Version 1.0: 0906

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science: Single Award 3463/1H
Specification B

Mark Scheme

2006 examination – June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Single Award (Co-ordinated)
Higher Tier 3463/1H

3463/1H Q1

question	answers	extra information	mark
(a)(i)	C		1
(ii)	lack of nucleus / others have a nucleus **or** chromosome / DNA / genetic material free in cytoplasm	accept plurals do **not** accept just 'has a strand of DNA'	1
(b)(i)	breathe in <u>air</u> / droplets exhaled by other people / breathe same air **or** higher concentration of bacteria in the <u>air</u> **or** more likely to be coughed on	mark for mechanism do **not** penalise reference to virus / TB / germ ignore answers involving proximity unqualified	1
(ii)	(bacteria / it) enter body / lungs by breathing / via air		1
(iii)	via the blood	accept via rbc or other components of blood accept lymph	1
(c)	any **two** from: • skin • scabs / clot • mucus / cilia • stomach acid / gut protease	accept tears do **not** accept ear wax / saliva / sebum apply list principle ignore nasal hair	2
total			7

3463/1H Q2

question	answers	extra information	mark
(a)	34	ignore working or lack of working $\frac{10\,200}{300}$ for **1** mark	2
(b)(i)	mouth / small intestine / duodenum / ileum		1
(ii)	amylase	accept phonetic spelling accept carbohydrase	1
(iii)	sugar / maltose / glucose / disaccharide / monosaccharide / dextrin		1
(iv)	small intestine / duodenum / ileum		1
total			6

3463/1H Q3

question	answers	extra information	mark
	Quality of written communication:	For correct use of scientific terms: at least **two** from: e.g. cancer, mutation, bronchitis, emphysema, arteries, atheroma, carbon monoxide, carcinogen, trachea, bronchus, bronchiole, cilia, alveoli, haemoglobin, mucus, red blood cell, white blood cell, ulcer, angina, nicotine, addiction, etc. annotate as Q ✓ or Q ✗	1
	any **four** from: • tar present • (chemicals from smoke / tar) enter the blood • mutation • (lung) cancer / reference to carcinogen • bronchitis / emphysema • less surface area / less oxygen enters blood • circulatory disease / blood clots / blocked arteries / heart attack / stroke • carbon monoxide • less oxygen carried by blood / CO combines with Hb • damage cilia / alveoli • microbes or correct named e.g. remain in lungs	do **not** accept just tar enters blood accept x **from** tar gets in the blood nb award less oxygen mark once only do **not** accept blocked by tar nb award less oxygen mark once only accept no oxygen	4
total			5

3463/1H Q4

question	answers	extra information	mark
(a)	cornea **and** lens	accept v / a humours	1
(b)	(muscle **A**) <u>contracts</u>		1
	<u>lens</u> gets fatter or <u>lens</u> bends light rays inwards more or <u>lens</u> becomes more converging / curved	do **not** accept lens expands / gets bigger	1
total			3

3463/1H Q5

question	answers	extra information	mark
(a)(i)	mitosis	do **not** accept 'meitosis' / 'miosis' **or** other hybrid spellings	1
(ii)	**D – B – A – C – E**		1
(b)(i)	mutation		1
(ii)	radiation / UV / X-rays / γ-rays / tobacco smoke / formaldehyde / mustard gas / smoking	accept any correct named mutagen	1
total			4

3463/1H Q6

question	answers	extra information	mark
	any **four** from: • fertilisers dissolve / washed / leached • growth of algae / water plants • block / reduce light • less photosynthesis / less O_2 produced • plants / algae die • rotting / decay caused by microorganisms / bacteria / saprotrophs • (microbes) use oxygen / are aerobic • less fish <u>respiration</u> • effect of hot weather <u>described</u> e.g. less O_2 dissolved in water **or** increased metabolism / growth of bacteria / increased fertiliser concentration	ignore 'decomposers'	4
total			4

3463/1H Q7

question	answers	extra information	mark
(a)(i)	**nn**	only accept other letters if key given	1
(ii)	**Nn**	accept other letters	1
(b)	parental genotypes correct – both **Nn**	N.B. can pick up chain of logic at any point correctly derived from candidate's previous point	1
	gametes correctly derived from **P** genotypes / correct gametes as starting point		1
	offspring genotypes correctly derived from gametes		1
	correct probability from candidate's offspring genotypes – e.g. ¼ / 1 in 4 / 0.25 / 25% / 1:3	do **not** accept '3:1' **or** '1:4'	1
(c)(i)	(cell) membrane		1
(ii)	gene only in lung cells or gene not transferred to gametes		1
total			8

3463/1H Q8

question	answers	extra information	mark
(a)(i)	protein molecule is too big (to pass through the filter) protein molecule cannot fit through filter	accept converse	1
(ii)	glucose is taken (back) into blood / is reabsorbed 100% by active transport / description or by kidney tubule		1 1 1
(b)	any **four** from: • water lost in sweating / breathing • lower water (concentration) in blood or higher salt (concentration) in blood • detected by hypothalamus • causes release of ADH from pituitary gland • causes increased water (re)absorption by the kidney		4
total			8