

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

MARK SCHEME for the October/November 2007 question paper

5096 HUMAN AND SOCIAL BIOLOGY

5096/02

Paper 2 (Theory), maximum raw mark 100

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

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Page 2	Mark Scheme	Syllabus
	GCE O LEVEL – October/November 2007	5096

Section A

- 1 (a) nitrogen
- (b) (i) A, B
- (ii) B
- (iii) C [4]
- (c) so temp. is even in the tube A/W [1]
- (d) $4.2 \times 50 \times 30 = 6300 \text{ J}$ [2]
- (e) heat losses, mass of sample etc. [1]
- (f) 1. elderly less active [1]
 2. 0–1 growing more/larger s/a for heat loss [1]
 3. male has more muscle; muscle uses more energy/male metabolic rate higher or female has more fat; fat uses less energy [2]
- (g) (i) F = bile
 G = lipase [2]
- (ii) F in liver, R. gall bladder
 G in pancreas [2]
- (h) (i) coronary [1]
- (ii) they supply heart muscle; with food/oxygen; in absence of these heart stops [2]
- [Total: 20]
- 2 (a) A = nitrification/A nitrifying bacteria
 B = nitrogen fixation/A N- fixing bacteria [2]
- (b) both points plotted correctly, line joined [1]
- (c) up to 150 kgs fertiliser; crop yield rises steadily; rises from 2.6 to 4.7 tonnes;
 from 150–200 little or no effect; rises only from 4.7 to 4.8 tonnes. [Max. 3]
- [Total: 6]

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- 3 (a) (i) transmitter present only/made in neurone 1;
receptors on neurone 2.
- (ii) diffusion a slow process/transmitter must diffuse.
- (b) (lots of) mitochondria in bulb. [1]
- [Total: 4]
- 4 (a) G: salts removed (by acid); only protein/collagen left. [2]
H: protein destroyed; only salts left. [2]
- (b) 1. growth; [2]
2. repair. [2]
- [Total: 6]
- 5 (a) prevent faeces, urine reaching water/ use latrines A/W;
kill snails;
purify/chlorinate drinking water;
do not bathe/paddle, or wear shoes in water.
drugs to kill adults in man. [Max. 3]
- (b) age when most likely to play in water. [1]
- (c) one (adapted) to enter snail; one to enter man; one to rep. Asexually. [Max. 2]
- [Total: 6]
- 6 (a) (i) W Letters only
X
S
S
T [5]
- (b) (i) two blood supplies/artery and portal vein/ox. and deox supplies. R two arteries. [1]
(ii) liver must process foods from gut (before they enter circulation). [1]
- [Total: 7]
- 7 (a) clot hardens/forms; arterioles constrict. [2]
- (b) less activators/less elastic fibres/A less serotonin. [1]
- (c) 1. calcium needed to form thrombin/activate prothrombin. [1]
2. enzymes involved in reactions; low temps. slow enzymes/slow reaction. [2]
- [Total: 6]

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Section B

- 8 (a) (i) grids/filters;
(ii) remove sticks, paper etc.;
(iii) sedimentation;
(iv) to trap/ collect solids;
(v) liquor pumped;
(vi) to trickling filter/to aeration tank;
(vii) organic material broken down;
(viii) to salts;
(ix) by aerobic/in presence of oxygen;
(x) bacterial action;
(xi) credit ref. to protozoa/nematodes/fungi/insects (if T. filter);
(xii) effluent to river;
(xiii) sludge digested by anaerobic bacteria;
(xiv) or dried;
(xv) ref to methane generated.

[Max. 11]

- (b) pit deeper: more room for faeces/less chance of overflow;
screen over door: keep flies out;
concrete lining: prevent entry of rats;
lid added: smell/prevent flies;
wider base: stability/prevent rats.

[Max. 4]

[Total: 15]

- 9 (a) (i) (i) named hormone;
(ii) correct origin;
(iii) correct target;
(iv) travels in blood.
- (ii) (v) 'quick' hormone named, e.g. insulin, glucagon, adrenaline, ADH etc;
(vi) acts on cell membranes/enzymes/or specific effect;
(vii) 'slow' hormone named, e.g. estrogen, progesterone, testosterone, FSH etc.;
(viii) acts on genes/growth processes/ or specific effect.
- (iii) (ix) suitable 'all-time' hormone named e.g. insulin;
(x) linked to what it does, e.g. sugar levels;
(xi) a process necessary all our life;
(xii) suitable periodic hormone named, e.g. estrogen;
(xiii) active for only a period, e.g. after puberty/before menopause/in first half of cycle etc.;
(xiv) since what it regulates is periodic/A/W.
- (b) (i) (i) (more thyroxine) pituitary gland depressed/switched off;
(ii) less TSH;
(iii) less growth of thyroid;
(iv) less secretion;
(v) of thyroxine;
(vi) so thyroxine levels fall.

[Max. 10]

[Max. 5]

[Total: 15]

Page 5	Mark Scheme	Syllabus
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10 Either

(a) (i) Protein

- (i) stays in blood;
- (ii) (proteins) too large;
- (iii) to be filtered/to pass through;
- (iv) at glomerulus;
- (v) into bowman's capsule.

(ii) Glucose

- (vi) filtered;
- (vii) at glomerulus (unless given in (iv));
- (viii) into b. capsule (unless given in (v));
- (ix) all reabsorbed;
- (x) at PCT;
- (xi) by active transport.

(iii) Urea

- (xii) filtered; (see (vii) and (viii) above);
- (xiii) most/all passes through to urine/not reabsorbed.

(iv) Water

- (xiv) filtered; (see (vii) and (viii) above);
- (xv) most/99% reabsorbed;
- (xvi) suitable site named, e.g. PCT, loop, DCT, collecting duct.

[Max. 10]

- (b) (i) blood concd./has less water;
- (ii) detected at brain/hypothalamus;
- (iii) pituitary;
- (iv) secretes (more) ADH;
- (v) travels to kidney;
- (vi) in blood;
- (vii) makes collecting duct more permeable;
- (viii) more water reabsorbed;
- (ix) less volume/less urine;
- (x) more concd. urine.

[Max. 5]

[Total: 15]

Page 6	Mark Scheme	Syllabus
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10 Or

- (a)** (i) single cells/are gametes R used in reproduction;
(ii) haploid/half set of chromosomes etc.;
(iii) formed by meiosis;
(iv) short lived.

[Max. 3]

- (b)** (i) fertilisation is fusion of egg and sperm;
(ii) of nuclei;
(iii) in oviduct;
(iv) forms zygote;
(v) fert. before implantation/ mplant. after fert.;
(vi) implant. in uterus;
(vii) lining/endometrium;
(viii) now ball of cells/blastocyst.

[Max. 5]

- (c)** (i) may have different blood groups;
(ii) maternal blood pressure too high;
(iii) maternal blood contains bacteria;.

[3]

- (d)** (i) carbon monoxide poisons Hb;
(ii) blood (either) carries less oxygen;
(iii) lower respiration of fetus;
(iv) less energy for growth/less growth;
(v) nicotine;
(vi) can cross placenta;
(vii) constricts arterioles/reduces blood flow;
(viii) less foods, oxygen to fetus;
(ix) so less growth (unless given in (iv) above)

[Max. 4]

[Total: 15]