OCR
Oxford Cambridge and RSA

GCSE

Science B

Unit **B711/01:** Modules B1, C1, P1 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2014

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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 marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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 should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

Annotation	Meaning
BP	Blank Page – this annotation **must** be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	correct response
	incorrect response
BOD	benefit of the doubt
NBOD	benefit of the doubt **not** given
ECF	error carried forward
^	information omitted
I	ignore
R	reject
CON	contradiction

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/ = alternative and acceptable answers for the same marking point
(1) = separates marking points
allow = answers that can be accepted
not = answers which are not worthy of credit
reject = answers which are not worthy of credit
ignore = statements which are irrelevant
( ) = words which are not essential to gain credit
__ = underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf = error carried forward
AW = alternative wording
ora = or reverse argument

Question	Answer	Marks	Guidance
1 a	iris (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank
b	refracted / focused (1) **<u>then</u> one from** (refracted) by the cornea / lens (1) (focused) on the retina or fovea / by lens (1)	2	**allow** bends **not** reflected / bounced **second marking point can only be awarded if no contradiction** e.g. focused by cornea (1) **allow** focused by lens (2) **allow** focused on the retina (2) **allow** rods and cones for retina **if no other mark awarded** **allow** passes through the pupil (1)
c	idea of judging how far away prey is (1)	1	**allow** to judge distance (1) **ignore** 3D vision **ignore** to focus on prey
	Total	**4**	

Question	Answer	Marks	Guidance
2 a i	the plant has bent / grown (1) towards the light (1)	2	**allow** leaves are paler (1) **but** paler leaves because they did not get enough light (2) **ignore** plant moves **allow** explanation (has bent because) there was only light from one direction (1) **ignore** Sun **but allow** sunlight (1) **allow** higher level explanations, e.g. auxin causes the side closest to the light to grow slower / ora (2) e.g. plant is phototropic (2) **ignore** just plant has lack of light **not** the plant is dying
a ii	hormones (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank
b	geotropism (1)	1	**allow** geotropic / gravitropism / gravitropic (1) **not** negative geotropism **not** other references to gravity e.g. gravitational pull
	Total	**4**	

Question	Answer	Marks	Guidance
3	**any two from:** insulin level increases to lower blood sugar (1) increase because there is glucose / sugar / carbohydrates in the meals (1) insulin released from pancreas (1) idea of lag because takes time for glucose OR sugar to enter blood (1) fall because the insulin not needed when blood glucose or blood sugar levels fall / ora (1)	2	**ignore** (insulin) increases when eating meals / decreases after meals **allow** hormone responses are slow (1) **ignore** stops blood sugar levels increasing **allow** insulin levels rise because **blood** sugar levels rise **allow** goes up and down because blood glucose OR blood sugar levels never stay the same (1) **allow** higher level ideas about negative feedback causes the rise and fall (1)
	Total	**2**	

Question	Answer	Marks	Guidance
4 a	(nicotine) increases heart rate (1)	2	**allow heart** has to work faster (1) **but ignore** heart has to work harder **ignore** make the blood pump faster
	carbon monoxide reduces 'oxygen-carrying' capacity of the blood / AW (1) **but** **carbon monoxide** reduces 'oxygen-carrying' capacity of the blood so heart rate increases (to compensate) (2)		**allow carbon monoxide** combines with haemoglobin so less oxygen carried (in blood) **ignore** just less oxygen carried round the body
			allow idea of smoking causes the narrowing or blocking of arteries (1) **ignore** smoking damages arteries **not** tar blocks arteries

Question	Answer	Marks	Guidance
4 b	**[Level 3]** **Describes at least <u>two</u> patterns** **AND** **suggests more specific reason why less people smoke.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** **Describes at least <u>two</u> patterns** **AND** **suggests a reason why less people smoke.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** **Describes a pattern** **OR** **suggests a reason why less people smoke.** Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient OR irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E** **To reach Level 3, answer must refer to a <u>specific</u> reason why less people smoke** **Indicative scientific points at Level 3 may include:** *patterns from level 2 plus specific reasons* • (more) aware that it may cause heart disease • (more) aware that it may cause **named** cancer e.g. lung or throat. oesophagus, mouth • (more) aware that it may cause emphysema • (more) aware that it may cause bronchitis • may affect them if they have asthma **Indicative scientific points for patterns may include:** • 25-34 year old have the highest percentage in 1980 • 20-24 year old have the highest percentage in 2008 • 50-59 year olds has the biggest drop • quotes data e.g. 35-49 drop by 20% • less people smoke in 2008 / more people smoked in 1980 • less over 60 smoke • change is greater for over 24 year olds **Indicative scientific points for reasons at Levels 1 & 2 may include:** • makes you unhealthy • causes cancer • don't want to die young • can kill you • people more aware of risks / risks highlighted on packet **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	Total	**8**	

