

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

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MARK SCHEME for the October/November 2013 series

5096 HUMAN AND SOCIAL BIOLOGY

5096/21

Paper 2, maximum raw mark 100

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Section A

- 1 (a) [A]oesophagus/gullet;
[B]duodenum/small intestine;

(b) Max 3 from:

contract and;
mix food;
and gastric / digestive juices / (named) enzymes / HCl;

(mechanical) break down food / increase surface area;

moving food along / emptying;
peristalsis;

sphincters;
control the entry and exit (to and from the stomach);

I Squeeze

[max 3]

(c) (i) Max 1 from:

to keep the volumes the same / AW;
control;

R for a fair test

[max 1]

(ii) Max 5 from:

protein / egg white has been, digested / broken down;
(converted) into, (poly)peptides / amino acids;
which are soluble;

(caused) an enzyme / protease / pepsin;

acid / lower pH (as environmental factor);

I acid acting alone

warmth / 37 °C / body temperature;

AVP e.g. ref to optimum temps or pH;

[max 5]

- (iii) test tube 2 – (does not work if pH is) not acid;

A needs acidity

test tube 3 – no enzyme / protease / pepsin ;

A needs enzyme

test tube 4 – no acid and no enzyme / protease / pepsin ;

A needs enzyme and acid /
both[max 3]

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(iv) **Max 4 from:**
measure pH/use pH papers/use pH meter;
ref. to changing pH / range of pH / use alkali / using buffers;

record time to clear ;
description of how to judge endpoint ;

vary temperature;
method of achieving different temperatures ;

use different concentrations of enzyme; **A** amount

different protein (substrate);

AVP;

Ignore more accurate (volume) measurements / repeats [max 4]

(d) **Max 2 from:**

pancreas;
liver;
(wall of) small intestine / duodenum ;

R gall bladder

[max 2]

[Total: 20]

2 (a) **Max 3 from:**

at certain places on the retina there are no light sensitive cells A/W ;

(the eye has) blind spot;

I optic nerve

not the same side for each eye A/W ;

the image falls on the blind spot at a certain distance only A/W ; [max 3]

(b) **Max 3 from:**

wide(r) field of vision;
each eye covers the other's blind spot;
useful for judging distance;
perception of depth / AW;
useful for judging speeds;
stereoscopic vision;
not complete blindness due to loss of one eye AW ;

[max 3]

[Total: 6]

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3 (a) 41% + 68% **Need both correct for the mark.**

(b) no mark for choice of meal –B

max 2 from:

because it has 68% / >50% from carbohydrates;
fats within range;
A has too much fat ;

[max 2]

(c) (i) not digested / not absorbed / egested ; **I not used / excreted** [1]

(ii) **max 2 from:**

any (named) vitamin or (named) mineral or water ;;

[2]

[Total: 6]

4 (a) **max 2 from:**

diffusion;
from high to low concentration / down concentration gradient;
via tissue fluid;
through muscle cell membrane;
AVP;

[max 2]

(b) max 2 if any symbols used (e.g. mixture of words and symbols)
ignore any symbols if all the words are given

[glucose] + oxygen; → carbon dioxide; + water;
or water; + carbon dioxide;

[max 3]

[Total: 5]

5 (a) C cell wall
D cell membrane
E cytoplasm
F nucleus

[4]

(b) **max 3 from:**

osmosis;
diffusion / movement, of water ;
out of, cell / cytoplasm / down water concentration AW / potential gradient;
through partially permeable (cell) membrane; **A semi-permeable**
plasmolysis / cell shrinkage;

[max 3]

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(c) max 3 from:

- sugar solution more concentrated;
- water passed out of cytoplasm/cell;
- plasmolysis/cell shrinkage;
- cell membrane detached from cell wall ;
- cytoplasm volume reduced;
- vacuole, reduced/non existent;

R vacuole bursts

[max 3]

[Total: 10]

