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 2015

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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.

Annotations used in scoris

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt **not** given
	error carried forward
	information omitted
	ignore
	reject
	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

MARK SCHEME

Question	Answer	Marks	Guidance
1 a i	**any two from:** idea grow towards light / away from gravity (1) (get light) for photosynthesis (1) idea of more chance of survival (1)	2	**allow** grow towards the Sun / to get light or energy from the Sun (1) **allow higher level answers** eg (shoots are) **positively** phototropic / **negatively** geotropic (1)
ii	**any one from:** get water / minerals (1) idea of anchorage (1) idea of growing towards gravity (1)	1	**allow** to get moisture (1) **ignore** get nutrients / get food **allow higher level answers** eg (roots are) **negatively** phototropic / **positively** geotropic (1)
b	hypothesis ✓ observation prediction variable (1)	1	**more than one tick scores 0**
	Total	**4**	

Question	Answer	Marks	Guidance
2 a	**Level 3** **Describes a detailed pattern including data** **AND** **explains a reason why temperature increases in terms of respiration and decreases in terms of evaporation of sweat.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2** **Describes a simple pattern** **AND** **gives a simple explanation why temperature increases or a simple explanation why temperature decreases.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** **Describes a simple pattern** **OR** **gives a simple explanation why temperature increases or a simple explanation why temperature decreases.** 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. (0marks)	6	**This question is targeted at grades up to C** **Indicative scientific points at Level 3 may include:** • temperature goes up during exercise to **37.34 °C (± 0.02)** / temperature increases by **0.7°C (±0.02)** • temperature returns to **36.6°C** after exercise • exercise causes increase in body temperature because **respiration** (in muscles) **increases** • idea that temperature goes down because of **evaporation** of sweat • sweat **evaporates** and takes heat energy from the body **Indicative scientific points at Levels 1 & 2 may include:** **Description** • temperature goes up / he gets warm or hotter, during exercise • temperature goes down / he cools down, after exercise **Explanation** • idea that sweating causes a decrease in body temperature • idea that (exercise causes increase in body temperature because) muscles are working harder **ignore** (exercise causes increase in body temperature because) heart beats faster **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**

Question	Answer	Marks	Guidance
b	Eat a diet with no proteins. ☐ Eat less salt. ✓ Eat only saturated fats. ☐ Increase body mass. ☐ (1)	1	**more than one tick scores 0**
c	carbohydrates (1)	1	
	Total	**8**	

Question	Answer	Marks	Guidance
3 a	growth / repair (1)	1	**allow** make enzymes (1) **allow** source of amino acids (1) **allow** build muscles up (1) **ignore** gain weight / get stronger **ignore** for a healthy diet
b i	source 1 **and** (EAR =) 42 (g) (2) **but** 42 (g) with no reference to source 1 (1) **but if answer is incorrect then** source 1 **and** 0.6 x 70 (1)	2	**allow** teenage males **and** (EAR =) 42 (g) (2) **allow** source 1 is 10g more / source 2 is 10g less (2) unqualified reference to source 1 scores 0

Question	Answer	Marks	Guidance
ii	**any two from:** **age** source 1 based on age **or** idea that source 2 or EAR does not take into account age (1) **mass** idea that source 1 does not take into account body mass or weight **or** source 2 or EAR is based on mass or weight (1) **gender** source 1 based on gender **or** source 2 is not based on gender (1)	2	**allow** reference to teenage males instead of source 1 **allow** source 2 or EAR based on body size (1) **ignore** source 2 or EAR is based on height **ignore** source 2 is calculated by EAR If no other mark awarded, **allow** idea that (recommended amounts of protein) vary with age / body mass / gender (1) i.e. without specific mention of source 1 or 2 **ignore** idea that source 1 is only an average as true for both
	Total	**5**	

Question	Answer	Marks	Guidance
4 a i	brain **and** spinal cord (1)	1	**Both required for the mark** **not** brain **and** spine **not** brain **and** spinal column
ii	electrical (1)	1	**allow** electric (1) **ignore** electronic
b	**any three from:** smoke without tobacco (1) because the tobacco is (more) harmful (1) (if legalised) make cannabis available on prescription only (1) so that it can be more controlled (1) (have cannabis in) tablet form / spray form (1) idea that harmful effects on airways are reduced (1)	3	 **allow** (tobacco) causes named effect such as emphysema / cancer (1) **allow** so they can only have so much / can be monitored / less likely to take other drugs / know the correct strength or dose / decrease strength of cannabis (1) **ignore** just idea of make cannabis legal
c i	26 (%) (1)	1	
ii	**any two from:** most or many people want cannabis available legally / ora (1) idea that nearly half or most or many want it available on prescription / for medicinal purposes (1) legal through licensed outlets and illegal have the same values (1) freely available and no penalty have the same values (1)	2	**allow** both marks for quoting data from the pie chart eg 17% think it should be illegal (1) **but** 17% think it should be illegal and 9% want it available like tobacco or alcohol (2) **allow** idea that there are (lots of) different opinions (1)
	Total	**8**	

