

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0610 BIOLOGY

0610/32

Paper 3 (Extended Theory), maximum raw mark 80

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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- **R** reject
- **ignore** mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- **AW** alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) 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
- **ecf** credit a correct statement that follows a previous wrong response
- () the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- **AVP** any valid point

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
1 (a)	<i>Triticum aestivum</i>	D	max [3]	5/6 right = 3 3/4 right = 2 1/2 right = 1 0 right = 0
	<i>Solanum tuberosum</i>	G		
	<i>Glycine max</i>	C		
	<i>Manihot esculenta</i>	F		
	<i>Ipomoea batatas</i>	B		
	<i>Zea mays</i>	A		
	<i>Oryza sativa</i>	E		
(b)	1 leaf, width / shape ; 2 leaf connection to stem / AW ; 3 number of (named) flower parts ; 4 number of, cotyledons / seed 5 leaves ; 6 type of root ; 7 pattern of vascular bundles ; 8 presence/absence of cambium / AW ;	<i>monocotyledon features:</i> narrow leaves ; sheath / no petiole ; flower parts in multiples of 3 ; one cotyledon / seed leaf ; fibrous roots ; scattered vascular bundles ; no, cambium / woody tissue ;	max [1]	<i>Mark answers in context of either general features (first column) or referring to monocotyledonous plants (second column)</i>

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
(c) (i)	1 increase in (soil) water/flooding/waterlogging ; 2 decrease in (soil) water/desertification ; 3 soil erosion ; 4 loss of, habitat/places where organisms live ; 5 disruption to food chain ; 6 endangered/extinction, of species or loss of biodiversity ; 7 AVP ; e.g. example of named soil organism in context of a function of a soil ecosystem		max [4]	A landslides/reduced soil volume loss of nutrients/reduced nutrient cycling
(ii)	1 collecting/sorting (of paper) ; 2 shredding/AW ; 3 adding water to make, pulp/paste ; 4 cleaned/de-inked/AW ; 5 bleached ; 6 rinsed ; 7 pressed/rolled/flattened/dried, into sheets ; 8 any named product made from recycled paper ; e.g. low quality paper/toilet paper/newspaper		max [3]	
			[Total:11]	

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers	Marks	Additional Guidance
2 (a)	(6) CO ₂ + (6) H ₂ O ; C ₆ H ₁₂ O ₆ + (6) O ₂ ; balancing ;	[3]	ignore word equations
(b)	acts as heat filter / absorbs heat from lamp / reduces heat effect of the lamp / AW ; maintain constant temperature / make sure temperature is not another variable ;	max [1]	A 'improves validity'
(c)	<i>colour prediction:</i> purple <i>explanation</i> 1 CO₂ is an acidic gas / forms carbonic acid ; 2 CO₂ been used up / taken in / absorbed (by the algae) ; 3 by photosynthesis ; 4 which causes pH increase / more alkaline / less acidic ; 5 more photosynthesis than respiration ;	max [3]	no mark for prediction alone

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
(d)	1 2 3 4 5 6 7 8 9	as distance increases / light intensity decreases, time taken for colour change increase / photosynthetic rate decreases ; ora rate of change slows, at low light intensity / furthest from lamp ; no change in rate, at high light intensity / close to lamp ; credit appropriate use of comparative figures with units stated at least once ; as distance (from lamp) increases, light intensity decreases ; ora light (intensity) is limiting (factor for photosynthesis) ; at high light (intensity), another factor could be limiting photosynthesis ; light provides energy (for photosynthesis) ; light is absorbed / trapped by, chlorophyll / chloroplast ;	max [5]	
			[Total:12]	
3 (a)	transports, oxygen / gases ;		[1]	
(b) (i)	1 2 3	controls activities in the cell / AW ; contains, chromosomes / genes / alleles / genetic information / DNA ; controls how cells, develop / divide / reproduce / grow ;	max [1]	
(ii)	more space for haemoglobin ; to enable greater oxygen carrying capacity / AW ; more flexible shape (to move through capillaries) ;		max [1]	

Page 7	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
(c) (i)	0.15 mol dm^{-3} (red blood cells) are normal shape / biconcave ; 0.20 mol dm^{-3} (red blood cells) have shrunk / crenation / AW ;		max [2]	
(ii)	1 osmosis ; 2 (diffusion / osmosis) of water molecules into cells ; 3 down a water <u>potential</u> gradient / from high water <u>potential</u> (of solution) to low water potential (in cells) ; 4 across partially permeable membrane ;		max [3]	
(iii)	cell wall (offers resistance) ; water potential (of plant cells) could be equal / higher / less negative (than 0.1 M solution) (so no net osmosis) ;		max [1]	
(d) (i)	0.15 mol dm^{-3} ; no net movement of water / (red blood) cells will remain normal shape / AW ;		[2]	units must be included A (red blood) cells won't be damaged / isotonic (with solution)
(ii)	1 ref to platelets ; 2 fibrinogen converted to fibrin ; 3 soluble to insoluble / fibrin is insoluble ; 4 thrombin / enzyme in context ; 5 mesh / network / web, to trap blood (cells) ; 6 AVP ; e.g. reference to prothrombin or involvement of calcium ions		max [3]	
			[Total: 14]	

