

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 70

SYLLABUS/COMPONENT: 0610/03

BIOLOGY
Paper 3 (Extended)



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3

- Q1 (a) (A) testa/seed coat
 (B) plumule; Ⓐ embryonic shoot Ⓜ shoot unqual.
 (C) radicle; Ⓐ embryonic root Ⓜ root unqual.
 (D) cotyledon; Ⓐ food store Ⓜ endosperm [4]
- (b) ovary; Ⓜ gynoecium/pistil/carpel/ovule [1]
- (c)(i) ref. to transfer / AW, of pollen;
 from anther to stigma ; [2]
- (ii) ref. to large petals; Ⓜ flower
 ref. to coloured petals;
 ref. to petals as landing stage;
 ref. to presence of guide lines on petals;
 ref. to scent;
 ref. to production of nectar/presence of nectary;
 ref. to large amount of pollen; max. 2
- (iii)
 i. ref. to more variation / AW;
 ii. due to genetic mixing / AW / hybridisation;
 iii. ref. to natural selection/greater ability to adapt;
 iv. so more chance of survival/ref. to resistance to disease; max. 2
 Ⓐ other suitable benefits of variation
- (d)(i) allows pollen tube to enter ovule; Ⓜ ovary wall
 ref. to male + gamete/nucleus; Ⓜ pollen nucleus
 to reach/fertilise + ovum/egg (nucleus)/female gamete / AW; max. 2
- (ii) allows water to enter (seed) / AW;
 ref. to weak point for exit of radicle / AW; [1]
 Ⓜ refs to root or shoot
- (e) ref. to digestion/be broken down/convert into soluble products
 changed to (simple) sugars; [1]
- Total 15**
- Q2 (a) carbon + hydrogen + oxygen ; Ⓜ chemical symbols [1]
- (b)(i) sweet potato ; Ⓜ potato unqual. [1]
- (ii) peas; Ⓜ chick peas [1]

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3

	(c)(i)	sweet potato; ⓐ potato unequal.	[1]
	(ii)	AWARD TWO MARKS FOR CORRECT ANSWER, WITH NO CALCULATION MAX 1 WITH NO UNIT MARK ANSWER BASED ON THAT GIVEN FOR (c)(i) some working involving: $20.5 - 8.9 = 11.6$ or 11.6×5 58g ;	[2]
	(d)(i)	energy level would increase / AW; potato gains <u>fat/oil</u> from frying; fat/oil is an energy source / AW;	max. 2
	(ii)	<u>i.</u> animal fats contain <u>cholesterol</u> ; <u>ii.</u> which can build up in arteries/arterioles; ⓐ ref. to atheroma/atherosclerosis/arteriosclerosis/hardening of arteries ⓐ ref. to fatty substances ⓑ refs to fats <u>iii.</u> to obesity/overweight; <u>iv.</u> which can lead to heart disease or attack//strain on heart/ high blood pressure/joint problems/diabetes;	max. 2
	(e)(i)	400g; ⓐ with no unit	[1]
	(ii)	cabbage/other names green vegetable; citrus fruit/named citrus fruit; blackcurrants; tomatoes; kiwi fruit;	max. 1
	(iii)	ref. to skin covered with bruises/ulcers/ref. to broken skin/sores; ref. to soft/bleeding + gums; ref. to loss of teeth; ref. to poor healing of wounds; ref. to bleeding around connective tissue AW; ref. to heart failure; ref. to anaemia;	max. 2
Total 14			
Q3	(a)	MAX. 1 EACH FOR (i) AND (ii) WITH NO LETTERS	
	(i)	at point X it starts to drop; then increases towards Y; drops again towards Z;	max. 2
	(ii)	at point X it increases (sharply) / AW drops/returns (nearly) to original level between Y and Z / AW;	[2]
	(b)(i)	ref. to <u>respiration</u> by + sewage fungus/bacteria; lack of algae/water plants + to produce oxygen; ref. to increase in temperature;	max. 1
	(ii)	ref. to lack of sewage fungus/bacteria; photosynthesis by algae; ref. to water turbulence AW;	max. 1

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3

- (c)(i) i. (ref. to suspended solids/sewage) + blocks light for algae / AW / algae cannot photosynthesise;
ii. ref. to lack/shortage + of nitrate in water; Ⓜ no nitrate
iii. ref. to possible presence of toxins in sewage/ref. to disease;
iv. ref. to possible increase in temperature or unsuitable temperature;
max. 2
- (ii) ref. to shortage of nitrates;
ref. to grazing by (aquatic) herbivores AW;
ref. to possible drop in temperature;
max. 2
- (d) ref. to herbicides will kill + algae/water plants/other organisms;
ref. to disruption of food chains AW;
ref. to eutrophication or description;
max. 1

