

CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2003 question papers

	0610 BIOLOGY
0610/01	Paper 1 (Multiple Choice), maximum mark 40
0610/02	Paper 2 (Core), maximum mark 70
0610/03	Paper 3 (Extended), maximum mark 70
0610/05	Paper 5 (Practical), maximum mark 40
0610/06	Paper 6 (Alternative to Practical), maximum mark 40

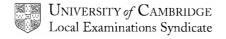
These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the Report on the Examination.

CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the November 2003 question papers for most IGCSE and GCE Advanced Level syllabuses.



Grade thresholds taken for Syllabus 0610 (Biology) in the November 2003 examination.

	maximum	minimum mark required for grade:				
	mark available	А	С	Е	F	
Component 1	40	-	34	28	25	
Component 2	70	-	36	23	18	
Component 3	70	50	39	-	-	
Component 5	40	32	26	19	17	
Component 6	40	26	19	13	11	

The threshold (minimum mark) for B is set halfway between those for Grades A and C. The threshold (minimum mark) for D is set halfway between those for Grades C and E. The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A* does not exist at the level of an individual component.



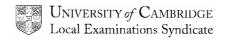
INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0610/01

BIOLOGY Paper 1 (Multiple Choice)



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

Question Number		Question Number	Key
1	Α	21	D
2	С	22	В
3	В	23	Α
4	С	24	В
5	Α	25	D
6	Α	26	D
7	В	27	Α
8	В	28	С
9	С	29	С
10	С	30	Α
11	С	31	С
12	D	32	С
13	В	33	С
14	В	34	D
15	В	35	D
16	Α	36	С
17	D	37	В
18	В	38	Α
19	В	39	D
20	Α	40	В

TOTAL 40



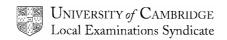
INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 70

SYLLABUS/COMPONENT: 0610/02

BIOLOGY Paper 2 (Core)



	i age i		IGCSE EXAMINATIONS – NOVEMBER 2003	0610	2
1			A – Anax;		
			B – Aranea;		
			C – Pandalina;		
			D – Cancer;		
			E – Buthus		
			F – Musca;		
			Ignore use of common names – e.g. crab, spider, f Any four correct – 1 mark each	ly etc	[4]
				Т	otal [4]
2	(a)	(i)	Y – exponential (phase) / log (phase);		[1]
		(ii)	animals take time to adjust / get used to the new ha	abitat / A/W	/ ;
			few (reproducing) individuals present;		
			individuals may be widely dispersed / A/W;		
			Any two – 1 mark each		[2]
	(b)		food / water supply;		
			disease;		
			predators / parasites;		
			availability of space / named example;		
			climate qualified / habitat qualified; Ignore r	ef. to pollut	ion
			Any three – 1 mark each		[3]
				Т	otal [6]
3	(a)	(i)	label to upper region of vagina / near to cervix;		[1]
		(ii)	label to upper third of oviduct;		[1]
		(iii)	label to uterine lining;		[1]
		(iv)	label to ovary;		[1]
	(b)		development of breasts / mammary glands;		
			widening of hips;		
			thicker layer of fat (under skin);		
			growth of axillary / pubic hair;		
			inhibition of FSH production;		
			Any three – 1 mark each		[3]

Mark Scheme

Syllabus

Paper

Page 1

	Page 2	!	Mark Scheme	Syllabus	Paper
			IGCSE EXAMINATIONS – NOVEMBER 2003	0610	2
	(c)		 ✓ / yes ★ / or left blank / no ✓ / yes; (Note – only 1 red tick to show correct response) 		[1]
			,	7	Total [8]
4	(a)	(i)	formation of amino acids / proteins / polypeptides;		[1]
		(ii)	nitrates lost with crop plants / by leaching;		
			must be replaced / to increase yield / increase grov	vth;	[2]
	(b)		plants / algae grow rapidly / algal bloom;		
			cover surface;		
			cut out light so submerge plants die; Ignore ref.	to water to	urbidity.
			dead plants decomposed;		
			bacteria multiply;		
			(bacteria) use up oxygen;		
			pond / water becomes anaerobic;		
			animals die; Ignore re	ef. to suffoo	cation
			eutrophication;		
			Any five – 1 mark each		[5]
				٦	Total [8]
6	(a)	(i)	lipase;		[1]
		(ii)	fatty acids and glycerol;		[1]
		(iii)	(fatty acids) increase acidity of mixture / make it ac	idic;	
			to below pH5 / lowers pH;		[2]
	(b)		enzyme activity faster at 35 °C / collisions occur mo	ore frequer	itly / A/W / OI
			(fatty) acids released more rapidly / sooner / ORA;		[2]
	(c)	(i)	5 °C – yellow;		
			55 °C – blue;		[2]
		(ii)	5 °C – enzyme inactive / working very slowly in cold	d;	
			works faster / digests / breaks down (oil when warn	ned);	
			55 °C – enzyme destroyed / denatured / damaged ref. to active site changes; R - killed	/	
			permanent change / not reversed when cooled (and	d no digest	ion of oil); [4]
				To	otal [12]

