

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**NOVEMBER 2002**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK : 70**

**SYLLABUS/COMPONENT : 0610/3**

**BIOLOGY**

**(EXTENDED)**



UNIVERSITY of CAMBRIDGE  
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
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- Q1 (a)
- (i) a community / group of (living) organisms AW + and their environment / habitats / surroundings ; 1
- (ii) a number of food chains linked together / all the food chains in a community / ref. to feeding relationships between organisms ; ref. to some animals with more than one food source ; shows flow of energy in an ecosystem ; max. 2
- (b)
- (i) locusts + impala ; (R) if in list with more organisms 1
- (ii) can be considered as 2<sup>nd</sup> consumer or 4<sup>th</sup> consumer / 3<sup>rd</sup> and 5<sup>th</sup> trophic level / leopard is in two food chains + at a different level in each ; 1
- (c)
- (i) numbers will drop + due to lack of grass ; (R) food unqual. 1
- (ii) scorpion numbers will increase + since more locusts to feed on ; 1
- (d) **ACCEPT OTHER VIABLE ALTRNATIVES RELATED TO THE WEB**
- (i) less impala for leopards to eat ;  
so leopards eat more baboons ;  
**OR**  
locusts migrate / locust levels drop + scorpion levels drop AW ;  
so less food for baboons ;  
**OR**  
grass sprayed with insecticide + ref. to bioaccumulation ;  
so baboons are + killed / poisoned ; 2
- (ii) ref. to disease / eaten by other animals (not shown on food web) / migration / drought / pollution / less reproduction / natural disaster ; 1
- (e) **ANY TWO REASONS FROM:**  
leopards could become extinct or to conserve leopards/  
leopards attract tourism to the area AW /  
baboon or impala numbers could get out of control or ref. to damage to food chain or web or ecosystem AW /  
not ethical /  
to maintain biodiversity /  
there are other alternatives to using natural fur ; ; 2
- max. 12

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- Q2 (a)
- (i) motor (neurone) ; 1
- (ii) **ANY TWO FROM:**  
 ref. to motor end plates /  
 cell body at start of cell or at end of cell or not in middle of cell /  
 cell body with dendrites on /  
 no dendron or axon only or ref. to long axon ; ; 2
- (iii) stretching from CNS to + body / peripheral / nerve AW ; 1  
 (A) origin / cell body + is in spinal cord / brain  
 (R) spinal cord / CNS unqual.  
 (R) in a nerve
- (b) **(cytoplasm)**  
 ref. to site of metabolic reactions / provides energy for impulse AW ;  
 is elongated AW ;  
 passes impulses along / electrical + signals / messages along AW ;  
 ref. to connecting different parts of the body AW ;  
 ref. to modification to form dendrites / links with other nerve cells ; max. 2
- (myelin sheath)**  
 acts as insulating material AW ;  
 prevents leakage of electrical signal from axon ;  
 allows fast(er) transmission of impulse ; max. 2
- (c)
- (i) ALL CORRECT FOR 2 MARKS  
 THREE BOXES CORRECT FOR 1 MARK  
 stimulus → receptor → coordinator → effector → response ; ; 2
- (ii) (effector) iris / circular muscle/ radial muscle ;  
 (receptor) retina / rods / cones ;  
 (response) pupil changes diameter AW / circular muscles contract /  
 radial muscles contract / iris muscles contract ;  
 (R) pupil changes shape  
 (stimulus) ref. to light / change in light intensity ; 4  
 (A) ref. to darkness

