

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

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MARK SCHEME for the October/November 2012 series

5096 HUMAN AND SOCIAL BIOLOGY

5096/21

Paper 2 (Theory), maximum raw mark 100

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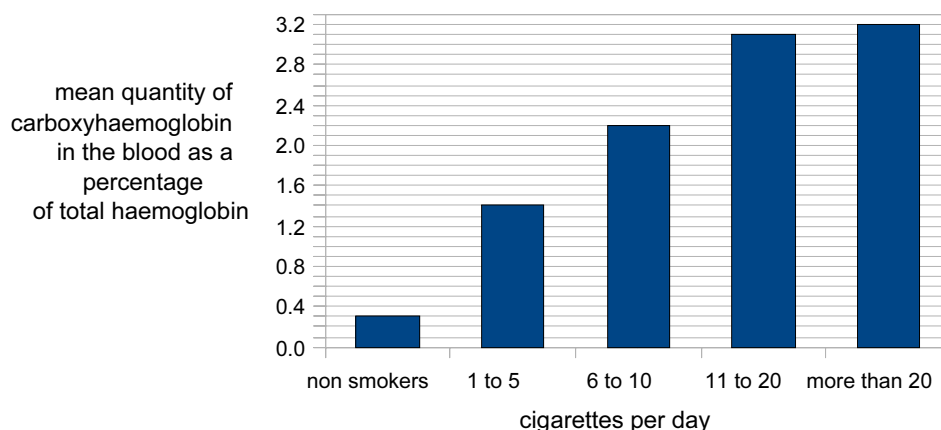
Section A

- 1 (a) (i) small intestine / ileum; [1]
- (ii) glucose;
wide / large / high surface area;
microvilli; (*reject* hairs)
diffusion;
into blood / capillary / bloodstream;
(maintains) concentration gradient;
(thin) epithelium; [max 4]
- (b) to allow time to reach stated temperature / equilibration / AW; [1]
- (c) blue-black colour (throughout the 5 minutes);
starch present;
not affected by amylase / enzyme;
A 0 °C enzyme deactivated / AW;
E 72 °C enzyme denatured; (*reject* killed) [max 3]
- (d) orange-red colour - no starch;
starch absent / removed / all broken down;
by amylase;
B 18 °C (negative for starch at) 5 minutes / enzyme works slowest (of these 3);
C 36 °C (negative for starch at) 3 minutes / optimum temperature;
D 54 °C (negative for starch at) 4 minutes / enzyme works slower (than 36); [max 4]
- (e) starch is insoluble / forms sol / suspension / not true solution;
large molecules;
digested / broken down (by amylase / enzyme);
to simpler / soluble products / sugars / maltose / (glucose); [max 3]
- (f) (i) starch / cloudiness would eventually disappear / becomes clear;
test-tube A enzyme activity would restart / starch digested after;
enzyme merely deactivated at low temperature / owtte; (*reject* frozen) [max 2]
- (ii) starch / cloudiness would continue to be present / starch not digested;
test-tube E enzyme activity would not restart;
enzyme denatured / damaged by heat; [max 2]

[Total: 20]

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- 2 (a) column lengths accurate;
labelled;



[2]

- (b) more cigarettes more COHb/proportionality;
up to a point/levelling off;
non smokers do not start at 0/other factors involved;
other sources/named source, of carbon monoxide;

[max 2]

- (c) higher (in both groups);
higher atmospheric CO than UK; (ORA if stated)
CO from traffic/industry/UK population may be rural;
older cars/no catalytic converters;
taken near highway;
no pollution control;
may smoke more cigarettes/be stronger;
AVP;

[max 3]

[Total: 7]

- 3 (a) vectors;

[1]

- (b) (named) bacteria ;
typhoid / cholera / bacterial dysentery / examples;
(accept names of disease-causing organisms or disease only)

[2]

- (c) cover food;
screens (on windows);
electrocuters / sticky strips / insecticides / method of killing; (reject swatting)
cooking – qualified;
AVP;

[max 2]

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- (d) (only) female bites /sucks blood;
she needs protein meal;
before producing eggs;
ORA for males – plant juices only; [max 2]

[Total: 7]

- 4 (a) fibre;
iron /Fe;
vitamin D; [max 2]

- (b) calcium /Ca;
vitamin D;
protein; [max 2]

- (c) iron is a component of haemoglobin;
haemoglobin carries oxygen;
prevents anaemia /less likely to have anaemia; [max 2]

- (d) promotes peristalsis;
prevents constipation; [max 1]

[Total: 7]

- 5 (a) (chemical) digestion; (*ignore* protein to amino acids) [1]

- (b) respiration; (*ignore* oxidation) [1]

- (c) assimilated;
turned into protein; [max 1]

- (d) ammonia is toxic;
it is combined with carbon dioxide;
turned into urea; [max 2]

[Total: 5]

- 6 (a) prevents blood loss /haemorrhage;
prevents entry of pathogens /infections;
scab is protection for new cells underneath; [max 2]

