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Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/33**

Paper 3 Core Theory **May/June 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.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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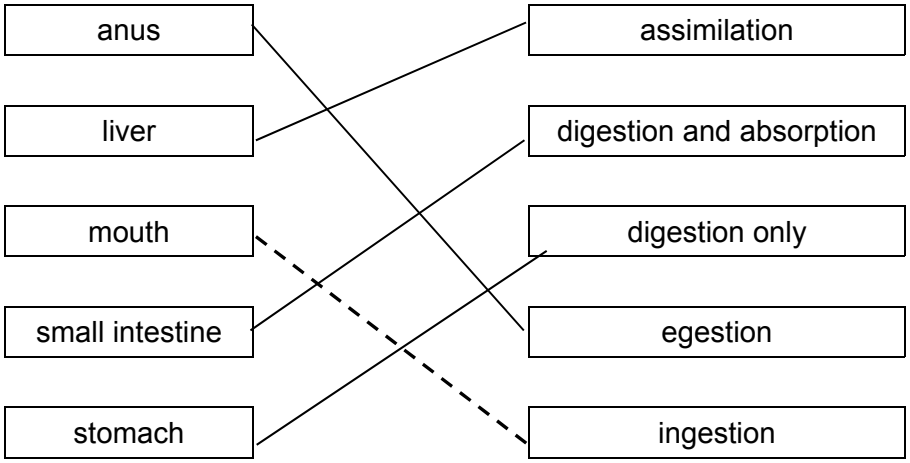
Question	Answer	Marks
1(a)	three lines drawn as follows  All 4 lines correct = 3 marks 3 or 2 lines correct = 2 marks 1 correct line = 1 mark	**3**
1(b)	idea of large amount of sugar in the drink ; bacteria feed on sugar ; produce acid ; acid attacks enamel ;	**max 3**
1(c)	brush teeth regularly ; visit dentist regularly ; reduce consumption of sugar ;	**max 2**

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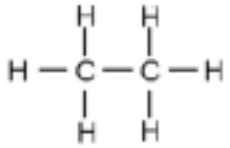
Question	Answer	Marks
2(a)(i)	white / anhydrous copper sulphate **or** anhydrous / blue cobalt chloride ;	**1**
2(a)(ii)	limewater ;	**1**
2(b)	(hexane) + oxygen ➔ carbon dioxide + water LHS ; RHS (either order) ;	**2**
2(c)	methane ;	**1**
2(d)(i)	covalent ;	**1**
2(d)(ii)	 C – C bond ; Six C – H bonds ;	**2**
2(d)(iii)	(atomic number) 6 ; (number of neutrons) 6 ;	**2**

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Question	Answer	Marks
3(a)(i)	two opposing vertical force arrows ; both arrows from the load ;	2
3(a)(ii)	weight / gravitational force ;	1
3(b)	speed = distance / time **or** time = 200 / 0.60 ; = 333 s ;	2
3(c)	density = mass / volume *or* mass = volume × density = 5000 × 1.025 ; = 5125 (kg) ;	2
3(d)(i)	watt ;	1
3(d)(ii)	idea that the same amount of energy is transferred / work done ; the same amount of energy is transferred / work done in less time ;	2

Question	Answer	Marks
4(a)(i)	only one parent involved ; offspring (genetically) identical ;	2
4(a)(ii)	it has flowers ;	1
4(b)	ticks in three boxes as shown ;; 2 marks all 3 correct 1 mark for 1 or 2 correct	2

condition	needed for germination ()
carbon dioxide	
chlorophyll	
light	
oxygen	✓
water	✓
warmth	✓

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Question	Answer	Marks
4(c)	a protein ; (that functions as) a (biological) catalyst ;	**2**
4(d)(i)	glucose, oxygen ; – *either order* carbon dioxide, water ; – *either order*	**2**
4(d)(ii)	any two of protein synthesis ; cell division ; growth ;	**2**

Question	Answer	Marks
5(a)(i)	(decreases) no mark gas produced / released (during reaction) ; (gas goes) to the surroundings / (gas) leaves flask ;	**2**
5(a)(ii)	lower temperature / lower (acid) concentration / use lumps (instead of powder) ;	**1**
5(a)(iii)	increases ; calcium is more reactive (than magnesium) ;	**2**
5(b)(i)	electricity ;	**1**
5(b)(ii)	ionic ;	**1**
5(b)(iii)	$MgCl_2$;	**1**
5(b)(iv)	reduction ;	**1**