Question	Answer	Marks	Guidance
5 a	because it contains bromine / does not contain carbon and hydrogen **only** (1)	1	**allow** has Br in the formula (1) **ignore** contains bromine water **ignore** contains a bromine molecule **allow** C and H for carbon and hydrogen **not** does not contain carbon and hydrogen molecules **only** **not** does not contain hydro and carbon **only**
b	polymerisation (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank **more than one answer scores zero**
c	poly(bromoethene) / polybromoethene (1)	1	**not** poly on its own **not** poly(bromoethane) / polybromoethane
	Total	**3**	

Question	Answer	Marks	Guidance
6 a	**any two from:** non-toxic (1) does not react with water (1) does not irritate skin (1) insoluble in water (1)	2	 **allow** non-poisonous (1) **allow** idea of no allergic reaction (1) **allow** non-corrosive (1) **allow** isn't washed off easily (1) **allow** doesn't stain clothes / skin (1) **ignore** not harmful / is safe **ignore** colourless **ignore** must be a liquid
b	**(carboxylic) acid** (1) (+ alcohol → ester + water)		**allow** organic acid (1) **not** acid catalyst **not** any named acid other than a named carboxylic acid
	Total	**3**	

Question	Answer	Marks	Guidance
7 a	(yes because) carbon monoxide is made (in incomplete combustion) (1) carbon dioxide is not made (in incomplete combustion) (1) soot is produced / carbon is made (in incomplete combustion) (1)	3	**marks are for explanation** **ignore** no **allow** complete combustion produces carbon dioxide (1) **allow** idea that less energy is given out / only 1100J is given out (in incomplete combustion) (1)
b	(use) limewater / calcium hydroxide (1) **then** (which goes) cloudy (1)	2	**The second marking point is dependent on the correct chemical** **ignore any reference to method** **ignore** use of an indicator / litmus paper **ignore** reference to blowing through a straw **allow** goes milky / goes white (1) **allow** a white solid or white precipitate or white suspension is formed (1) **ignore** put out lighted splint
c	ethanol + oxygen → carbon dioxide + water	1	**allow** = or ⇌ instead of → **not** and / & / instead of + **not** '+ heat' in equation, but **allow** heat above arrow **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 **not eg** ethan**al/**ethon**al** + oxygen → carbon dioxide + water
	Total	**6**	

<table>
<tr><th colspan="2">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>8</td><td>a</td><td>(fractional) distillation (1)</td><td>1</td><td>allow fractionation (1)</td></tr>
<tr><td></td><td>b</td><td>propane (1)</td><td>1</td><td>allow correct answer ticked, circled or underlined in list if answer line is blank

more than one answer scores 0</td></tr>
<tr><td></td><td>c</td><td><table><tr><th>atom</th><th>number</th></tr><tr><td>C</td><td>6</td></tr><tr><td>H</td><td>14</td></tr><tr><td>O</td><td>1</td></tr></table>
all three correct scores (2)
two correct scores (1)
one correct scores (0)</td><td>2</td><td></td></tr>
<tr><td></td><td>d</td><td>idea of (cracking converts) large (hydrocarbon) molecules or chains into smaller ones (that are more useful) (1)

and any two conditions from

catalyst / named catalyst e.g. zeolite or aluminium oxide (1)

high temperature (1)

high pressure (1)</td><td>3</td><td>allow breaks down hydrocarbons (1)
allow higher level answers
e.g. (cracking converts) large alkane molecules into smaller alkane / alkene molecules (1)

allow catalyst even if linked with incorrect name (1)

allow any temperature above 200°C (1)
allow heat / hot (1)
not warm

allow any quoted pressure above atmospheric pressure (1)
allow under pressure (1)
ignore just pressure</td></tr>
<tr><td></td><td></td><td>Total</td><td>7</td><td></td></tr>
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Question	Answer	Marks	Guidance
9	**Level 3** **Explains why <u>BOTH</u> LDPE and HDPE are suitable for their uses, giving at least two relevant reasons for each plastic.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) *Level 2* **Explains why <u>BOTH</u> LDPE and HDPE are suitable for their uses, giving at least one relevant reason for each plastic** **OR** **Explains why <u>EITHER</u> LDPE or HDPE are suitable for their uses, giving at least two relevant reasons.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** **Explains why <u>EITHER</u> LDPE or HDPE are suitable for their uses, giving one relevant reason.** 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 may include:** LDPE is used for making plastic carrier bags because • it has a low density (so will not be heavy to carry) • it is flexible (so will bend to accommodate shopping) • idea that it's strong (enough to hold the shopping) • idea that maximum useable temperature is above normal room temperature HDPE is used for making water pipes because • it has a low density (so doesn't require heavy lifting equipment to install) • it is strong (so will not break easily) • it is rigid (so pipe will not bend) • idea that its maximum useable temperature is above boiling water or above the temperature of any liquid that will flow through the pipe / pipes will not melt with hot water **ignore** biodegradability **ignore** just quoting numerical data from the table eg LDPE has a density of 0.91 (g/cm^3) **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**
	Total	**6**	