F	Page 3		Mark Scheme	2002	Syllabus Paper				
			IGCSE EXAMINATIONS – NOVE		2003	•	610	2	
5	(a)	(i)	(parent genotypes -)	Gg,		Gg;			
			(gamete genotypes -)	G,	g,	G,	g;		
			(offspring genotypes -)	GG,	Gg,	Gg,	gg;		
			(offspring phenotypes -) Accept - normal chlorophyll / nor	green mal for g			green, loroph		[4 e
		(ii)	green – 375 white – 125; (Note – only 1 red tick to show co	orrect re	sponse)			[1
	(b)		20 seeds not viable etc./ do not g	germinat	e;				
			75% / 360 of seedlings to be gree	en;					
			25% / 120 white seedlings die;						
			because they lack chlorophyll;						
			*thus no photosynthesis;						
			*seedlings use up reserves / run o	out of foo	od / car	not ma	ke owr	n food;	
			the two points with * can be	awarde	d as co	nverse	staten	nents in	
			relation to green seedlings						
			Any five – 1 mark each						[5
									Total [10]
7	(a)	(i)	X – aorta;						
			Y – pulmonary vein;						[2
		(ii)	prevent backflow / give one-way	flow / co	ntrol di	rection	of flow	of blood;	[1
		(iii)	has to generate greater pressure	;					
			to push / pump blood all round be	ody / fur	ther;				[2
	(b)	(i)	open closed;						
			closed open; Note – mark across each row)						[2
		(ii)	(tricuspid valve -) pressure in (right) atrium / 2 units	s, greate	r than i	n (right) ventri	cle / 0 unit	s;
			(semilunar valve -)		O		al aul - 4 \		
			pressure in pulmonary artery / 3	units, gr	eater tr	ian in (r	ignt) v		· -
									Total [9]

	Page 4		Mark Scheme IGCSE EXAMINATIONS – NOVEMBER 2003	Syllabus 0610	Paper 2	
Ω	(2) (:\		0010		<u></u>
8	(a) (i)	X – sensory neurone;			
			Y – relay / intermediate / connector / internuncial / r	nuitipolar	neurone;	
			Z – motor neurone;			
	·	ii)	muscle / named muscle / gland / named gland;			
	(b)		slower;			
			blood;			
			electrical;			
			sense organ/ receptor;			
						Tota
9	(a)		user becomes dependent upon drug / description o (this can be physiological, physical or psychological	•	•	
			user suffers withdrawal symptoms if denied drug / c Note - Ignore vague statements	craving for	drug;	
			Any one – 1 mark			
	(b)		periods of drowsiness / stupor / " not with it" / slow i	esponses	to surroun	ding
			damage to blood vessels in nose / blue veining;			
			damage to blood vessels in limbs / bruising / injection	on marks;		
			abscesses on limbs where injecting;			
			constricted pupils / black "panda" eyes;			
			very happy / relaxed but with mood swings;			
			no desire for food / drink / lack of sexual appetite;			
			constipation;			
			Any two – 1 mark each			
	(c)		inhaling – damage to membranes / cilia of nose / th	roat;		
	-		injecting –risk of infection by hepatitis / HIV / septice			[2]
				•		Tota



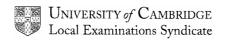
INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 70

SYLLABUS/COMPONENT: 0610/03

BIOLOGY Paper 3 (Extended)