max. 14

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- Q3 (a) **ONE MARK FOR PROCESS, THREE MARKS FOR SUBSTANCES**
- (i) **(capillary)**  
 ref. to absorption of / uptake of / diffusion of / transport of ;  
 glucose / amino acids / salts / vitamins (or named vitamins B,C) / water /  
 O<sub>2</sub> to cells / CO<sub>2</sub> from cells ; ;  
**(lacteal)**  
 ref. to absorption of diffusion of / transport of ; (IF NOT ALREADY GIVEN  
 IN FIRST PART)  
 fat droplets / fat globules / fatty acids / glycerol / fat soluble vitamins (or  
 named vitamins – A or D) ; ;
- max. 4
- (ii) increases surface area / increases rate of absorption) ; 1
- (b)
- (i) diffusion ; 1
- (ii) ref. to thin wall / wall 1 cell thick ; (R) ref. to thin cell wall  
 ref. to absorbed materials transported away to maintain gradient AW ;  
 provide large surface area AW ;  
 ref. to large numbers / many branches / close to surface of villus ;  
 ref. to gaps in wall for transfer of materials / walls permeable or  
 semipermeable ;
- max. 2
- (c)
- (i) higher concentration in blood than in ileum AW ;  
 so materials need to be moved against concentration gradient AW ;  
 diffusion is too slow ;
- max. 2
- (ii) respiration + stops / slows down AW ;  
 (so) no energy available ;
- 2
- (d) **ANY TWO FROM:**  
 ref. to making white blood cells or fighting disease /  
 ref. to returning tissue fluid to blood stream AW /  
 ref. to transport of fat droplets or fat globules or fatty acids or glycerol /  
 ref. to prevention of pooling of tissue fluid AW ; ;
- 2
- max. 14

Page 4	Mark Scheme	Syllabus	Paper
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Q4 (a)

- i. ref. to auxin production near shoot tip AW ;
- ii. ref. to diffusion to spread auxin ;
- iii. auxin collects on + lower side of shoot / shaded side of shoot AW ;
- iv. ref. to gravity / effect of light ; (linked to iii.)
- v. auxin stimulates cells to + lengthen / grow ;
- vi. cells in lower side lengthen / grow + faster than those in upper side ;
- vii. (so) shoot grows / bends + upwards AW ;
- viii. ref. to positive phototropism / negative geotropism ; max. 5

(b)

(i) **REJECT WALL REFS. ONCE, THEN IGNORE (OESTROGEN)**

- i. produced by + ovary / follicle / corpus luteum ;
  - ii. increase in oestrogen affects pituitary gland / ref. to neg. feedback on FSH production ;
  - iii. ovulation triggered ;
  - iv. helps to build up uterus lining (in 1<sup>st</sup> half of cycle) ;
  - v. helps to maintain uterus lining + in 2<sup>nd</sup> half of cycle ;
- (PROGESTERONE)**
- vi. produced by + ovary / corpus luteum / remains of follicle ;
  - vii. maintains or further develops lining / wall + of uterus / controls or increases mucus production ;
  - viii. prepares uterus lining + to receive fertilised egg / for implantation AW ;
  - ix. drop in progesterone causes menstruation / period ;
  - x. description of breakdown of lining ; must be in context - linked to ix. max. 6

(ii)

- i. ref. to placenta secretes / produces + oestrogen / progesterone ;
- ii. to maintain uterus + lining ;
- iii. ref. to stimulate growth of milk-producing tissue in breasts AW ;
- iv. ref. to prevention of further ovulation ; 4

.....  
max.15

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Q5 (a)  
(i)

- i. ref. to colour e.g. dull green or brown or not colourful ;
- ii. ref. to small petals or lack of petals ;
- iii. flowers small or inconspicuous ;
- iv. ref. to presence of bracts ;
- v. ref. to long filaments ;
- vi. anthers / stamens + exposed / hang outside flower ;
- vii. anthers are loosely attached AW ;
- viii. stigmas + exposed / hang outside flower ;
- ix. stigmas are feathery ;
- x. stigmas are + large / have a large surface area ;
- xi. large(r) amount of pollen produced ;
- xii. no nectary / no nectar produced ;
- xiii. no scent ;

max. 9

(ii)

- i. pollen is light ;
- ii. ref. to no spikes / smooth / not rough / dry / not sticky ;
- iii. pollen has large surface area AW ; A ref. to air sacs
- iv. large amounts of pollen produced ; [IF NOT GIVEN IN (a)(i) x.]
- v. pollen is small ;

max. 3

(b)

