

## MARK SCHEME for the October/November 2006 question paper

### 5090 BIOLOGY

9050/02

Paper 2, maximum raw mark 80

This mark scheme is published as an aid to teachers and students, 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.

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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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

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Section A

- 1 (a) (micro)villi  
diffusion/or good description of  
thin wall/epithelium (R ref. cell wall)  
into lacteals/lymph (Ignore capillaries)  
lymph returned to blood max 4
- (b) (i) lipase/steapsin 1
- (ii) optimum/best AW + for enzyme/lipase action (I ref. body temp) 1
- (c) fatty acids  
glycerol/glycerine/propantriol 2
- (d) fatty acids/ref. smaller molecules  
(can) pass through membrane/Visking tubing  
concentration gradient/diffusion  
ref acidity of or lowers pH of water/ref acidity of molecules max 3
- Total = 11**
- 2 (a) (i) transpiration (A evapotranspiration) (R evaporation) 1
- (ii) 12.30 1
- (b) (i) warmer AW  
faster + evaporation/vapouration (I refs. to transpiration)  
lighter/brighter  
stomata open  
ref. increased wind/decreased humidity max 4
- (ii) water lost from plant cannot be replaced  
(A loses water faster than it gains water)  
overall decrease in water content of plant/loss of turgidity AW)  
(A refs. wilting)
- stomata/pores + close max 2
- (c) \* less evaporation of water/less loss of latent heat  
(R less transpiration)  
\* to cool plant  
(\* A reverse argument) 2
- Total = 10**

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- 3 (a) (i) coronary artery 2
- (ii) P aorta (-tic arch) 2  
Q left + atrium/auricle
- (b) (mark the first, one per line)  
2 from: thinner or weaker + walls/valves/pressure ref.  
(A less muscular + walls) 2
- (c) (i) (mtf,opl) (A platelets) 2  
2 from: fat/cholesterol/blood cells/clot(ted blood)  
(A atheroma for 1 mark) (A ref. fibres/fibrin)
- (ii) natural response to damage or injury is for blood to clot AW  
platelets + release enzymes/cause fibrinogen to change to fibrin  
therefore drug prevents clotting (or implied – platelets cause blood to clot) max 2

**Total = 10**

- 4 (a) (i) oxygen/temperature qualified (I air/temperature) (R warmth)
- (ii) cotyledon/seed leaves/endosperm
- (iii) testa (A seed coat) not accounted for 3
- (b) (i)& (ii) mark together  
food digested/ref. enzyme action (I breakdown)  
starch → sucrose or glucose/protein → amino acids  
transportation AW  
to growing regions/used for growth (or process described)  
used for respiration/correct energy reference max 4
- (c) (i) & (ii) mark together  
(food storage region) will still lose mass  
more slowly AW  
plumule + photosynthesis AW  
large(r)/fast(er) increase in mass  
radicle slightly faster increase in mass (than when in dark)  
due to more/faster growth max 4

**Total = 11**

- 5 (a) oviduct/Fallopian tube (mark the first) 1  
(A description of oviduct)
- (b) mitosis (-totic) 1
- (c) implantation AW  
in lining/endometrium (R wall)  
of uterus/womb  
differentiation AW/ref. placental devpt. (I fetal membranes) max 2

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- (d) mother's gametes<sup>#</sup> shown as  $I^A$  and  $I^o$  } max 1 if wrong  
 father's gametes<sup>#</sup> shown as  $I^B$  and  $I^o$  } symbols used  
 \*grid correctly filled (A e.c.f. if gametes incorrectly shown)  
 square  $I^oI^o$  identified as the embryo 4  
 (A genetic diagram, but <sup>#</sup>ensure gametes are not shown as parental genotypes –  
 \*this mark not available on a genetic diagram)

**Total = 8**

Total for Section A = **50**

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Section B

- 6 (a) (A any three facts linked to a process)  
osmosis is simple diffusion  
partially/selectively/semi-permeable membrane  
*correct refs. in each case to:*  
no energy/energy required  
water only/ions AW or larger molecules  
down/against concentration gradient  
(R along) max 3
- (b) (i) salts ions or one named (A minerals) (R nutrients)  
from soil  
ref. root hairs  
to make proteins/amino acids/DNA  
chlorophyll (R chloroplasts)  
even when scarce in surrounding soil AW  
(could be ref. to concentration gradient) max 4 for (i)
- (ii) glucose  
amino acids  
uptake from gut  
through (micro)villi  
\*for protein (or named) manufacture (linked to amino acids)  
\*for respiration/correct energy ref. (linked to glucose) max 7 for (b)  
(mark 1<sup>st</sup>.2)
- Or kidneys;** reabsorption; 2 named salts or any 2 from glucose, amino acids, urea, salts (unspecified or one named);  
ref. osmoregulation; any one of those marked \* above; max 7 for (b)
- Total = 10**
- 7 (a) ref. hypothalamus  
nervous control/impulses/brain  
less active sweat glands/sweating stops  
(A inactive)  
less evaporation (of sweat) (R no evaporation)  
vasoconstriction AW  
of arteries/-erioles/blood vessels (R capillaries/veins)  
less blood  
to capillaries (A ref. heat loss from)  
less heat lost  
shivering generates heat/hair erection decreases heat loss (or insulates)/adrenaline release/higher metabolic rate  
one behavioural reference (e.g. moving/putting clothes on) max 7
- (b) a change (in level/of set point) AW  
is responsible for/triggers/causes/ref. sensor/ref. receptor  
a response/reaction  
(which leads to) restoration of original level max 3  
(If given, accept specific examples instead of general account)

**Total = 10**

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**8 E (a)** mosquito is a human parasite  
 (breeds in) large numbers  
 attracted to warm bodies  
 feeds on blood  
 sharp mouthparts/relatively painless bite  
 feeds at night/while victim sleeps  
 spits before sucking/ref. anticoagulant  
 vector of/carrier of/not seriously affected by/host to + human pathogen(s) (or named) AW  
 (R named disease)  
 carry many pathogens  
 (fly) from person to person

max 5

**(b)** intimate body contact or described  
 bacterium/a/spirochaete/*Treponema*  
 primary sore or described/papule/chancere  
 a secondary symptom described  
 (headache/slight pyrexia/rash/skin lesions/ulceration/hair loss)  
 (lengthy) dormant period  
 tertiary symptom described (organ destruction)  
 antibiotic or named (doxycycline, erythromycin, tetracycline)  
 (A 'penicillin' to mean antibiotic)  
 need for early diagnosis/treatment

max 5

**Total = 10**

**8 O (a)** named plant or animal (with some economic importance)  
 (plausible for description given)  
 named selected feature  
 breeding of specimens both with desired feature  
 selection of offspring with best of desired feature  
 over a period of time/repitition  
 financial reward (i.e. of some pecuniary benefit)  
 danger of inbreeding/disadvantage to organism involved  
 (e.g. highly-strung dogs/Pekingeses with breathing problems)

max 6

**(b)** named organism + required characteristic  
 (i.e. what you are breeding for)  
 required characteristic ensured/no variation  
 no dangers of inbreeding/of introduction of undesirable traits  
 \*cheap/large numbers of offspring/one parent needed  
 \*relatively quick  
 \*genetically identical  
 Any of the marks indicated with \* available for a fungus or a seaweed  
 Up to a max 2

max 4

**Total = 10**