

GCSE

Further Additional Science B

Unit **B761/02**: Modules B5, C5, P5 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2017

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

© OCR 2017

Annotations used in scoris

Annotation	Meaning
	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

MARK SCHEME

Question	Answer	Marks	Guidance
1 a	pituitary (gland) (1)	1	
b	inhibit FSH (1) so no ovulation / no egg release (1)	2	allow reduce FSH / no FSH (1) allow does not stimulate the egg to mature (1) not releases an egg (that is not fertilised) / reduce or stops the production of eggs / controls the production of eggs ignore references to the uterus lining / menstruation / periods / LH allow inhibits FSH which releases or matures an egg (2) if no other mark awarded allow mimics pregnancy / tricks the body into thinking it is pregnant / acts as though the egg has been fertilised (1)
Total		3	

Question	Answer	Marks	Guidance																								
2 a	<table border="1"> <thead> <tr> <th>Replacement body part</th> <th>Biological</th> <th>Mechanical</th> <th>Inside body</th> <th>Outside body</th> <th></th> </tr> </thead> <tbody> <tr> <td>kidney dialysis machine</td> <td></td> <td>(✓)</td> <td></td> <td>(✓)</td> <td></td> </tr> <tr> <td>artificial heart valve</td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td>(1)</td> </tr> <tr> <td>ovary transplant</td> <td>✓</td> <td></td> <td>✓</td> <td></td> <td>(1)</td> </tr> </tbody> </table>	Replacement body part	Biological	Mechanical	Inside body	Outside body		kidney dialysis machine		(✓)		(✓)		artificial heart valve		✓	✓		(1)	ovary transplant	✓		✓		(1)	2	1 mark for each correct line ignore 1 st row of table (answer given in question)
Replacement body part	Biological	Mechanical	Inside body	Outside body																							
kidney dialysis machine		(✓)		(✓)																							
artificial heart valve		✓	✓		(1)																						
ovary transplant	✓		✓		(1)																						

<p>b i</p>	<p>any four from</p> <p>less likely to wear out or break / not likely to wear out or break / lasts longer (1)</p> <p>no reaction to materials (1)</p> <p>do not need to wait (for a donor) (1)</p> <p>can be made to be the correct size (1)</p> <p>(exact) tissue match (1)</p> <p>no rejection (1)</p> <p>do not need to use immune-suppressant (drugs) (1)</p>	<p>4</p>	<p>ignore references to cost / just save a life</p> <p>allow do not need to be replaced / others types of transplants need to be replaced (1)</p> <p>allow does not recognise it as foreign / no antibodies produced / antibodies will not attack it / immune system will not attack it(1)</p> <p>allow idea that you need to wait for a donor for (biological) replacement / quicker (as own (stem) cells are used) (1)</p> <p>ignore close tissue match</p> <p>allow prevents rejection / body will accept transplant (1)</p> <p>ignore reduces the chance of rejection</p> <p>ignore just do not need medication</p>
-------------------	--	----------	---

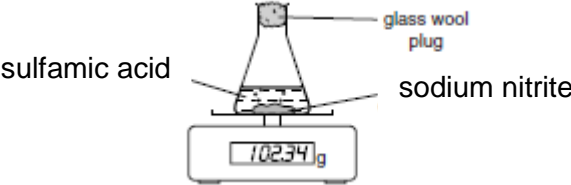
ii	<p>(no mark for no)</p> <p>any two from</p> <p>not using embryo (cells) / not harming potential life / saving (patient's) life (1)</p> <p>reduces need for donors / donors can be used for other patients (1)</p> <p>idea that they are their stem cells so can consent to using them (whereas an embryo cannot) (1)</p>	2	<p>if some objections or some concerns then ignore these but if just if yes then 0 marks for the question</p> <p>allow idea that adult stem cells cannot create life or grow into a person (1)</p> <p>ignore not using a baby</p> <p>allow idea that it only affects the person having the stem cells (1)</p> <p>allow idea that adults can make decisions about their own life / it is their decision (1)</p> <p>ignore just they are their own stem cells</p>
Total		8	

Question	Answer	Marks	Guidance
3 a	produces (small) electric current (1) stimulates muscle contraction / causes muscle contraction (1)	2	allow shocks the heart / causes electrical impulses or pulses (1) allow electronic for electric allow stimulates heart beat / maintain regular heart beat (1) allow increases or speeds up heart rate or heart beat (1) allow any muscular part or chambers of the heart to contract e.g. causes the atrium to contract (1) ignore references to relaxing ignore valves contracting ignore reference to nodes
b	idea that it allows the blood to flow more easily (1) so blood is less likely to form a blood clot (1)	2	allow idea that aspirin 'thins' the blood (1) allow blood less likely to agglutinate (1) allow stops a blood clot/agglutination (1) ignore reference to cholesterol / blocked arteries
c i	B (1)	1	
ii	E (1)	1	
iii	D (1)	1	
iv	100 (milliseconds) (1)	1	allow answer in range 90 -110 (milliseconds)
	Total	8	