Question	Answer	Marks	Guidance
10 a	**any two from:** no wires (to connect to each other) / wires do not get tangled / no wires to trip over / AW (1) idea that (all) the devices are portable (1) devices can be in different parts of the house (1)	2	 **allow** specific examples e.g. only need to plug in to recharge (1) **allow** idea that devices can be anywhere (in the world) (1)
b	electromagnetic (radiation) (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank **more than one answer scores 0**
	Total	**3**	

Question	Answer	Marks	Guidance
11 a	**Level 3** **measurements** **AND** **results explained** **AND** **missing energy calculated** Quality of written communication does not impede communication of the science at this level (5 – 6 marks) **Level 2** **measurements AND missing energy calculated** **OR** **measurements AND results explained** **OR** **missing energy calculated AND results explained** Quality of written communication partly impedes communication of the science at this level (3 – 4 marks) **Level 1** **measurements** **OR** **results explained** **OR** **missing energy calculated** 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** **measurements may include:** • measure the mass of water / keep the mass of water the same for each experiment • measure temperature at the start • measure temperature at the end all three measurements required for level 3 **results explained may include:** • greater temperature increase requires more energy • the energy decreases each time by 8400 (J) as go down table • a 10^0C change changes the energy by 8400 (J) **allow** any correct data quoted from the table **ignore** references to greater temperature increase **producing** more energy **missing energy calculated** • missing result is 16800 (J) result written in the table takes precedence over result written in the body of the answer if values are different **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**

Question	Answer	Marks	Guidance
b i	**any two from** idea of wrap (insulating) material around (the cup) (1) suitable named insulating material (1) use foil (to reflect heat) (1) put a lid on it / cover top of cup (1)	2	 **allow** stand on insulating material (1) **ignore** put insulating material **inside** the cup **ignore** insulate the cup examples of named insulating material include bubble wrap / foam / paper / cardboard / wool / polystyrene **ignore** idea of using a cup made of a different material
ii	no or reduced convection (currents) (1)	1	**allow** the air cannot move / air is a (good) insulator / air is a poor conductor / air is trapped (1) **allow** reduces heat loss (1) **ignore** no heat loss **not** traps heat
iii	less time needed / quicker / faster (1) **then any one from:** less energy lost or less heat lost (1) (so) less energy needed or less heat needed (1)	2	 **allow** less heat escapes (1) **allow** less convection / less conduction / less radiation (1) **ignore** no heat loss / no energy loss
	Total	**11**	

Question	Answer	Marks	Guidance
12 a	strong waves linked to high level of ozone (1) weak waves linked to low level of ozone (1) **but** strong**er** waves linked to more ozone **or** weak**er** waves linked to less ozone (2)	2	**ignore** ref to more or less long waves
b i	causes (skin) cancer / sunburn / premature (skin) aging (1) causes (eye) cataracts (1)	2	**allow** damage to (skin) **cells** / (idea of) mutation (1) **ignore** just 'skin damage' **allow** causes lens or eyes to go cloudy (1) **allow** causes damage to the retina (1) **ignore** just 'eye damage' **ignore** causes blindness
ii	**any two from:** use sunscreen / use suncream / use sunblock (1) wear clothes / wear hat (1) limit time in the sun / move to the shade (1)	2	 **allow** use (high factor) SPF (1) **allow** avoid sunlight (1) **allow** wear sunglasses (1) **allow** avoid sun tanning beds (1)
	Total	**6**	

Question	Answer	Marks	Guidance
13 a	**any one from:** idea of microwaves are longer (wavelength) / infrared radiation are shorter (wavelength) (1) idea of microwaves have a lower frequency / infrared radiation has a higher frequency (1)	1	 **allow** microwaves have a bigger or higher wavelength / infrared radiation has a smaller wavelength (1) **allow** there are more infrared waves every second / ora (1)
b	true true false all three correct scores (2) two correct scores (1) one correct scores (0)	2	
c	 **C** (1) optical fibres use (total internal) reflection / TIR **and** most cost effective (1)	2	**B** or **D** scores 0 for the question **allow** 45 (1) **allow** correct answer ticked, circled or underlined in list if answer line is blank **more than one answer scores 0** **allow** uses (total internal) reflection / TIR **and** cheap**er** (than A) / second cheapest / **only** costs £45 (per metre) (1) **ignore** cheap / cheapest, if unqualified if no other marks awarded **allow A** because of TIR (1)
	Total	**5**	

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