	age i	Į(GCSE EXAM		NS – NOV	EMBER 2	003	0610	3
Q1	(a)	(A)	testa/see	d coat					
	(- /	(B)	<u>plumule</u> ;		embryor	nic shoot	® shoo	t unqual.	
		(C)	radicle;	A	embryor	nic root	® root	unqual.	
		(D)	cotyledor	<u>n</u> ; (A	food sto	re	® endo	sperm	[4]
	(b)	ovary	ر; ® gynoed	cium/pis	til/carpel/	ovule			[1]
	(c)(i)		o transfer / / anther to st	_	oollen;				[2]
	(ii)	ref. to ref. to ref. to ref. to	ef. to large petals;						max. 2
	(iii)	<u>ii.</u> dı <u>iii.</u> re <u>iv.</u> so						isease;	max. 2
	(d)(i)	ref. to	allows pollen tube to enter <u>ovule;</u> ® ovary wall ref. to male + gamete/nucleus; ® pollen nucleus to reach/fertilise + ovum/egg (nucleus)/female gamete /				amete / AV	√; max. 2	
	(ii)	ref. to	s water to e weak poin fs to root or	t for exi					[1]
	(e)		o digestion/l ged to (sim			convert int	to soluble	products	[1]
								٦	Γotal 15
Q2	(a)	carbo	on + hydrog	<u>en</u> + <u>ox</u>	<u>ygen</u> ;	® cher	mical sym	bols	[1]
	(b)(i)	swee	t potato ;	®	potato u	nqual.			[1]
	(ii)	peas	; ®) chick p	oeas				[1]

Mark Scheme

Syllabus

Paper

Page 1

Paç	ge 2	Mark Scheme	Syllabus	Paper				
		IGCSE EXAMINATIONS – NOVEMBER 2003	0610	3				
	(c)(i)	sweet potato; ® potato unqual.		[1]				
	(ii)	AWARD TWO MARKS FOR CORRECT ANSWER, CALCULATION MAX 1 WITH N MARK ANSWER BASED ON THAT GIVEN FOR (c some working involving: 20.5 – 8.9 = 11.6 or 11.6 X = 58g;	IO UNIT)(i)	[2]				
		30g ,		[۷]				
	(d)(i)	energy level would increase / AW; potato gains <u>fat/oil</u> from frying; fat/oil is an energy source / AW;	potato gains <u>fat/oil</u> from frying;					
	(ii)	 i. animal fats contain <u>cholesterol</u>; ii. which can build up in arteries/arterioles; A ref. to atheroma/atherosclerosis/arteriosclerosis/h A ref. to fatty substances ® refs to fats iii. to obesity/overweight; 	ardening o	of arteries				
		 iv. which can lead to heart disease or attack//strain of high blood pressure/joint problems/diabetes; 	on heart/	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 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;	skin/sores	s; max. 2				
			7	Total 14				
Q3	(a) (i)	MAX. 1 EACH FOR (i) AND (ii) WITH NO LETTERS at point X it starts to drop; then increases towards Y; drops again towards Z;	5	max. 2				
	(ii)	at point X it increases (sharply) / AW drops/returns (nearly) to original level between Y and	d 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) <u>i.</u> (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;
 - (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) <u>i. internal</u> intercostal muscles + contract;
 - ii. <u>external</u> 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; (A) ref. to lungs/thorax
 - vii. internal pressure increases;
 - viii. ref. to lower pressure outside lungs AW;
 - <u>ix.</u> so air is forced out AW + of lungs; (linked to <u>vi.</u>, <u>vii.</u> or <u>viii.</u>)

max. 7

(b) table with suitable headings;ACCEPT WITHOUG 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;

A 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;

(A) 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 unqual.
 - ii. ref. to photosynthesis;
 - <u>iii.</u> 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;
 - <u>ix.</u> 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;
 - <u>xiv.</u> ref. to arrows show direction of energy flow; max. 8
- (b)(i) suitable species named;

valid reason for its conservation;

(ii) suitable habitat named; valid reason for its conservation

[2]

[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;
- <u>vi.</u> in response to presence of pathogens/foreign bodies/toxins; (linked to v.)
- vii. ref. to presence of antigens on surface of foreign cells AW;
- <u>viii.</u> antibodies + kill pathogens/make them clump/prepare them for action by phagocytes;
- <u>ix.</u> 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) <u>i.</u> 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/xenotransplantaion/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 15

Q7 (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

- <u>i</u> $A = \underline{\text{upper epidermis}}$;
- ii ref. to a single layer of cells;
- iii produces/secretes wax/cuticle;
- iv to make leaf waterproof/decreases transpiration; (linked to iii)
- $\underline{\mathbf{v}}$ ref. to $\underline{\mathsf{transparent}}$ nature of + cells/cuticle; A 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

- <u>xii</u> $C = \text{spongy } \underline{\text{mesophyll}};$
- xiii cells are rounded;
- <u>xiv</u> 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; (A) description max. 3
- <u>xviii</u> **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



INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0610/05

BIOLOGY (Practical)

