OCR
Oxford Cambridge and RSA

GCSE

Further Additional Science B

Unit **B761/01:** Modules B5, C5, P5 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2016

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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.

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	AB positive **and** AB negative (1)	1	**both answers needed either order** **allow** positive AB **and** negative AB (1) **allow** ab positive **and** ab negative (1)
b i	4 (1)	1	
b ii	The supply of O positive would have lasted longer than the other blood groups. ☐ There was less supply of group B positive blood than group B negative. ☐ The banks would have run out of O positive blood in 3 days. ☐ The supply of blood group O negative and B negative was the same. ✓	1	more than one tick = 0
c	**any one from:** during an operation (1) treat haemophiliac / sickle cell anaemia / other named inherited disorders (1) blood loss during childbirth(1) treat anaemia (1)	1	**allow** for organ transplants (1) **ignore** blood clot **allow** unable to produce own blood (in leukaemia) (1) **ignore** they haven't got enough blood in their bodies
d	**any two from:** closed - blood transported in blood vessels(1) closed – has veins / arteries / capillaries (1) closed –idea that organs are bathed in tissue fluid (1) open – organs are bathed in blood (1)	2	it refers to closed system unless qualified. **allow** open-doesn't have blood vessels / closed- does have blood vessels (1) **allow** only tissue fluid / plasma leaks out (1) **allow** open- blood flows through the body freely (1) **allow** low blood pressure in open / high blood pressure in closed (1)
	Total	**6**	

Question	Answer	Marks	Guidance
2 a	humerus (1)	1	
b	compound / open(1) the bone is sticking out of the skin / skin has been cut or broken (1)	2	**ignore** complex fracture **ignore** cuts through muscle
	Total	**3**	

Question	Answer	Marks	Guidance
3 a	**Level 3** **Answer includes a full explanation that does refer to molecule size <u>AND</u>** **diffusion <u>OR</u> the role of carbohydrase.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2** **Attempts a simple explanation that does refer to molecule size <u>OR</u> solubility <u>OR</u> the role of carbohydrase.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** **Attempts a simple explanation that may not refer to molecule size or the role of carbohydrase or solubility**. 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 may include:** • sugar molecules are smaller than starch molecules so they can **diffuse** out of the visking tubing / ora • starch molecules are not broken down in tube A so no sugar present to be absorbed into the water • carbohydrase breaks down / digests starch in tube B into sugar. **Indicative scientific points at Level 2 may include:** • sugar molecules are smaller than starch molecules/ora • starch molecules are too large to get through holes • starch molecules are made up of many sugar molecules joined together • starch is insoluble / sugar is soluble • carbohydrase/enzyme is needed to make sugar • carbohydrase/enzyme breaks down starch into sugar. **Indicative scientific points at Level 1 may include:** • starch cannot get out of the visking tubing • sugar can get out of /released from the visking tubing • sugar only present if there is carbohydrase. • digestion changes starch to sugar **Reference to diffusion without molecular size (maximum of level 2)** **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question	Answer	Marks	Guidance
b	**any two from** there would be no sugar in either tube (1) lipase will **not** breakdown starch (1) lipase breaks down/acts on fats or lipids (1) carbohydrases breakdown/act on starch (1) enzymes are specific (to one substrate) (1)	2	**ignore yes or no** **ignore** lipase will not react with starch **allow** lipase **only** breakdown or act on fats (2) **ignore** lipase breaks down fatty (acid) **allow** carbohydrases **only** breakdown/act on starch (2) **ignore** carbohydrases react with starch
	Total	**8**	

Question	Answer	Marks	Guidance
4 a i	700 (cm^3) (2) **but if incorrect** 2500 -1800 (1)	2	
a ii	**any two from:** increase (1) **but** sweat more (on hot days) (2) idea that water lost from skin is needed to cool you down (1)	2	**allow** idea that more may be drunk (so need to lose more) (1)
b	100 (cm^3) (1)	1	