Page 5	Mark Scheme	Syllabus	Paper
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- (b) slow flow rate;
low blood pressure/pooling of blood;
lower than heart/longer distance to travel;
problems with moving blood against gravity;
people sitting/legs not moved for long periods of time; [max 2]
- (c) (leg) muscles contract **less**;
squeeze veins **less**;
resulting in **reduced** blood flow; (*accept* slowly)
AVP; [max 2]
- (d) fatty deposits/cholesterol;
poor circulation/AW;
less movement or exercise; [max 2]
- (e) heart attack/myocardial infarction;
stroke;
pulmonary embolism;
other likely consequence; [max 1]

[Total: 9]

- 7 (a) *filtration* **F**;
reabsorption of glucose **G**;
reabsorption of salts **G, H, J**; (max 1, mark first letter only)
reabsorption of urea **G, K**; (max 1, mark first letter only)
reabsorption of water **G, H, J, K**; (max 1, mark first letter only) [max 5]
- (b) (i) (tubule) into pct;
active transport/is pumped/cotransported;
against concentration gradient;
using energy/ATP;
from respiration;
(out of tubule/nephron) into blood vessels/capillaries;
down concentration gradient; [max 4]
- (ii) by osmosis/diffusion;
along with salts/sugars;
under influence of ADH;
water concentration/potential gradient/AW;
into blood vessels/capillaries; [max 3]
- (c) water-soluble/blood soluble substances;
pass into filtrate/are filtered, so pass into urine;
removed/excreted, as sweat/through skin;
may be broken down in liver; [max 3]

[Total: 15]

Page 6	Mark Scheme	Syllabus	Paper
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- 8 (a) cornea;
lens;
vitreous humour;
fovea / yellow spot; [4]
- (b) light / rays bent / refracted;
(refracted) by cornea;
(refracted) by lens;
light passes through aqueous humour / vitreous;
focused onto retina;
fovea / yellow spot;
image is inverted / upside down ; (*ignore* rods / cones / optic nerve onwards) [max 4]
- (c) *rods*
rod-shaped / blunt tip;
of one type only;
monochrome;
(still sensitive) in low light intensities;
widespread throughout retina;
about twice as many as cones;
absent from fovea;
several connect to one bipolar neuron / ganglion cell / relay cell / nerve fibre;
lower resolution image;
(*reverse argument – do not credit twice*)
cones
cone-shaped / tapered tip;
three types / RGB;
colour / trichromatic;
not so sensitive to low light intensities;
widespread throughout retina;
about half as many as rods;
greater concentration in fovea / fovea is cones only;
each connects to one bipolar neuron / ganglion cell / relay cell / nerve fibre;
higher resolution image; [max 3]
- (d) (electrical / nervous) impulses; (*ignore* messages)
passes along sensory neurone;
passed via synapse / across gap;
chemical / (neuro) transmitter;
diffuses;
to relay neurone / to next cell or neurone;
which recreates (electrochemical) impulse; [max 4]

[Total: 15]

Page 7	Mark Scheme	Syllabus	Paper
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- 9 (a) (antibiotic is) compound / drug; (*ignore* chemical / tablet)
that kills bacteria;
inhibits bacterial growth;
concept of specificity;
produced by micro-organism / mould / fungus / penicillium;
may be modified (by Man) / semi-synthetic;
(antibacterial but) not antiviral; (*ignore* resistance, example) [max 5]
- (b) (antiseptic is) used on human body / tissue / skin / externally;
reduce / prevent infection; (*ignore* cure)
inhibit reproduction of bacteria / bacteriostatic;
example of antiseptic;
example of use scenario for antiseptic; e.g. wounds
- as opposed to / milder than disinfectants;
which kill bacteria / are bacteriocidal;
and damage human tissue;
use of disinfectants on surfaces;
example of disinfectant;
example of use scenario for disinfectant; [max 5]
- (c) is injected (into patient);
(antiserum) gives immediate protection;
immune system too slow producing antibodies;
bacteria will spread;
serum contains antibodies;
passes on passive immunity;
e.g. antitoxin vs tetanus;
produced in horse / animal / donor organism (usually not human);
injected with antigen / tetanus toxoid / toxin;
does not involve person's own antibodies;
effect wears off after some time; [max 5]
- [Total: 15]**
- 10 (a) *respiration*
release of energy;
production of ATP;
mitochondria;
aerobic;
involving oxygen;
(equation) glucose + oxygen → ;
carbon dioxide + water;
anaerobic;
resulting in production of lactic acid; (*reject* and CO₂)
less energy / less efficient / less ATP; [max 5]

Page 8	Mark Scheme	Syllabus	Paper
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(b) *recycling of carbon* – credit points on diagram
 photosynthesis;
 assimilation / fixation;
 respiration;
 decomposition;
 role of carbon dioxide / CO₂ as input in processes above;
 role of carbon dioxide / CO₂ as output in processes above;
 reference to organic compounds e.g. carbohydrates / fats / proteins; [max 5]

(c) *reflex action*
 quick;
 automatic;
 not involving brain / involuntary / without thinking;
 response to a stimulus;
 protection / to avoid damage / example e.g. withdrawal / description of scenario;
 nervous impulse passed from;
 sensory neurone;
 (to) intermediate / relay / connector neurone / motor;
 mention of synapse (between neurones above);
 (to) effector / muscle; [max 5]

[Total: 15]