Total 11

- Q4 (a) i. internal intercostal muscles + contract;
ii. external intercostal muscles + relax;
iii. so ribcage + drops(s)/goes down or in; (linked to i. or ii.)
iv. diaphragm (muscles) relax(es);
v. diaphragm + rises/becomes dome-shaped;
vi. volume of chest cavity decreases AW; Ⓜ ref. to lungs/thorax
vii. internal pressure increases;
viii. ref. to lower pressure outside lungs AW;
ix. so air is forced out AW + of lungs; (linked to vi., vii. or viii.)
max. 7
- (b) table with suitable headings;
ACCEPT WITHOU G TEASONS COLUMN
Ⓜ symbols for gases
MAX. 2 FOR COMPARISONS WITHOUT PERCENTAGES
CAN AWARD MARK FOR ONE % PLUS CHANGE FOR EACH GAS

gas	inhaled air %	exhaled air %	reason
nitrogen	78 ± 1	78 ± 1;	not used in respiration/insoluble/not used by body/not absorbed by blood;
oxygen	21 ± 1	16 ± 1;	used up in respiration/absorbed by blood/ref. to diffusion gradient;
carbon dioxide	0.04 ± 0.01	4 ± 1;	waste product of respiration/released from blood in lungs/excreted by lungs/ref. to diffusion gradient;
water vapour	variable	higher;	product of respiration/evaporates (from surface of alveoli AW)/ref. to diffusion gradient;

Ⓜ ref. to diffusion gradient ONCE

max. 8

Total 15

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3

- Q5 (a)(i) food chain with FOUR suitable NAMED organisms in correct order;
 Ⓐ parasite/decomposer at end of chain, if named
 starts with producer; (ignore sun/light if included)
 arrows all correct ; [3]
- (ii) i. solar/light + energy trapped/absorbed + by producer; Ⓔ sun unequal.
ii. ref. to photosynthesis;
iii. changed to chemical energy/stored in food AW/used to make starch or glucose;
iv. primary consumer + eats producer;
v. some energy stored in p. consumer;
vi. ref. to respiration;
vii. some used for movement;
viii. e.g. to find a mate/find food/escape from predators;
ix. ref. to not all energy extracted from food/not all parts of organism eaten/undigested food egested AW;
x. secondary consumer + eats primary consumer;
xi. ref. to 90% of energy lost at each stage;
xii. ref. to other forms of energy loss e.g. through excretion/heat;
xiii. tertiary consumer + eats secondary consumer;
xiv. ref. to arrows show direction of energy flow; max. 8
- (b)(i) suitable species named;
 valid reason for its conservation; [2]
- (ii) suitable habitat named;
 valid reason for its conservation [2]
- Total 15**
- Q6 (a) (FUNCTION)
i. defence against + disease/foreign bodies;
ii. ref. to pathogens/bacteria/viruses/fungi;
- (ANTIBODY PRODUCTION)
iii. antibodies produced by lymphocytes;
iv. lymphocytes + produce antitoxins/inhibit toxins AW;
v. lymphocytes made in + lymph nodes/named nodes;
vi. in response to presence of pathogens/foreign bodies/toxins;
 (linked to v.)
vii. ref. to presence of antigens on surface of foreign cells AW;
viii. antibodies + kill pathogens/make them clump/prepare them for action by phagocytes;
ix. ref. to remain in blood to provide long-term protection AW;
- (PHAGOCYTOSIS)
x. ref. to phagocytes/granulocytes/polymorphs;
xi. move to site of infection;
xii. ingest/engulf + bacteria/pathogens/foreign bodies;
xiii. and kill them by + digestion/breaking them down AW; max. 9

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3

- (b) i. transplanted organ may be a different tissue type;
ii. so there is a chance of rejection;
iii. ref. to need for similar tissue type/good match/same blood group;
iv. e.g. from close relative AW;
v. ref. to use of immunosuppressant drugs;
vi. ref. to loss of protection from disease for patient AW;
vii. so patient needs to be kept in isolation AW; (linked to vi.)
viii. ref. to use of genetic engineering/cloning + to produce organs;
ix. ref. to use of other animal organs/xenotransplantation/use of own vein to repair e.g. heart;
x. ref. to shortage of organs for transplantation/creates black market/ref. to high cost/use of data base to locate suitable organ

max. 6

Total 15Q7 (a) **MAX. 2 WITHOUT NAMED EXAMPLE**

named tissue; Ⓡ blood
 made up of a group of cells;
 of the same type;
 performing the same function;

max. 3

(b) **MAX. TWO IF PART IS NOT NAMED**

- i. **A** = upper epidermis;
ii. ref. to a single layer of cells;
iii. produces/secretes wax/cuticle;
iv. to make leaf waterproof/decreases transpiration; (linked to iii.)
v. ref. to transparent nature of + cells/cuticle; Ⓐ ref. to lack of chloroplasts
vi. to allow light to pass through; (linked to v.)
vii. ref. to acting as a barrier against + bacteria/fungi AW; max. 3
viii. **B** = palisade mesophyll;
ix. cells are very long/columnar AW;
x. cells contain many chloroplasts/much chlorophyll; AWARD ONCE
xi. ref. to photosynthesis; AWARD ONCE max. 3
xii. **C** = spongy mesophyll;
xiii. cells are rounded;
xiv. ref. to presence of air spaces (between cells)/cells loosely packed;
xv. cells contain + chloroplasts/chlorophyll; AWARD ONCE
xvi. ref. to photosynthesis; AWARD ONCE
xvii. ref. to gaseous exchange AW; Ⓐ description max. 3
xviii. **D** = guard cells/stoma(ata);
xix. ref. to presence of guard cells in pairs;
xx. guard cells surround a + pore/hole/stoma;
xxi. and control its opening or closing;
xxii. ref. to gaseous exchange AW;
xxiii. ref. to control of transpiration;
xxiv. cells contain + chloroplasts/chlorophyll; AWARD ONCE
xxv. ref. to shape of guard cells/irregular thickness of cell wall;
xxvi. correct ref. to role of turgor in cells; (can award for **A, B, C** or **D**)

max. 3

Total 15