Question	Answer	Marks	Guidance
4	<p>[Level 3] Describes jobs of all four parts AND describes movement at a hinge joint. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Explains the jobs of some of the parts AND describes movement at a hinge joint. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Explains the jobs of some of the parts OR describes movement at a hinge joint. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A</p> <p>Indicative scientific points may include:</p> <p>movement of joint</p> <ul style="list-style-type: none"> • backwards and forwards / up and down / left and right / one direction / extend and retract / move like a lever / move in one plane / more than 90° / (less than) 180° / AW <p>ignore references to other joints e.g. ball and socket</p> <p>explanations of the functions of the parts</p> <ul style="list-style-type: none"> • synovial membrane contains synovial fluid / produces synovial fluid • synovial fluid acts as a lubricant / shock absorber / reduces friction <p>ignore stops leaks</p> <ul style="list-style-type: none"> • cartilage reduces friction / stops bones rubbing together / cushions joint / acts as shock absorber/ allows bones to move smoothly against each other • ligament holds bones together / keeps bones in place / connects bones/ holds the joint together <p>Use the L1, L2, L3 annotations in RM; do not use ticks.</p>
	Total	6	

Question	Answer	Marks	Guidance
5 a	<p>mass of sodium ion = 3.14 (g) (2)</p> <p>BUT if answer incorrect then</p> <p>(M_r of NaCl =) 58.5 (1)</p> <p>or</p> <p>(% of Na in NaCl =) 39 (%) (1)</p> <p>or</p> <p>(number of moles NaCl =) $\frac{8}{58.5}$ or 0.136 (1)</p> <p>or</p> <p>$8 \times \frac{23}{23 + 35.5}$ (1)</p>	2	<p>allow full marks for correct answer with no working out or incorrect working out</p> <p>allow any inclusive value between 3.1 and 3.15 (2)</p> <p>allow any inclusive percentage between 39 to 39.4 (1)</p>
b	no - the answer is more than the GDA (1)	1	<p>allow no – there is too much salt or sodium (ions) (1)</p> <p>allow no – goes over the guidelines (1)</p> <p>allow no-it's more than 2.49(g) (1)</p> <p>allow ecf from incorrect answer to (a)</p>
	Total	3	

Question	Answer	Marks	Guidance
6	<p>conclusion for A is correct but for B it is incorrect (1)</p> <p>A contains hydrogen ions since universal indicator goes red and sulfate because barium chloride goes white (1)</p> <p>B is not a chloride since it does not go white with lead nitrate (1)</p>	3	<p>if not all marks awarded check table for marking points</p> <p>allow only A is correct / B is not supported / A is correct but B contains different ions (1)</p> <p>allow B should produce a white precipitate (1)</p> <p>allow B is not a chloride since goes yellow with lead nitrate (1)</p> <p>allow B contains iodide ions (rather than chloride ions as precipitate is yellow) (1)</p>
Total		3	

Question	Answer	Marks	Guidance
7	<p>Level 3 Complete description of the method and apparatus used AND Detailed explanation of why the rate of mass change decreases with time Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>Level 2 Complete description of the method and apparatus used OR Detailed explanation of why the rate of mass change decreases with time Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>Level 1 Incomplete description of the method and apparatus used AND simple explanation for why the total mass decreases Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>Level 0 Insufficient or irrelevant science. Answer not worthy of credit. (0marks)</p>	6	<p>This question is targeted at grades up to A. Indicative scientific points may include:</p> <p>Apparatus</p> <ul style="list-style-type: none"> • use of balance /measurement of mass • suitable container for reaction mixture e.g. conical flask, beaker not test tube or measuring cylinder • use of stopwatch/ reference to time • measure total mass of flask and contents at regular intervals • complete diagram of apparatus as below (glass wool plug not needed) <div style="text-align: center;">  </div> <p>Explanation</p> <ul style="list-style-type: none"> • gas is given off so mass decreases (ignore other products being given off) • mass stops changing as reaction stops / reaction stops as (sodium) nitrite/ (sulfamic) acid/ limiting factor is used up / reaction stops when 0.35-0.37 (g) loss or 84-86 (s) • rate of mass change decreases with time since concentration of reactants decreases • rate of mass change decreases with time since fewer collisions per second <p>allow mass for weight throughout ignore any incorrect named gases given off</p> <p>Use the L1, L2, L3 annotations in RM; do not use ticks.</p>
Total		6	

Question	Answer	Marks	Guidance
8 a	<p>any two from:</p> <p>more hydrogen ions / ora (1)</p> <p>more particles in a smaller or the same volume / ora (1)</p> <p>more collisions (per second) / ora (1)</p>	2	<p>assume answer refers to hydrochloric acid unless otherwise stated</p> <p>allow fully ionised / ora (1)</p> <p>allow more crowded particles /ora (1)</p> <p>allow more frequent collisions/ more successful collisions/ ora (1)</p> <p>BUT more hydrogen ions in a smaller or same volume (2)</p>
b i	0.0025 / 2.5×10^{-3} (1)	1	
ii	0.00125 / 1.25×10^{-3} (1)	1	allow ecf from (i) i.e. answer to (i) x 0.5
iii	0.03 (dm ³)	1	<p>allow 30 cm³ if unit quoted</p> <p>allow ecf from (ii) i.e. answer to (ii) x 24</p>
c i	CH ₂ O (1)	1	allow any order of symbols
ii	39.5 (1)	1	
	Total	7	

