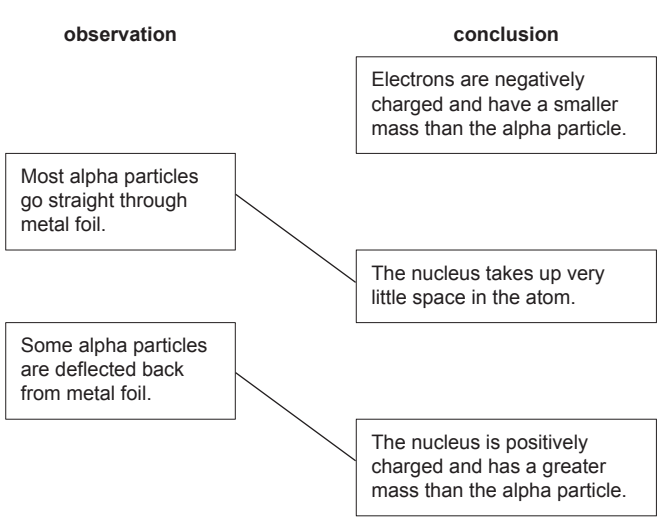
Question	9		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	$\mathbf{A_1 = A_2 = A_3}$ ☐ $\mathbf{A_1 + A_2 = A_3}$ ☐ $\mathbf{A_1 = A_2 + A_3}$ ✓ $\mathbf{A_1 = A_2 - A_3}$ ☐	more than one box ticked = 0 marks
(b)	2	use a (battery / cell / power supply of) higher voltage replace lamp L_2 with a smaller resistance lamp	answers can be in either order **Accept** the idea that the resistance of any component replacing L_2 must be lower **Ignore** references to ammeters / wires / L_1 / power / removing L_2
Total	**3**		

Question	10		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	75 (kg) 100 – 25	**Accept** correct answer with no working for 2 marks correct working but no answer or wrong answer = 1 mark
(b)	2	correct use of data to show that mass increase of tree is greater than mass decrease of soil = 2 marks mass increase of tree greater than mass decrease of soil / calculates the mass decrease of the soil	**Ignore** reference to water
(c)	2	reactants correct products correct	carbon dioxide / CO_2 and water / H_2O in either order on left of arrow glucose / $C_6H_{12}O_6$ and oxygen / O_2 in either order to right of arrow **Ignore** anything written on arrow if symbol equation written it does not need to balance
Total	**6**		

Question	11		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	period 3	
(b)(i)	1	column 7 shaded	**Ignore** shading that slightly overlaps into adjacent columns **Accept** no additional shading in 3rd box down
(b)(ii)	1	X in any box of column 0	
(b)(iii)	1	Z in top box of column 4	
Total	**4**		

Stage 9 Paper 2 Mark Scheme

Question	1		
Part	**Mark**	**Answer**	**Further Information**
(a)	3	Plants take in **carbon dioxide** from the air to make glucose. This process uses energy from **sunlight** and is called **photosynthesis**	1 mark for each correct answer
(b)	1	Plants also take in substances like **nitrate** through the roots which they can use for **growth**	both answers needed for 1 mark **Accept** Plants also take in substances like **oxygen** through the roots which they can use for **respiration**
Total	**4**		

Question	2		
Part	**Mark**	**Answer**	**Further Information**
	2		two correct lines = 2 marks one correct line = 1 mark two lines come from one observation = incorrect
Total	**2**		

Question	3		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	At_2	if answer line blank look in table for answer
(b)	1	80 – 150 (°C)	if answer line blank look in table for answer **Accept** any value or range of values between 80 and 150
(c)	1	idea that reaction is slower than chlorine but faster than iodine (e.g. slow)	if answer line blank look in table for answer **Accept** less quickly than chlorine
Total	**3**		

Question	4		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	bacteria	
(b)	2	release minerals or nutrients into soil (these minerals or nutrients) are taken up by new plants	**Accept** named mineral e.g. nitrate / phosphate **Ignore** nitrogen / phosphorus **Accept** used by new plants to grow
(c)	1	not enough oxygen in soil / decomposers die / roots cannot respire / no more minerals produced	**Accept** no oxygen in soil **Accept** microorganisms / bacteria / fungi instead of decomposers accept nutrients for minerals
Total	**4**		

Question	5		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	density = mass / volume	**Accept** d = m / v **Accept** lower or upper case letters **Accept** correct rearrangements e.g. mass = density × volume OR m = dv OR volume = mass / density
(b)	3	put rock (completely) into water use of measuring cylinder to measure volume of water **either** measure rise in water level if rock put in measuring cylinder containing water **OR** measure volume of water displaced if rock put in eureka can or displacement can	**Accept** marks from labelled diagram or written response
(c)	2	*if yes* contains the same material density depends on type of material / does not depend on size *if no* rock may be uneven composition different densities of material within it	no mark for yes or no but explanation (2 points) must match If both yes and no circled then **accept** one reason for yes and one reason for no = 2 marks
Total	**6**		