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	5

```
(a)
        X
              lose these marking points if no table
        x
              use of ruled lines for columns and rows;
        x
              time (table heading);
              temperature (table heading);
              record of units temp and min/clock times;
              readings taken at 2 min intervals; (6 readings in total)
              records for both A and B;
                                                                             max 5
(b)
              only credit these marking points if bar chart drawn
              lose these marking points if axes the wrong way round AND award max 4
        ✓ × orientation of axes; (time horizontal, temp vertical)
              labels for axes including units; (A) clock times
           × plotting data using suitable scale; c. half the paper min.,
                                                    linear scale,
                                                    sensible scale,
                                                    grid capable of plotting their results
              plotting data for A (points visible, no obvious error, not (0,0));
              plotting data for B (points visible, no obvious error, not (0,0));
              clear lines;
                                  correctly drawn,
                                  not extending beyond data plots
              each curve identified/use of key;
                                                                             max 5
(c) (i)
          temperature decreases;
          comment on decrease;
                                                                                  2
    (ii)
          temp. of A decreases more than B/converse;
          more heat lost from A/converse;
          B remains almost the same/use of comparative figs./
          comment on gradient/comment on rate;
                                                                             max 2
    (iii) animal at the centre of a group will retain, heat/warmth;
          solitary animal will lose more heat;
          crowding is better to retain heat (in cold conditions);
          ref. to surface area (of individual v. group);
                                                                             max 2
    (iv) suggestion;
          explanation/detail;
          suggestion;
          explanation/detail;
          Credit any reasonable suggestion such as ...
                         increase time/change starting temperature/
                         change the no. of tubes/repeats/
                         cover tubes with different material/
                         other suitable suggestion
                                                                                  4
                                                                       [Total : 20]
```

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	5

```
Drawing ~
2 (a) (i)
                          clear outline W1;
                          at least 5 cm in one direction;
                          3 body sections shown;
                          legs; (should be 6/3 pairs)
             Labels ~
                          antennae/compound eyes;
                                                        (should be 2 / 1 pair)
                          head/thorax/abdomen;
                                                                                   6
       (ii)
            length of drawing measured correctly (\pm 2 mm); with units
             clear measurement line shown;
             correct calculation of "drawing length + specimen length";
                                                                  to 1dp
                                                                  (allow .25 or .75 <u>exactly</u>)
                                                                  no units
   (b)
             Credit any reasonable suggestion together with reason, such as ....
             cover top with vegetation;
             camouflage;
             make sure that container is deep enough;
             to prevent insects from escaping;
             put water in container;
             kill insects/stop insects escaping;
             smooth/slippery side;
             stop insects escaping;
            bait:
            to attract insects;
            other valid suggestion;;
                                                                              max 4
   (c) (i)
            W1
                  thick/tough/sturdy/shape ref.;
                                                                                   2
            W2 thin / delicate / shape ref.;
            W1
                  biting/chewing/cutting/holding/grasping/ etc.;
                                                                                   2
            W2
                  sucking/equivalent;
       (ii)
            Credit any suitable comparison, such as ...
            W1 has no outstretched wings and W2 has outstretched wings;
            W1 has hard casing and W2 does not;
            W2 has longer antennae;
             W2 has more delicate legs;
             other suitable comparison;;;
                                                                             max 3
```

[Total : 20]



NOVMEBER 2003

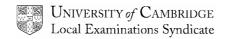
INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0610/06

BIOLOGY (Alternative to Practical)



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	6

Question 1

(a) (i) Graph

o - axes to show correct orientation;

S - suitable scale to fill the printed grid; [at 10 mins scale should cover 2½ large squares]

L - label axes correctly with appropriate unit;

P + P - correct plotting [minus 1 for 1 error, minus 2 for 2 errors]

ruled straight lines from point to point / smooth line of best fit [R. wavy lines. No extrapolation back to axes. Allow extra line past 10 min for label line]

K - identify lines by labels or use of a key;

Histogram allow **L**, **O**, **K** to max 3.

[7]

(ii) temperature drops faster at first / AW;

temperature continues to drop but slower / AW;

but if A loses heat with no further detail, max 1 mark no credit for a description comparing A with B and C

[2]

[2]

(iii) reference to one tube having dropped more / lower / faster than another; A compared with B / A compared with C / B compared with C; (if just final temperatures given with no working = 0)

(iv) reference to animals or tubes *with idea of* transfer of heat/trap warm air/keep them warm /maintain body temperature;

use of appropriate scientific term – insulation/conduction/radiation/convection;

(b) shield tubes from draughts/move apparatus out of draught; use of lids [to reduce loss of heat from too exposed surface]; stir the water before taking temperature reading; replication/average/ accept measure more tubes in outer ring C; more frequent readings; [ignore longer periods]

R. leave longer/use more test tubes or larger groups/use of animals or blood instead of water/lagging tubes/alter volume of water.

