Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/31**

Paper 3 Theory (Core) **October/November 2019**

MARK SCHEME

Maximum Mark: 80

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.

Cambridge International is publishing the mark schemes for the October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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.

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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	Guidance
1(a)(i)	carbon, hydrogen, oxygen **;**	**1**	
1(a)(ii)	fatty acids **;** glycerol **;**	**2**	
1(b)	*any three from:* carbohydrates **;** proteins **;** (named)vitamins **;** water **;** (named) minerals **;** fibre **;**	**3**	
1(c)(i)	4 **;**	**1**	
1(c)(ii)	marmots and lynx have a higher percentage of body fat in Alaska than in Virginia /AW **; ora** marmots have a greater difference in percentage body fat (than lynx) **; ora** marmots have the higher percentage body fat than lynx in Alaska **/** lynx have a higher percentage body fat than marmots in Virginia **; ora**	**2**	
1(c)(iii)	*(Alaska is colder than Virginia)* so (more) fat is needed **: ora** for insulation **;** fat helps to, maintain body temperature **/** keep (mammal) warm / AW **;** (lynx and marmots) are mammals so they regulate their body temperature **;**	**2**	
2(a)	inherited / hereditary **;** survive **;** environment / habitat **;**	**3**	
2(b)(i)	4.4–4.5 (μm) **;**	**1**	

Question	Answer	Marks	Guidance
2(b)(ii)	9 ;	1	
2(b)(iii)	continuous / phenotypic ;	1	
2(c)	to swim, faster / further ;	1	
2(d)	testis ;	1	

Question	Answer	Marks	Guidance
3(a)(i)	**B** and **C** ; (**B**) is too cold / not optimum temperature / needs warmth ; (**C**) is dry / lacks water / needs to be damp ;	3	
3(b)	1 : 2 ;	1	
3(c)	chlorophyll (production) ; (named), amino acids / proteins ;	2	
4(a)(i)	decreases then increases and levels off ; lowest thickness (reached) at day 6 / decreases from day 0/1 to day 6 ; increases in thickness from day 6 to day 15 ; constant thickness between days 15 and 28 / 0 / end ;	3	
4(a)(ii)	day 0 / 1, to day 6 ;	1	
4(a)(iii)	**X** drawn on the graph at approximately day 14 ;	1	**A** ± 2 days
4(b)(i)	chemical ; gland ; blood / plasma ;	3	

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Question	Answer	Marks	Guidance
4(b)(ii)	increased rate of breathing **;** increased, pulse / heart, rate **;** widening of pupils **;** AVP **;;** e.g. more glucose in the blood **/** more alert	**2**	
4(b)(iii)	<u>adrenal</u> (gland) ;	**1**	
5(a)	both use glucose **;** both occur in cells **;** aerobic respiration uses oxygen **; ora** aerobic respiration releases <u>more</u> energy (than anaerobic respiration) **; ora** anaerobic respiration produces lactic acid **; ora** aerobic respiration produces carbon dioxide **; ora**	**4**	
5(b)	active transport ticked **;** protein synthesis ticked **;**	**2**	
5(c)	*Alcohol linked to:* can be addictive (box 2) **;** increases reaction times (box 5) **;** is a depressant (box 6) **;**	**3**	
5(d)	liver / brain / pancreas / heart / stomach **;**	**1**	

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Question	Answer	Marks	Guidance
6(a)(i)	*any three from:* capillaries / coronary artery / coronary vein / pulmonary artery / aorta / pulmonary vein / vena cava / left ventricle / right ventricle / left atrium / right atrium / septum / (named) valve / AVP **;;;**	**3**	
6(a)(ii)	presence of valves **;** thinner wall **;** thinner muscle layer / AW **;** thinner elastic layer / AW **;** wider lumen /AW **;** AVP **;**	**3**	
6(a)(iii)	carries blood, away from the heart **;**	**1**	
6(b)(i)	red blood cell labelled with line and **X** **;**	**1**	
6(b)(ii)	(named) white (blood cell) **;**	**1**	
6(b)(iii)	plasma **;** platelets **;**	**2**	
6(c)(i)	high, fat / cholesterol / salt, diet **;** smoking **;** genetic predisposition **;** age **;** stress **;** sex **;** obesity **;** lack of exercise **/** sedentary lifestyle **/** AW **;** AVP **;** high blood pressure / alcohol consumption	**3**	
6(c)(ii)	<u>coronary artery</u> **;**	**1**	

Question	Answer	Marks	Guidance
7(a)	lack of biodiversity / fewer (wild) species / AW **;** extinction of species **;** loss of, habitats **/** resources (for species) **/** deforestation **;** (crop) disease easily spread **;** (crops) more susceptible to pests **;** depletes soil nutrients **;** *ref. to* pollution **;** e.g. herbicides / pesticides / fungicides / fertilisers AVP **;;** e.g. flooding / droughts	**3**	
7(b)	**1 (**first) **;** (then) **3**, **5**, **2 ;** **4** (at the end) **;**	**3**	
8(a)(i)	whooping crane **;**	**1**	
8(a)(ii)	574 **;;;**	**3**	one mark for correct numbers from table one mark for correct calculation one mark for correct rounding to a whole number
8(b)(i)	hunting / collecting / poaching **;** introduced species / competition (for named resource) / AW ; food, chain / web, disrupted **or** over predation **or** lack of food **:** (named) pollution **;** disease **;** loss / change, of habitat **or** natural disasters **;** global warming / climate change **;**	**3**	

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Question	Answer	Marks	Guidance
8(b)(ii)	growing in a glasshouse / AW ; seed banks ; legislation ; nature reserves / protected areas ; botanical gardens ; AVP ;	1	
9(a)	kill / remove, pathogens / microorganisms ; to make it safe to, use / drink ; prevent disease ; to remove, toxic waste / nitrate pollution ; it can harm species in, river / sea / oceans ; AVP ;	2	
9(b)	screening ; primary treatment ; secondary treatment ; separation ; aeration ; settlement / sedimentation ; anaerobic / sludge, digestion ; disinfection / chlorination / UV light ; AVP ;	1	
9(c)(i)	microorganism / AVP ;	1	
9(c)(ii)	decompose / digest / breakdown, (sewage) ;	1	

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