

MARK SCHEME for the October/November 2007 question paper

5096 HUMAN AND SOCIAL BIOLOGY

5096/02

Paper 2 (Theory), maximum raw mark 100

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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.

[Max. 10]

- (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. 5]

[Total: 15]

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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]

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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]