Page 8	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
4 (a) (i)	bronchus / bronchiole(s) ;		[1]	
(ii)	1 goblet cells, release / produce, mucus ; 2 mucus traps, dirt / particles / pathogens ; 3 cilia, beat / AW ; 4 to move, fluid / AW, up / out (of airway) ;		max [3]	R 'cilia trap dirt'
(b) (i)	1 diffusion ; 2 across (cell / permeable) membranes ; 3 high concentration to low concentration (of O ₂) / down concentration gradient ; 4 moist lining / AW / O ₂ is dissolved ;		max [3]	
(b) (ii)	1 <u>external</u> intercostal muscles contract ; 2 <u>internal</u> intercostal muscles relax ; 3 lifts ribs, upwards / outwards ; 4 diaphragm contracts ; 5 diaphragm, flattens / drops ; 6 volume of, thorax / lungs / chest, increases ; 7 pressure in, thorax / lungs / chest, decreases ; 8 air flows in down a pressure gradient ;		max [4]	A ribcage expands
(iii)	carbon dioxide ; water <u>vapour</u> ;		max [1]	

Page 9	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
(c)	1	tar / carcinogens ;	max [4]	<i>component must be linked to correct effect</i>
	2	carcinogenic / can cause, lung cancer ;		
	3	sticks to / blocks / damages, (named) air passages / alveoli / cilia ;		
	4	(trigger) production of, more / excess, mucus ;		
	5	(smoke) particles ;		
	6	trigger white blood cells ;		
	7	irritant / causes asthma / prone to infection ;		
	8	phagocytosis described ;		
	9	carbon monoxide ;		
	10	combines with haemoglobin (permanently) ;		
	11	reduced oxygen transport (of blood) ;		
			[Total: 16]	

Page 10	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers						Marks	Additional Guidance	
5 (a) (i)	Y	W	V	T	S	X	U	[2]	2 wrong = 1 mark more than 2 wrong = no marks
(ii)	letter from Fig. 5.2	name	function during pregnancy					[5]	each correct row = 1 mark
	P	amniotic sac	encloses the amniotic fluid						
	Q	umbilical cord ;	attaches the placenta to the fetus						
	N	amniotic fluid	protection / maintains temperature / allows fetus to move / AW ;						
	M	uterus (wall) ;	contracts to push the baby through the birth canal						
	R	placenta	immune protection / exchange of (named) nutrients or wastes or gases / secretes hormone to maintain lining / separates blood of mother and fetus ;						
	O	cervix ; A vagina / birth canal	widens during labour to allow the head of the baby to pass						
(b)	difference: protein ; similarity: lipid ; energy content ; lactose ;						max [2]	1 mark for difference and 1 mark for similarity	

Page 11	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
(c) (i)	1 2 3 4	increase in, size / length / mass / volume / AW ; increase in dry mass ; increase in cell number ; ref to permanent ;	max [2]	A reference to cell division / mitosis / reproduction of cells or tissues ignore development
(ii)	1 2 3 4 5 6	lower mass / slower growth, of breast-fed babies ; ora both (babies) show same increasing trend ; appropriate use of comparative data from table or figure with units stated at least once ; because less protein / less energy (in breast-fed milk) ; ora (protein / energy) is required for growth ; ora lower volume of milk drunk (by breast fed babies) ; ora	max [4]	

Page 12	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers	Marks	Additional Guidance
(iii)	<i>advantages:</i> 1 provides, best / complete / most suitable / AW, food ; 2 easy to digest / less risk of colic ; 3 no additives / less risk of allergies / child less likely to develop diabetes ; 4 contains antibodies / reference to colostrum / provides passive immunity / provides protection against, pathogens / diseases / microorganisms ; 5 sterile / less risk of infection ; 6 is at, body / correct, temperature ; 7 no preparation / always available ; 8 bonding with mother ; 9 it's free / 'cheap' ; <i>disadvantages:</i> 11 time consuming ; 12 13 transfer of, viruses / HIV / hepatitis B ; 14 painful / sore nipples / mastitis ; 15 stressful / may be embarrassing / AW ; 16 mother may not be able to produce enough milk ; 17 cannot see how much baby has consumed ; 18 task cannot be shared with other parent ; medications / drugs / alcohol, can pass to baby ;	max [4]	<i>maximum 3 marks for advantages</i> <i>maximum 3 marks for disadvantages</i>
		[Total: 19]	

Page 13	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0610	32

Question	Expected Answers		Marks	Additional Guidance
6 (a)	log / exponential (phase) ;		[1]	
(b)	1 decomposition of waste ; 2 by bacteria / microorganisms ; 3 reduces oxygen available ; 4 eutrophication / algal bloom ; 5 results in death of (aquatic) plants and animals ;		max [3]	ignore pollution / contamination unqualified
(c)	secondary consumer / third trophic level ;		[1]	
(d)	1 seaweed at a lower trophic level (than salmon) ; ora 2 energy is lost, between / within, trophic levels / along food chain ; 3 reference to 10% energy transfer / ora ; 4 (energy lost in) respiration / heat / (named) metabolic process ; 5 (energy lost in) movement / muscle contraction ; 6 reference to (more) material that is, inedible / not digestible (in longer food chains) ; 7 (energy lost in) excretion / urine ; 8 <i>idea that</i> less fuel required to farm seaweed / AW ;		max [3]	A seaweed are producers / first trophic level
			[Total: 8]	