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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0610 BIOLOGY

0610/23 Paper 2 (Core Theory), maximum raw mark 80

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.

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- R reject
- I ignore (mark as if this material was not present)
- A accept (a less than ideal answer which should be marked correct)
- AW alternative wording
- underline words underlined must be present
- max indicates the maximum number of marks that can be awarded
- mark independently the second mark may be given even if the first mark is wrong
- A, S, P, L Axes, Size, Plots and Line for graphs
- O, S, D, L Outline, Size, Detail and Label for drawings
- (n)ecf (no) error carried forward
- ( ) the word / phrase in brackets is not required, but sets the context
- ora or reverse argument.
- AVP any valid point

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Question	Answer	Marks	Additional Guidance
1	B (*Camelus dromedaries*) D (*Camelus ferus*) C (*Lama glama*) E (*Vicugna vicugna*) A (*Vicugna pacos*)	max 4	1 correct = 1 mark 2 correct = 2 marks 3 correct = 3 marks 4 or 5 correct = 4 marks
		[Total: 4]	
2 (a) (i)	glucose and oxygen (either order); carbon dioxide and water (either order);	2	**I** if energy has been added to the LHS (and rest is accurate and balanced) but R if energy is on the LHS **A** if correct chemical equation given
(ii)	maintenance of constant body temperature; movement / muscle contraction; example of movement e.g. running, breathing, peristalsis; synthesis of other chemicals / e.g. of such a chemical; growth / repair / cell division; AVP;	max 3	AW throughout e.g. active transport / transmission of nerve impulses / deamination
b (i)	2.9 (dm^3); 1.4 – 1.5 (s);	2	
(ii)	difference: male exhales greater volume / rate of expiration is greater in male; similarity: male takes same time / 1.4 – 1.5 (s) to empty lungs;	2	ora for females sex must be stated clearly

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(iii)	would take longer to empty lungs / AW; would exhale smaller volume of air / AW;	**max 1**	
(c)	tar; nicotine; carbon monoxide; smoke particles / particulates; AVP;	**max 2**	**A** only one material not in the list for AVP e.g. cyanide
(d) (i)	anaerobic respiration: does not use oxygen; does not release water; does not produce carbon dioxide; releases (very) small amounts of energy; occurs in (skeletal) muscle cells only; produces lactic acid / lactate;	**max 3**	**A** if answers given for aerobic respiration but it must be stated that this is how the question is being answered **A** is only produced during exercise
(ii)	wine production / beer production / brewing / fermentation; bread making;	**2**	
		[Total: 17]	
3	sperm; haploid; ovary; oviduct; zygote;	**5**	
		[Total: 5]	

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4	fossil fuels: they are non-renewable / will eventually run out; if used less it would result in: less carbon dioxide released from burning; less global warming; (so less) example of adverse effect of global warming; less (other) pollution resulting from burning; example of adverse effect of such pollution; restricted use will encourage development of renewable forms of energy; restricted use means less pollution from extraction activities; AVP; water supplies: all life depends on supply of fresh water / animals and plants will die without fresh water / need to irrigate crops; water is a scarce resource / unevenly distributed geographically; morally wrong to use too much / deprive others / pollute water supplies; water treatment is expensive / uses energy; pure supplies must be maintained otherwise people use polluted water which can cause poisoning / transmit disease; expensive to transfer water to other places; demand for water is increasing; AVP;	**max 3** **max 3** **max 4**	AW throughout **A** AVP in either section;; max 3 for answers referring to fossil fuels max 3 for answers referring to water supplies
		[Total: 4]	

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<table>
<tr><td>5 (a)</td><td>Hb present: combines with oxygen / forms oxyhaemoglobin;

no nucleus: more volume for presence of haemoglobin / can transport more oxygen;

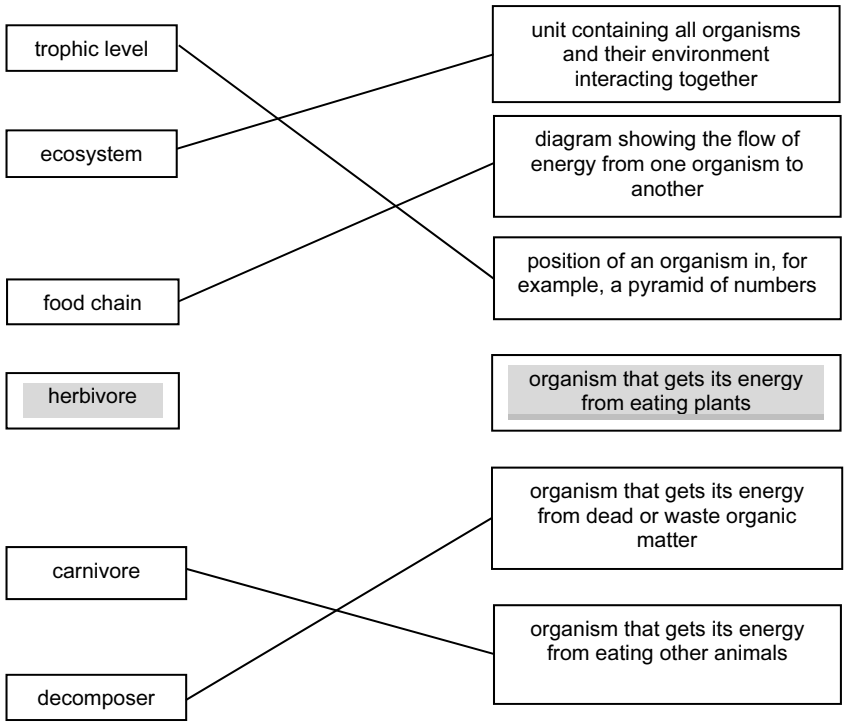
small cell: small to pass through capillaries (without damage) / increases surface area;</td><td>3</td><td></td></tr>
<tr><td>(b)</td><td>white blood cell;
produces antibodies / phagocytosis (or description);