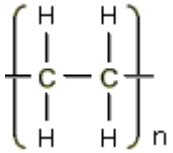
Question	Answer	Marks	Guidance
5 a	55% (1)	1	
b	higher percentage of proteins (1) because teenagers are growing (1)	2	allow **need** more **protein for growth (2)** **ignore** other foodstuffs e.g. fats / carbohydrates
c	**any two from:** make you fat / put on weight / make you obese (1) (cause) heart disease / heart attack / heart failure (1) (cause) diabetes (1) (cause) breast cancer (1) (cause) arthritis (1) (cause) high blood pressure (1) (cause) blocked arteries / high cholesterol (1)	2	 **ignore just** makes you unhealthy **allow** damage to the heart **allow** blocked blood vessels (1) **allow** plaque (1) **ignore** blood clot **ignore** stroke **ignore** thrombosis
d	idea of cheating / unfair to other athletes (1) idea of health issues (1)	2	 e.g. dizziness / headaches / flushed skin / heart problems / chest pains / palpitations / sweating / vomiting / abdominal cramps / weight gain / dehydration / aggression **allow** just bad for your **health** / cause damage to your **body** (1)
	Total	**7**	

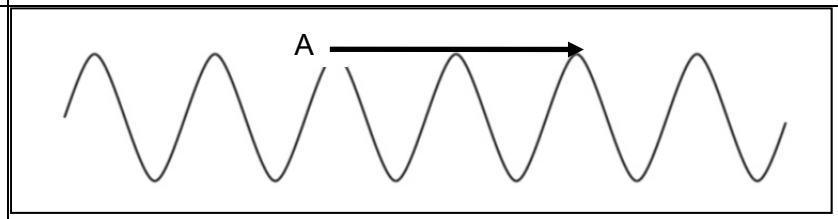
Question	Answer	Marks	Guidance
6 a	thermochromic (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank
b	A (1) idea of greatest percentage of solvent (1)	2	 **second mark is dependent on correct choice of A** answer must be comparative
	Total	**3**	

Question	Answer	Marks	Guidance
7 a	ethanol + oxygen → carbon dioxide + water (1)	1	**allow** = instead of → **not** and / & / instead of + **allow** correct formulae but equation does not need to balance e.g. $C_2H_5OH + O_2 \rightarrow CO_2 + H_2O$ **allow** mix of correct formulae and words
b i	soot / carbon (1)	1	**allow** phonetic spelling **ignore** ash
b ii	**any two from:** soot produced (1) **less** energy or heat released (1) (poisonous) carbon monoxide produced (1)	2	 **ignore** references to colour of flame
c	(no because) **any two from:** both fuels give same temperature **rise** (1) **BUT** **smaller** mass of ethanol burned (1) cost of fuel burned is **less** for ethanol (1)	2	**marks are for explanation** **ignore** yes **ignore** incorrect temperature rise **answers must be comparative** **assume unqualified answer refers to butanol** **allow** reverse arguments for butanol
	Total	**6**	

Question	Answer	Marks	Guidance
8 a	Gore-Tex® (1) idea that Gore-Tex® is **waterproof** and **breathable** (1)	2	 **allow** Gore-Tex® can breathe **ignore** other factors
b i	will not decay / will not decompose (by bacterial action) (1)	1	**allow** does not rot / will not break down (1) **ignore** does not disintegrate / does not deteriorate / does not wear away / does not degrade / cannot be destroyed / does not corrode / does not dissolve
b ii	**any two from:** using a landfill site / bury underground / aw (1) idea of burning / incineration / combustion (1) recycling (1) cracking (1)	2	 **ignore** reuse
	Total	**5**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>9 a i</td><td>C (1)</td><td>1</td><td>more than one answer scores 0</td></tr>
<tr><td>a ii</td><td><table><tr><th>atom</th><th>number</th></tr><tr><td>C</td><td>2</td></tr><tr><td>H</td><td>4</td></tr><tr><td>O</td><td>2</td></tr></table></td><td>2</td><td>all three correct scores (2)
two correct scores (1)
one correct scores (0)</td></tr>
<tr><td>a iii</td><td>C (1)</td><td>1</td><td>more than one answer scores 0</td></tr>
<tr><td>a iv</td><td>C_2H_4 / H_2 (1)</td><td>1</td><td>allow reactant indicated in equation (e.g. circled) if answer line is blank
allow both reactants, however written, e.g. $C_2H_4 + H_2 \rightarrow H_2$</td></tr>
</table>

Question	Answer	Marks	Guidance
b	**[Level 3]** Answer describes the polymerisation of propene, including the conditions needed, and gives the name of the polymer made. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** **Answer describes the polymerisation reaction of propene and gives the name of the polymer made** **OR** **names the polymer and gives at least one condition** **OR** **describes the polymerisation reaction and gives at least one condition** **OR** **gives both conditions needed** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** **Answer attempts to describe the polymerisation reaction of propene** **OR** **gives the name of the polymer made** **OR** **gives one condition** Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C** **Indicative scientific points at Level 3 must include:** • conditions needed are **high** pressure and a catalyst (**ignore** refs to temperature) **Indicative scientific points at Levels 1, 2 & 3 may include:** • propene is a small molecule / monomer • propene is an alkene (monomer molecule) • propene contains a double bond • double bond makes propene reactive • many monomer molecules join together • a large or long chain polymer molecule is made • reaction is a polymerisation reaction • double bond in propene is broken • reaction is an addition polymerisation reaction • polymer made is poly(propene) / polypropene **allow** marks via equations and structures e.g.  implies many monomers and a polymer **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	Total	**11**	