Question	Answer	Marks	Guidance
c i	**kidney** (1)	1	**not** bladder / liver
c ii	**for** **any one from** idea that somebody can benefit from the death of a person (1) idea that donors want to donate so their loss of life is allowing another person to live (1) **against** **any one from** idea that the donor may (need to) die before the organ is available(1) idea that relatives may not want to donate organs from their loved ones (1) idea that it is difficult to decide who gets the organ (1)	2	 **allow** saving a life (1) **allow** donors can help another person (when they die) (1) **allow** issues involved in using live donors, such as paying people for kidneys (1) **allow** idea of needing to consider religious beliefs e.g. bodies need to be left intact after death (1) **allow** just 'playing God' / not letting natural selection happen (1)
	Total	**8**	

Question	Answer	Marks	Guidance
5 a	burette (1)	1	**allow** correct answer ticked , underlined or circled if answer line left blank
b i	2 (1)	1	
ii	30 (cm^3) (1)	1	
iii	60 (cm^3) (1)	1	**allow** ecf i.e. 2 x answer to part (ii) (1)
	Total	**4**	

Question	Answer	Marks	Guidance
6 a	No (no mark) **D** is not the steepest gradient (1) **D** is the slowest reaction (1)	2	**If yes no mark** **allow A** has the steepest gradient (1) **allow A** is the fastest (1) **allow** with **D** it takes longer for the mass to be lost / ora (1)
b	reactant not in excess / reactant that is all used up (at the end of the reaction) / reactant that is used up (first) (1)	1	**ignore** only lasts a limited time **allow** runs out (first) / reactant that controls how much product is made (1) **allow** it will run out (first) (1)
c	$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ formulae (1) balancing (conditional on correct formulae) (1)	2	**allow** any correct multiple, including fractions e.g. $2CaCO_3 + 4HCl \rightarrow 2CaCl_2 + 2CO_2 + 2H_2O$ (2) **allow** = or $\rightleftharpoons$ instead of $\rightarrow$ **not** and or & balancing mark is dependent on the correct formulae but **allow** 1 mark for a balanced equation with a minor error in subscripts or case e.g. $CaCo_3 + 2HCl \rightarrow CACl2 + CO_2 + H_2O$ (1)
d	idea that peer review is scientists checking each other's work (1) **then any one from** important as it allows work to be replicated (1) provides information to others (1)	2	**allow** to ensure results are accurate (1) **allow** so work can be developed further (1) **allow** Idea of avoiding plagiarism (1)
	Total	**7**	

Question	Answer	Marks	Guidance
7 a	a gas or carbon dioxide is given off (1)	1	**not** if incorrect gas e.g. hydrogen is given off **ignore** references to evaporation
b	1.60 (g) (1)	1	**allow** 1.6 (g)
c i	molar mass of copper carbonate is 124 (g/mol) (1)	1	
ii	% by mass is 51.6 (%) (1)	1	**allow** 52 (%) (1) **allow** ecf from part (i)
	Total	**4**	

Question	Answer	Marks	Guidance
8	**Level 3** **Describes differences and similarities between the reactions of hydrochloric acid and ethanoic acid with reference to pH <u>AND</u> reaction with magnesium.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2** **Describes at least one difference <u>AND</u> one similarity** **<u>OR</u>** **two similarities** **<u>OR</u>** **two differences** **between the reactions of hydrochloric acid and ethanoic acid.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** **Describes one difference <u>OR</u> similarity between the reactions of hydrochloric acid and ethanoic acid.** 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.** **Indicative scientific points may include:** **Differences** • pH of hydrochloric acid is lower than pH of ethanoic acid ora • hydrochloric acid releases more H^+ than ethanoic acid (at the same concentration) • reaction with magnesium is faster with hydrochloric acid ora • hydrochloric acid makes magnesium chloride and ethanoic acid makes magnesium ethanoate • hydrochloric acid releases more energy than ethanoic acid. **Similarities** • both react with magnesium to make hydrogen • make the same volume of hydrogen • both reactions are exothermic • both form a colourless solution • both bubble or fizz. **allow** higher level answers e.g. dissociation or collision theory **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
		6	

