
SCIENCE FOR ALL**5031/02**

Paper 2

October/November 2019

MARK SCHEME

Maximum Mark: 60

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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This document consists of **8** printed pages.

PUBLISHED**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.

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)	<i>Any two from:</i> Looks pale / yellow eyes / swelling or pain in hands and feet / swelling in abdomen / pain in chest / does not grow as much as unaffected children / lack of energy / irritability or fussiness in babies / frequent infections / vision problems / ulcers take longer to heal / strokes / loss of appetite / nausea and vomiting / lack of calcium / hair loss	2
1(b)	Process may be risky for the patient / not natural / could have side effects ;	1
1(c)(i)	aa ;	1
1(c)(ii)	<i>Any three from:</i> (carrier) can pass it on to children / grandchildren / etc. ; (carrier) does not have the condition ; (carrier) has the faulty / recessive allele (a) ; (carrier) has the normal / dominant allele (A) ;	3
1(c)(iii)	25% ;	1

Question	Answer	Marks
2(a)	Numbers (of cases) go up (as time goes on) ; Gives more detail: the increases get greater and greater / quotes numbers from graph, e.g. 100 at the start and 1600 after 5 months ;	2
2(b)	<i>Any two from:</i> Need contact with an ill person to catch Ebola ; As more people become ill, more people will be in contact with an ill person ; poor hygiene ; treatment not readily available ;	2
2(c)	<i>Any two from:</i> (can treat with) antibiotics ; Because antibiotics work only on bacteria (and fungi) / do not work on viruses / do not work on Ebola ; Virus mutates / changes ;	2

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Question	Answer	Marks
3(a)	Correct food for all three ; A has the most powerful / biggest bill / beak (bigger than B) ; Describes shape of C , e.g. pointy / sharp ;	3
3(b)	For Huxley: Accounts for all observations ; Many similarities and differences in living things ; Speciation via diversification (and habitat separation), e.g. finch beaks; Explains the fossil record ; Links previously unexplained facts ; (now) supported by DNA studies ; For Wilberforce: Disagrees with established scientific teaching / books ; Cannot observe evolutionary changes (in a short time) ; Goes against religious teaching ;	3

Question	Answer	Marks
4(a)(i)	second NO molecule drawn on left of arrow ; second NO ₂ molecule drawn on right of arrow ;	2
4(a)(ii)	(NO) gains oxygen (to produce NO ₂) / reacts with oxygen ;	1
4(b)	oxygen and water (in either order) acid rain sulfur dioxide	3

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Question	Answer	Marks
5(a)	Tensile strength (can be) larger ; Melting point (can be) lower ; Quotes correct values to support either of the above / wider range for each property ;	3
5(b)	(Yess) mean tensile strength of copper alloys is greater / top of range is greater / quotes data 1310 and 600 ; (Kavi) ranges of tensile strength values overlap greatly ;	2
5(c)	The Earth's supplies of copper are running out (box 3) ; Large amounts of electricity are used to extract aluminium (box 4);	2

Question	Answer	Marks
6(a)(i)	Sand is being replaced / made anew ; by crushed corals / rocks grinding up ;	2
6(a)(ii)	<i>Any two from:</i> Being removed too fast / net loss of sand / sand will run out ; Replacement is too slow ; Non-renewability argument, e.g. erosion, habitats damage, effect on tourism ;	2
6(b)	polymerisation	1
6(c)	<i>Any two from:</i> Ryan's idea is easy to achieve, but Noë's idea is not ; check each boat as it docks / estimate fish population (from catch records) ; cannot really count the total fish population in Mauritian waters ;	2

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Question	Answer	Marks
7(a)	They are at plate boundaries	1
7(b)	<i>Any three from:</i> Plates are moving / colliding / rubbing against each other ; due to convection / movement in the mantle ; (At a boundary) the plates are moving differently in different directions ; Plates suddenly slip ;	3
7(c)	<i>Any three from:</i> Have stricter building regulations (and ensure they are followed) ; Buildings with flexible foundations ; Build stronger buildings ; Build lower buildings ; Encourage building further from plate boundaries ; Public education about what to do in an earthquake ;	3

Question	Answer	Marks
8(a)	Warms the Earth ; Allows plants to grow / photosynthesise ;	2
8(b)	The (surface) temperature of the Sun is much greater than that of the Earth ;	1
8(c)	<i>Any two from:</i> Incoming radiation (A) not absorbed by greenhouse gases ; Outgoing radiation (B) / IR absorbed by greenhouse gases ; Less energy emitted from the Earth than absorbed by it ;	2
8(d)	Reason for scepticism: not in personal experience / reluctance to accept frightening prospects / accept authority of sceptics / believe global warming is a conspiracy / Global warming is real because: More data confirm temperature rise / predicted consequences are already occurring / computer models confirm the links with human activities	2

Question	Answer	Marks
9(a)	A – radio (waves) ; B – X(-rays) ;	2
9(b)	<i>Any 2 from:</i> Sunlight contains UV / ionising radiation ; which damages cells / mutates cells / causes cancer ; reference to photon energy from table ;	2
9(c)	<i>Any 2 from:</i> Microwave photon energy is very, very small / $< 1 \mu\text{eV}$; Not enough energy to cause damage to cells ; Microwave energy is non-ionising ; Risk decreases with distance idea ;	2