platelet;
produces blood clot;</td><td>4</td><td>either order

A if different types of white blood cell are given (with correct functions)</td></tr>
<tr><td></td><td></td><td>[Total: 7]</td><td></td></tr>
<tr><td>6</td><td>
<table>
<tr><td>point of comparison</td><td>translocation</td><td>transpiration</td></tr>
<tr><td>substance moved</td><td>sucrose / amino acids;</td><td>water;</td></tr>
<tr><td>direction of movement</td><td>from region of production / leaf to region of storage / growth / respiration;</td><td>from surface of mesophyll cells to stomata;</td></tr>
<tr><td>tissue</td><td>phloem;</td><td>mesophyll / lower epidermis;</td></tr>
</table>
</td><td>6</td><td>A sugar

A region of storage to region of use / leaf to root
I reference to xylem</td></tr>
<tr><td></td><td></td><td>[Total: 6]</td><td></td></tr>
</table>

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7		**4**	4 or 5 correct = 4 marks 3 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark
		[Total: 4]	

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8	(a)	carbon cycle: arrow from CO_2 box to tree labelled **P**; arrow from feces to CO_2 box labelled **D**; arrow from bison to CO_2 box – **R;** arrow from tree to CO_2 box – **R**;	**4**	**A** arrow from faeces to CO_2 box (**R**)
	(b)	water cycle: arrow from cloud to land labelled **K**; arrow from stream / faeces / bison / tree to cloud labelled **E**;	**2**	arrow must show evaporation from one of these listed
			[Total: 6]	
9	(a)	carbohydrates; lipids / fats; proteins; vitamins / named vitamin; water;	**max 4**	
	(b)	cannot be digested; adds volume to contents of alimentary canal; promotes peristalsis; prevents constipation; prevents cancer AW;	**max 3**	**A** AVP e.g. absorbs some fats so prevents absorption into body

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(c)	mechanisation (or example of); benefit: e.g. use of tractors to plough more land; (inorganic) fertilisers; improved crop growth; pesticides; more plants / animals grow / survive; herbicides; kills unwanted plants so more crop growth; artificial selection / selective breeding; improved quality of plants and animals; irrigation; more plants / animals survive / grow more / faster; crop rotation; reduction in pests / improved soil fertility; genetic engineering; introduction of desirable genes from other organisms; biotechnology; benefit: e.g. production of fungal protein; AVP plus explanation;;	**max 4**	AW throughout 2 different methods with example required, method and example must match
		[Total: 11]	

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<table>
<tr><td>10 (a)</td><td>
<table>
<tr><td>structure</td><td>wind-pollinated</td><td>insect-pollinated</td></tr>
<tr><td>anther</td><td>hang outside of the petals / loosely attached / larger</td><td>hang inside of the petals / firmly attached / smaller;</td></tr>
<tr><td>stalk of stamen</td><td>long / flexible</td><td>short / stiff;</td></tr>
<tr><td>stigma</td><td>feathery / large</td><td>sticky / small;</td></tr>
</table>
</td><td>3</td><td></td></tr>
<tr><td>(b)</td><td>brightly coloured / large petals or flower;
production of scent / odour;
production of nectar;
arrangement of petals / AW;
presence of honey guide-lines;</td><td>max 3</td><td></td></tr>
<tr><td>(c)</td><td>small;
light;
smooth / rounded;</td><td>max 1</td><td>I produced in large quantities</td></tr>
<tr><td></td><td></td><td>[Total: 7]</td><td></td></tr>
</table>

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11 (a) (i)	meiosis: cell division; chromosome number halved / diploid to haploid;		
(ii)	chromosome: thread of DNA; made up of string of genes;	**4**	
(b)	parental phenotype Bb × Bb; gametes: B + b × B + b; offspring genotype: BB + Bb + Bb + bb; offspring phenotype: blue + blue + blue + white; ratio: 3 blue : 1 white;	**5**	**A** recessive given first i.e. bB **A** either order (b + B × b + B) **A** ecf if mistake is made
		[Total: 9]	

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