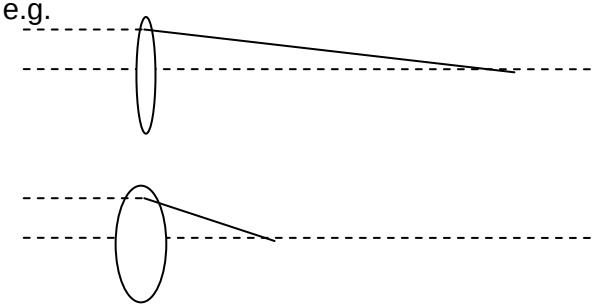
Question	Answer	Marks	Guidance
9 a	increasing the temperature – reduces percentage of ethanol (1) increasing the pressure – increases the percentage of ethanol (1)	2	**allow** ora
b	reversible reaction – idea of reaction that goes both ways (1) the symbol ⇌ shows that the reaction is reversible (1)	2	**allow** returns to original reactants (1) **ignore** reaction can be undone
	Total	**4**	

Question	Answer	Marks	Guidance
10 a	trajectory (1)	1	**answer line takes precedence** more than one answer indicated = 0 marks
b	as **angle** increases the distance increases (1) and then decreases (1)	2	**allow** just distance increases and then decreases (1) **allow** quantitative answers e.g. greater angle increases the distance / ball travels further up to 40 degrees or 45 degrees or 50 degrees (1) greater angle decreases the distance / ball doesn't travel as far after 44 degrees or 50 degrees (1)
c	peak at 45 degrees (1) take a reading between 40 degrees and 50 degrees (1)	2	**allow** answer in the range of 44 degrees – 46 degrees (1) **allow** take reading at 45 degrees (1) **allow** take readings at 1 degree intervals / AW (1) **allow** test between 40 and 50^{o} (1) **ignore** change angles 5^{o} at a time
d	(The horizontal distance travelled at 80 degrees is) 16.1 (m) (1) (The horizontal distance travelled at 90 degrees is) 0 (m) (1)	2	**allow** answer in the range 15.1 – 17.1 (m) (1) **allow** answer in range of 0 – 1 (m) (1)
	Total	**7**	

Question	Answer	Marks	Guidance
11 a	idea of light and dark bands / dots / AW (1) **or** appropriate diagram e.g.  (1)	1	minimum of three bands or dots required for the mark **ignore** curved lines
b	**any two from** the light or waves overlap (1) waves can add together (1) waves can subtract from each other (1)	2	 **allow** constructive interference (1) **allow** destructive interference (1) **allow** waves cancel each other out (1)
	Total	**3**	

Question	Answer	Marks	Guidance
12 a	0 (m/s) (2) **but if answer incorrect** 4.8 – (0.4 x 12) (1) **or** 4.8 – 4.8 (1)	2	 **allow** 0.4 x 12 on its own (1)
b	7.2 (m) (2) **but if answer incorrect** $\frac{4.8 \times 3}{2}$ (1)	2	 **allow** 2.4 x 3 **or** $\frac{14.4}{2}$ **or** 14.4 (1)
c	20 (N) (1)	1	**answer line takes precedence**
	Total	**5**	

Question	Answer	Marks	Guidance
13	**Level 3:** **Answer recognises that there is greater particle speed creating more collisions.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2:** **Answer recognises that there is greater particle speed** **OR** **there are more collisions.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1:** **Describes how gas particles produce a pressure** **OR** **Describes why there is greater pressure when warmer.** 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 up to grade C** **Indicative scientific points may include:** **Level 3:** • faster particles / particles have more energy AND • more collisions. **allow** higher level answers in terms of KE **Level 2:** • faster particles / particles have more energy OR • more collisions. **ignore** particles move about more **Level 1:** • (gas) particles are moving • (gas) particles hit the sides of the bottle • more pressure when warmer • more bubbles (released) when warmer can push liquid out with more force. **allow** bigger bubbles **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	Total	**6**	

Question	Answer	Marks	Guidance
14 a	real (image) (1) on a screen / on a sensor / on a film (1)	2	**allow** upside down (1) **allow** diminished / enlarged (1) **allow** on back of camera (1) **ignore** digital / jpeg / raw format
b	a straight line (shown on either diagram) from incident ray to principal axis (1) comparison of diagrams show that thicker lens has a shorter focal length (1)	2	**ignore** line **in** lens **ignore** lines **below** principal axis e.g.  (2) **allow** on diagram angle of line for thicker lens is more acute than thin lens (1)
	Total	**4**	

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