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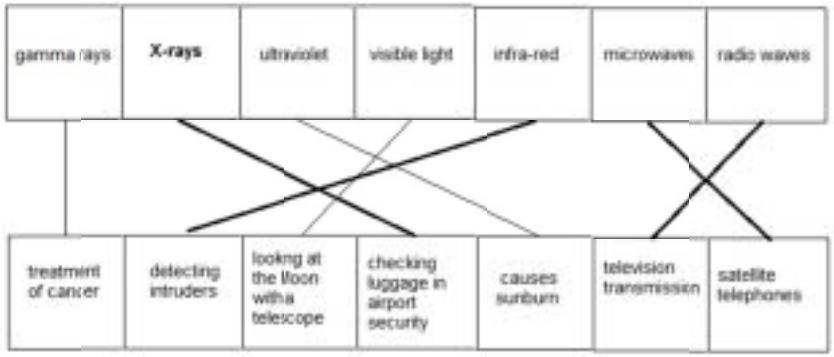
Question	Answer	Marks
6(a)(i)	X-rays ;	**1**
6(a)(ii)	 any two lines correct ; all four lines correct ;	**2**
6(b)(i)	conduction ;	**1**
6(b)(ii)	glass is a bad / poor conductor (of thermal energy) ;	**1**
6(b)(iii)	air / gas expands on heating **/** volume of gas increases on heating ;	**1**

Question	Answer	Marks
7(a)	July ;	**1**
7(b)	(more) light is available (on forest floor) ; less shading by trees ; idea that light is needed for photosynthesis ;	**3**
7(c)(i)	loss of habitat ; loss of food that may live in the trees ; birds migrate from / leave the area ;	**max2**
7(c)(ii)	soil more likely to become eroded ;	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(a)(i)</td><td>(left) metal(lic) and (right) non-metal(lic) ;</td><td>1</td></tr>
<tr><td>8(a)(ii)</td><td>(Group) I / 1 / one ;</td><td>1</td></tr>
<tr><td>8(a)(iii)</td><td>transition ;</td><td>1</td></tr>
<tr><td>8(b)</td><td><table>
<tr><td></td><td>(bromine)</td><td>(chlorine)</td><td>(iodine)</td></tr>
<tr><td>(sodium bromide)</td><td>(✗)</td><td>✓</td><td>✗</td></tr>
<tr><td>(sodium chloride)</td><td>✗</td><td>(✗)</td><td>✗</td></tr>
<tr><td>(sodium iodide)</td><td>✓</td><td>✓</td><td>(✗)</td></tr>
</table>
Three correct ✓ ;
Three correct ✗ ;</td><td>2</td></tr>
<tr><td>8(c)</td><td>kills / destroys bacteria / microbes / microorganisms / viruses ;</td><td>1</td></tr>
<tr><td>8(d)(i)</td><td>releases heat / thermal energy / temperature increases ;</td><td>1</td></tr>
<tr><td>8(d)(ii)</td><td>sodium hydroxide / NaOH / sodium carbonate / Na_2CO_3 / sodium hydrogen carbonate / sodium bicarbonate / $NaHCO_3$ / sodium oxide / Na_2O ;</td><td>1</td></tr>
</table>

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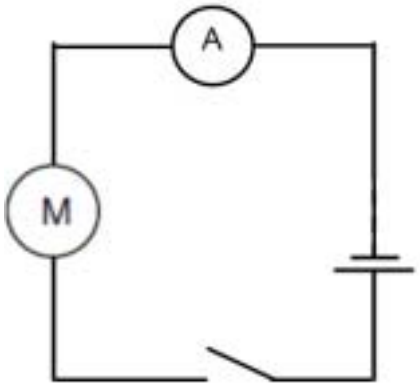
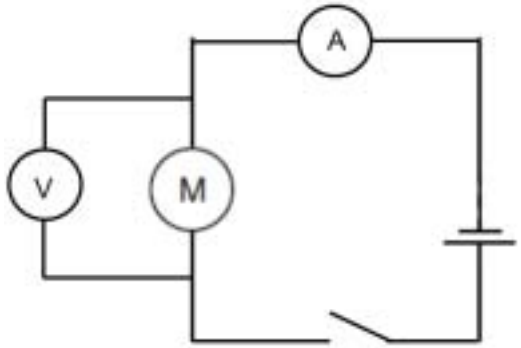
Question	Answer	Marks
9(a)(i)	 correct symbol for cell ; correct symbol for switch ; meter identified as an ammeter and a complete series circuit connected ;	**3**
9(a)(ii)	 correct meter selected (V symbol) ; meter connected in parallel with motor ;	**2**
9(b)(i)	$I = V / R$ *or* $I = 1.5 / 5.0$; = 0.30 (A) ;	**2**

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Question	Answer	Marks
9(b)(ii)	reading on ammeter increases / current increases ; (extra cell) increases pd / voltage (across motor) ;	**2**
9(c)(i)	angle of incidence = angle of reflection ;	**1**
9(c)(ii)	mirror shown at approx. correct angle ;	**1**

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