MAX [2]

[Total: 15]

Question 2

(a) (i) Drawing: clear outline of whole animal; R sketchy outlines and excessive

artistic shading

proportions; R. obvious gross errors/extra detail not present

e.g. open carapace

detail; check 3 parts to body and 3 pairs of segmented legs.

Labels: number and structure for 1 mark

6 legs/3 pairs/6 jointed appendages;

2 antennae/feelers; R. anthers/tentacles;

3 parts to body / head and thorax and abdomen;

R. segmented body alone

2 pairs of wings (accept 1 pair of wings / wing covers)

ignore mouthparts/carpace/hard case.

MAX [5]

(ii) measurement of Fig 2.1 3 to 4.2 cm max. AND

magnification;

check answer, must be times or x in front of figure without units.

if answer is incorrect look for correct working accept a ratio if correct

[3]

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	6

(b) **TWO** precautions and explanations from:-

traps must be checked early and regularly; so animals do not become eaten/escape;

use of suitable fluid;

to kill the insects/to stop carnivorous insects/predators/large animals eating beetles;

suitable covering/mesh; animals washed away/eaten; rain;

container deep enough/grease sides of pit; so beetles cannot escape/trap insects;

R. bait/food to attract insects/identification of insects/exit holes for rain/glass pits/position of pits/gap around tin/sharp edge/use of gloves.

MAX [4]

(c) THREE visible differences between beetle in Fig. 2.1 and the butterfly in Fig. 2.3

Need points from **both** insects to be compared – statements MUST be paired.

Feature	Beetle fig 2.1	Butterfly fig 2.3
wings	one pair /	2 pairs of wings [alone] /
	no wings /	bigger / visible wings /
	folded wings	unfolded / upright wings;
wing covers	present	wings exposed / absent;
antennae (accept ecf for	shorter / smaller /	longer / larger /
incorrect name already penalised)	no swellings /	swellings at tip /
personer sy	segmented	not segmented;
mouthparts	pincers / claws /	proboscis / tongue /
	piercing parts / AW	sucking;
eyes	none / not visible / small	compound / visible / large;
	R. simple eyes	
body	accept small	accept large;
abdomen	not visible (accept not segmente	visible / segmented;
	segments not visible)	R. striped/shaded
legs	hairy / claws	not hairy / no claws;
	R. length of legs	

MAX [3]

[Total: 15]

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2003	0610	6

Question 3

(a) Award 1 + 1 mark in pairs (i.e. second mark can only be awarded with its own first mark)

ONE of:-

Cover with petroleum jelly;...... Plant will not wilt;

Cover with polythene bag/bell jar/bottle;..... condensation/drops of water will collect; R. water vapour

Use of photometer;..... bubble movement/level of capillary water;

Shoot in container;...... water taken up; [needs for water to be covered with oil to prevent evaporation/covered with polythene].

Cobalt chloride paper;..... colour change – to pink;

Anhydrous copper sulphate...colour change – to blue; R. litmus/universal indicator

(b) to prevent / minimise loss of moisture / water from the soil / pot by evaporation; [1]

(c) similar apparatus including same sized/mass plants/equal number of leaves; *ignore ref. to same bags*

same conditions of water added before starting investigation;

same time for readings/one day;

same conditions of light;

same temperature;

same humidity;

same air movement;

data analysis/comparison of graphs;

if candidate describes a different experiment, then max 2 for 2 controlled conditions

MAX [4]

[2]

(d)

feature	description	comment relating to adaptation
leaves	no leaves / small leaves / small surface area / spines / thorns;	to reduce water loss / transpiration; for protection / to prevent being
	h = in= f== = 4=== = = = 1== 41;	grazed / eaten;
	hairs [or stem or plant];	to trap water;
stem	swollen / thick / fleshy /	stores water;
(R. bulb)	succulent;	
	green / ref. chlorophyll;	for photosynthesis [as leaf
		area reduced];
cuticle / skin	thick/waxy; R. hard alone	stops water loss;
roots	long / tap;	to trap / absorb water from
		deep;
	shallow / network / fibrous /	to trap/absorb water over wide
	many roots;	area;
		R. store water
hairs/spines	on stem / plant / surface;	traps moist air;
		reduce transpiration;
stomata	not in direct light / sunken /	reduce water loss / reduce
	less in number;	transpiration;
plant shape	width / thickness / less surface	stores water / reduce water
	area to volume ratio / reduce	loss;
	surface area; ignore compact	

³ valid features without adaptation comment = max 1

MAX [3]

[Total: 10]

R. big roots / main root / light reflecting / shiny / ribs / grooves