**REJECT REF. TO IDENTICAL ONCE, THEN IGNORE**

- i. pollinating agent not necessary ;
- ii. pollination much more likely AW ;
- iii. only one plant needed ;
- iv. offspring similar to parent / ref. to little variation ;
- v. so will be suited to same environment AW ;
- vi. less capable of adaptation / greater risk of extinction + if environmental conditions change / could suffer from the same diseases AW ;

max. 3

max. 15

Page 6	Mark Scheme	Syllabus	Paper
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- Q6 (a)
- i. the breakdown / chemical release of + glucose / sugars / food / fat / lipid / protein / amino acids ;
  - ii. to release or produce + energy / ATP ;
  - iii. in cells / for use by cells / for named use (e.g. movement or ref. to heat or maintaining body temp ) ;
  - iv. ref. to mitochondria ;
- max. 3

(b) **ACCEPT EQUATIONS**  
**– FORMULA EQUATIONS MUST BE BALANCED**

- i. table with suitable headings ;  

<p>(aerobic)</p> <p>ii. oxygen used +</p> <p>iii. more energy produced +</p> <p>iv. CO<sub>2</sub> + water produced ;</p> <p>v.</p> <p>vi.</p>	<p>(anaerobic)</p> <p>oxygen not used ;</p> <p>less energy produced ;</p> <p>ethanol + CO<sub>2</sub> produced (in yeast);</p> <p>lactic acid / lactate + produced (in muscles) ;</p>
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- max. 5

- (c)
- i. ref. to hypothalamus ;
  - ii. detects temperature rise in + body / blood ;
  - iii. ref. to no shivering ;
  - iv. hairs lie flat AW ;
  - v. so no air trapped to act as insulation AW ;
  - vi. ref. to vasodilation ; (A) widening or expansion of blood vessels
  - vii. of arterioles ; (R) capillaries or veins
  - viii. so more blood is near surface of skin ;
  - ix. so more heat radiated ; - linked with iv. or v. or viii.
  - x. sweat glands + produce sweat ; (A) refs to panting
  - xi. evaporates from skin (surface) ;
  - xii. removing heat from skin AW ;
  - xiii. ref. to a behavioural response ; ; ; THREE MAX.
  - xiv. so body temperature drops AW ; (linked to any mechanism)

max. 7

max.15

Page 7	Mark Scheme	Syllabus	Paper
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Q7 (a)  
(i)

**(phenotype)**

the observable characteristic/ physical appearance + of an individual AW ;

Ⓐ "what the organism looks like"

**(genotype)**

the alleles that an individual possesses / the combination of genes in an organism / the genetic makeup of an organism ;

(ii)

**(dominant)**

the allele / form + of a gene that always expresses itself (shows itself) in the phenotype / heterozygote AW ;

**(recessive)**

the allele / form + of a gene that only expresses itself (shows itself) when homozygous AW ;

Ⓐ the hidden characteristic in a heterozygote

(iii)

**(homozygous)**

both alleles / forms of a gene + in the organism are the same AW ;  
eg. HH or hh ;

**(heterozygous)**

the alleles / forms of a gene + are different AW ;  
eg. Hh ;

max. 7

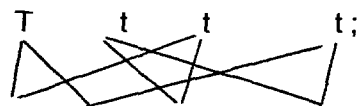
(b)

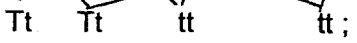
(i)

i. suitable example chosen;

ii. letters identified correctly (e.g. tall = T and dwarf = t);

iii. Tt x tt;

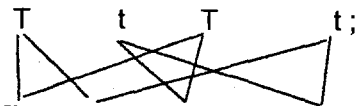
iv. 

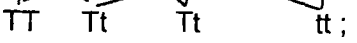
v.  - must be linked to gametes correctly

vi. phenotypes identified ; MUST BE LINKED TO GENOTYPE

(ii)

vii. Tt x Tt;

viii. 

ix.  - must be linked to gametes correctly

x. phenotypes identified ;

max. 8  
max. 15