Question	Answer	Marks	Guidance
9 a	vanadium pentoxide / vanadium(V) oxide / V_2O_5 (1)	1	if both name and formula given both must be correct allow vanadium oxide with the correct formula
b	350 – 600 °C (1) 1 – 10 atmospheres / atmospheric pressure (1)	2	if range of numerical values given must be completely within range in mark scheme if no other marks scored allow 1 mark for high temperature or low pressure (1)
c	any one from increases rate of reaction (1) allows a lower temperature to be used (1)	1	allow speeds up (the reaction) (1) not increases yield allow saves energy (1) ignore cheaper
Total		4	

Question	Answer	Marks	Guidance
10	the average mass of an atom of an element (1) compared to $(1/12^{\text{th}})$ the mass of one atom of carbon-12 (1)	2	ignore the average mass of a particle of an element not the average mass of an element not compared to mass of carbon
Total		2	

Question	Answer	Marks	Guidance
11 a	geostationary (orbit) (1)	1	allow correct answer circled, underlined or ticked but answer line takes precedence
b	<p>[Level 3] Answer gives both correct relationships between speed AND required force (to keep it in a stable orbit). Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Answer gives one correct relationship between speed and required force (to keep it in a stable orbit). Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Answer indicates a correct effect of changing speed on orbit OR a simple appreciation that the speed and height have to be matched. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>Level 0: (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted up to grade A*</p> <p>Indicative scientific points may include:</p> <p>Level 3 :</p> <ul style="list-style-type: none"> • As speed increases centripetal force or gravitational force increases/ ORA • As speed increases it moves away from the Earth • As speed decreases it moves towards the Earth <p>Level 2 :</p> <ul style="list-style-type: none"> • As speed increases centripetal force or gravitational force increases/ ORA <p>OR</p> <ul style="list-style-type: none"> • As speed increases it moves away from the Earth <p>OR</p> <ul style="list-style-type: none"> • As speed decreases it moves towards the Earth <p>Level 1:</p> <ul style="list-style-type: none"> • idea that height and speed have to be matched e.g if closer speed needs to increase/ ora • speed change causes orbit to change e.g falls to Earth or moves away from the Earth <p>Use the L1, L2, L3 annotations in RN; do not use ticks.</p>

c	advantage any one from: people can go up to it / repair any damage / install new instruments (1) idea of good quality images / pictures are clearer / more detailed images (1) fast orbit so more images in short time (1) disadvantage idea that it does not spend much time in one area (1)	2	
----------	--	---	--

d	<p>(wave) X (1)</p> <p>(because) reflected by ionosphere / AW (1)</p> <p>(Wave) Z (1)</p> <p>(because) there is absorption / reduced signal strength / scattering / AW (1)</p>	4	<p>answers can be in any order</p> <p>second mark of this statement is dependent on first</p> <p>allow bounce off the ionosphere (1) not refracted in the ionosphere</p> <p>second mark of this statement is dependent on first</p>
Total		13	

Question	Answer	Marks	Guidance
12	<p>any four from</p> <p>idea that light slows when entering prism / light speeds up when leaving prism (1)</p> <p>light bends towards normal when entering prism / light bends away from normal when leaving prism (1)</p> <p>violet (light) refracts more / ora (1)</p> <p>violet (light) has shorter wavelength / ora (1)</p> <p>violet (light) has a higher frequency / ora (1)</p> <p>violet (light) has a higher refractive index (1)</p> <p>violet (light) has bigger changes in speed / ora (1)</p>	4	<p>allow violet (light) bends more / ora (1)</p> <p>ignore reference to energy</p> <p>allow violet light travels more slowly ora (1) allow violet (light) slows more when entering the prism ora (2)</p>
Total		4	

Question	Answer	Marks	Guidance
13 a i	13.4 (m/s) (1)	1	if table blank allow answer on the lines but answer in table takes precedence
ii	1.4 (m/s) (1)	1	allow ecf from ai (answer to ai -12)
b	5.23 (s) (2) but if answer is incorrect or incomplete then: $\frac{2 \times 110}{13 + 29}$ (1)	2	allow 5.238 or 5.24 or 5.2 (2) allow $\frac{220}{42}$ or $\frac{110}{21}$ (1)
Total		4	

Question	Answer	Marks	Guidance
14	drop distance = 200 (m) (4) if drop distance is incorrect or incomplete then: time = 4 (s) (3) or if drop distance is incorrect or incomplete then: $t^2 = 16$ or $80 = \frac{10t^2}{2}$ (2) if the above is incorrect or incomplete then: evidence of vertical initial velocity = 0 (m/s) (1)	4	allow examples of initial velocity =0 e.g u=0 (1)
Total		4	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2017



001