Question	Answer	Marks	Guidance
10 a	arrow from A to position two wavelength away (1)	1	 **allow** line without the arrow / double headed arrow **allow** any arrow two wavelength long in either direction
b i	3 (cm/s) (2) **but if answer incorrect** 2 x 1.5 (1)	2	 **allow** 4÷2 x 1.5 (1) **or** 4 x 1.5 (1) **or** 6 (cm/s) (1)
ii	doubles / 6 (cm/s) (1)	1	**allow** ecf for numerical answers only from (b)(i) e.g. if (b)(i) is 6 cm/s then allow 12 cm/s (1) **allow** gets higher / gets faster / increases / aw (1) **but** answer must not contradict 10(b)(i)
c	no (no mark) idea that (all electromagnetic) waves travel at the same speed (in vacuum) (1)	1	**if yes, 0 marks** **allow** travel at 3 x 10^8 m/s (1)
	Total	**5**	

Question	Answer	Marks	Guidance
11	**[Level 3]** **Makes one correct calculation that identifies safe time or SPF** **AND** **explains why dark skin allows longer safe time in the sun.** Quality of written communication does not impede communication of the science at this level (5 – 6 marks) **[Level 2]** **Makes one correct calculation that identifies safe time or SPF** **OR** **explains why dark skin allows longer safe time in the sun.** Quality of written communication partly impedes communication of the science at this level (3 – 4 marks) **[Level 1]** **identifies difference in skin colour as important** Quality of written communication impedes communication of the science at this level (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C** **To reach Level 3 answer must refer to pigment or melanin** **Indicative scientific points at level 2 and 3 may include:** **Calculation** • Anton safe time - Bronzer 75 (minutes) / Toptan 225 (minutes) • Ben safe time - Bronzer 300 (minutes) / Toptan 900 (minutes) • Anton should use SPF 36 • Ben should use SPF 9 **Explanation** • dark skins contain more pigment / dark skins contain more melanin / ora • pigment or melanin absorbs UV / pigment or melanin stops UV **ignore** pigment or melanin filters UV **Indicative scientific points at level 1 may include:** • dark skin does not burn as much • dark skin can stay in sun longer • dark skin stops UV / dark skin blocks UV • lower spf needs reapplying **allow** ora **Use the L1, L2, L3 annotations in scoris; do not use ticks.**
	Total	**6**	

Question	Answer	Marks	Guidance
12 a	80 (°C) (1)	1	
b	**steeper gradient** from 100°C (1) line levels out at 80°C (1)	2	**allow steeper gradient** reaches 80°C in less time than original graph if line does not start at 100°C(1) **ignore** any lines drawn after horizontal line at 80°C
c	**any two from:** (idea that bubble wrap) contains <u>trapped</u> air OR bubbles of air OR air pockets (1) air is a (good) insulator / air is a poor conductor (1) (air is trapped so) less convection (currents) (1)	2	 **ignore** "it" traps air, if unqualified **ignore** air in the bubble wrap (stem of question) **allow** plastic / bubble wrap is a (good) insulator (1) **allow** less conduction (1) **allow** prevents OR stops heat loss by conduction OR convection (1)
	Total	**5**	

Question	Answer	Marks	Guidance
13 a i	idea of detects OR senses person (1) **but** idea of detects OR senses (body) heat / infrared (from person) (2)	2	**ignore** sees the person **ignore** ideas of light reflecting / detecting movement
ii	idea of making sure it points at the person (walking towards the doors) / idea that the doors open (in time) **before** the person gets to the doors (1)	1	**allow** to make sure it detects OR senses the person / person's body / person's heat (1) **ignore** ideas of detecting movement **allow** converse arguments e.g. it might not detect the person (if at wrong angle) (1) **ignore** just so that doors open
b i	takes a shorter time to reach the sensor (1)	1	**allow** person gets in the way / hits the person (1) **allow** reflects or bounces (from the person) (1)
ii	**any two from:** idea that the results can be checked (1) idea that the results can be compared (1) to make other scientists aware of the work that has been done (1) allows other scientists to collect further evidence / so other scientists can develop the work (1) idea of recognition for work / improve career / become famous (1)	2	 **ignore** other people or public **ignore** financial remuneration
	Total	**6**	

Question	Answer	Marks	Guidance
14 a	value in the range of 57 to 63 (%) (1)	1	
b	1700 (1) **because** has the lowest % loss (per km) / only has 51% loss (1)	2	**allow** ecf from (a) if answer to (a) is less than 51% **allow** loses the least signal (strength) (1)
	Total	**3**	

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