<table>
<tr><td>Question</td><td>6</td><td colspan="2"></td></tr>
<tr><td>Part</td><td>Mark</td><td>Answer</td><td>Further Information</td></tr>
<tr><td>(a)</td><td>1</td><td>gives out heat / gives out energy</td><td>Accept the surroundings get warmer</td></tr>
<tr><td>(b)</td><td>2</td><td><table><tr><td>burning fuel</td><td>✓</td><td></td></tr><tr><td>firework</td><td>✓</td><td></td></tr><tr><td>water freezing</td><td>✓</td><td></td></tr><tr><td>rock melting</td><td></td><td>✓</td></tr></table></td><td>all four correct = 2 marks

two or three correct = 1 mark

one correct = 0 marks

if ticks in both columns answer is incorrect</td></tr>
<tr><td>(c)</td><td>1</td><td>D</td><td>more than one letter circled = 0 marks</td></tr>
<tr><td>Total</td><td>4</td><td colspan="2"></td></tr>
</table>

<table>
<tr><td>Question</td><td>7</td><td colspan="2"></td></tr>
<tr><td>Part</td><td>Mark</td><td>Answer</td><td>Further Information</td></tr>
<tr><td>(a)</td><td>1</td><td>electrons move off the metal ✓

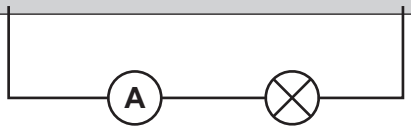
protons move onto the metal

electrons move off and protons move on</td><td>additional ticks = 0 marks</td></tr>
<tr><td>(b)</td><td>1</td><td>H</td><td>more than one letter circled = 0 marks</td></tr>
<tr><td>(c)</td><td>1</td><td>to prevent accidental discharge / (electric) shock / sparks / fire risk</td><td>Accept to make it safe</td></tr>
<tr><td>Total</td><td>3</td><td colspan="2"></td></tr>
</table>

Question	8		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	some animals fit into more than one group / some animals can walk and swim / swim and fly / walk swim and fly / some animals cannot walk swim or fly	**Accept** correct named examples with description e.g. a duck can walk, swim and fly
(b)	1	*plant* cannot walk, swim or fly	
(c)(i)	1	idea that it comes from fossils	
(c)(ii)	2	**evidence that supports** they get (gradually) bigger / taller **evidence that does not support** the number of ribs goes up and down (over time)	
Total	**5**		

Question	9		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	**A** **Any two from:** greater area (in contact with floor) weight or force is more spread out less pressure (exerted on floor)	no mark for **A** but if **B** given then question total = 0 **Accept** reverse argument in explanation if refer to **B**
(b)	3	40 000 / 0.25 160 000 N/m^2	 **Accept** 1.6×10^5 **Accept** correct answer with no working for 2 marks correct working but no answer or wrong answer = 1 mark **Accept** $N\,m^{-2}$ or Pa or Pascals
Total	**5**		

Question	10		
Part	**Mark**	**Answer**	**Further Information**
(a)(i)	1	too windy / soil not deep enough to support them / not enough minerals or nutrients in soil	
(a)(ii)	1	(always) too cold / no rain / water frozen / no soil / not enough minerals or nutrients in soil / not enough oxygen / not enough carbon dioxide	
(b)	1	global warming / (average) temperatures are rising / earth is warming up / increase in carbon dioxide	**Ignore** climate change without qualification
Total	**3**		

Question	11		
Part	**Mark**	**Answer**	**Further Information**
(a)	2		1 mark each component must be in series **Do not accept** lines drawn into / through components or gaps in circuit to 1mm tolerance
(b)	1	that the current is not too large / off the scale (of his ammeter) / will not cause the lamp to fail / will not cause overheating	**Ignore** safety / electric shock
(c)(i)	2	4 points correct = 2 marks 2 or 3 points correct = 1 mark	points plotted to within ± ½ small square
(c)(ii)	1	best fit straight line drawn through their points	**Accept** best fit line through incorrectly plotted points
(d)	1	in range 2.3 – 2.5 (A)	**Accept** value derived from incorrect line
Total	**7**		

Question	12		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	displacement	
(b)(i)	2	one mark each product zinc+copper sulfate → **zinc sulfate** **copper**	**Accept** products in either order **Accept** Cu instead of copper and $ZnSO_4$ instead of zinc sulfate
(b)(ii)	1	copper is less reactive than zinc / copper is below zinc in the reactivity series	**Accept** reverse argument answer must be comparative e.g. copper is not reactive or copper is near the bottom of the reactivity series is insufficient
Total	**4**		

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