(6) max 8 from:

stage 1

- (tip head back) to open airways;
- idea of making sure that the tongue is not obstructing flow of air ;*
- idea of making sure that debris is not obstructing the flow of air ;*

stage 2

- (pinching nose) idea of ensuring air goes down windpipe / stop air coming out of nose ;

stage 3

- (blowing air) increasing pressure so air enters the lungs;
- idea that oxygen is in expired air ;*
- air / oxygen enters, lungs / alveoli;
- hand on chest to check that air is entering A/W;

stage 4

- (removing mouth) person can exhale;
- weight of rib cage causes exhalation;
- removal of carbon dioxide;
- hand on chest to check that air is leaving A/W;

max 8

[Total: 8]

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Section B

* allow once only

7 (a) (i) brain and nervous system

max 7 from:

(short-term :)

idea of light headed / euphoria;

neurone damage / effects on neurone membranes; **I ordinary cells**

idea of longer reaction time / slower decisions / impulses slower / impaired judgement ;

link to passage of impulse / synapses;

loss of consciousness;

loss of coordination / muscular control / slurred speech;

rationality altered / mood changes (happy, sad, angry, confused, sexy, sleepy, aggressive);

memory loss;

dehydration / diuretic effect;

hangover / description (headache / sickness / upset stomach / dizziness);

AVP;

(long-term:)

brain shrinkage;

blood vessels (possibly) leaky stroke;

sleep patterns altered;

addiction ;

AVP;

[max 7]

(ii) liver

max 4 from:

removes / converts alcohol (from blood);

(limited) removal rate of one unit per hour ;

(breakdown makes) toxic products / acetaldehyde / ethanal;

fatty deposits / fatty liver ;

cirrhosis;

(alcoholic) hepatitis;

liver cancer;

AVP;

[max 4]

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(b) alcohol and baby in utero
max 4 from:

reference to maternal and fetal blood;
through placenta;
idea that placenta is not a barrier for alcohol;

reduced birth-weight / reduced growth;
possible miscarriage;

reduced, IQ / intellectual ability / brain development / head size;
behaviour problems/ learning difficulties;
modified facial features or described;

fetal alcohol syndrome;

AVP;

[max 4]

[Total: 15]

8 (a) max 5 from:

Red blood cells - transport oxygen;

- transport carbon dioxide;

White blood cells - defence, against / 'fight', infections or pathogen;

ref. to phagocytes / phagocytosis / description;

lymphocytes produce antibodies ;

- (antibodies) counteract antigens ;

AVP ; e.g. produce antitoxins

[max 5]

(b) max 5 from:

cause blood clotting;

fibrinogen fibrin;

soluble to insoluble (threads);

fibres trap (red) blood cells;

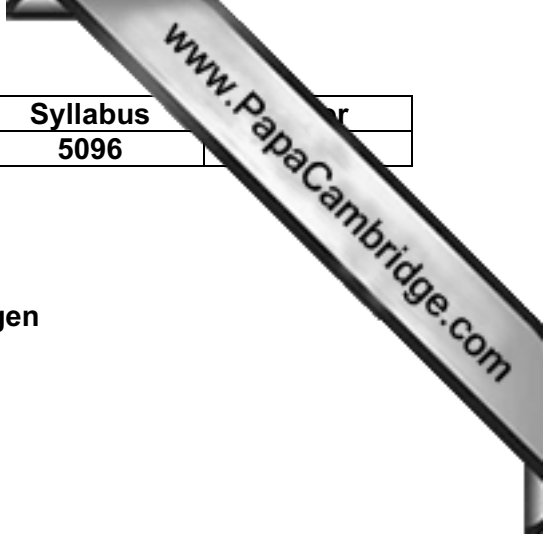
forms, clot / scab ;

prevents, blood loss / haemorrhage;

prevents, infection / entry of pathogens;

AVP; e.g. ref. of calcium ions / vitamin K

[max 5]



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(c) max 5 from:

- transport of, cells / platelets;
- transport of (one named) digestion products;
- transport of carbon dioxide / bicarbonates ; **I oxygen**
- transport of water;
- transport of urea;
- transport of (one named) hormones;
- transport of heat;
- ref to plasma proteins e.g. fibrinogen, albumin, antibodies;
- ref to tissue fluid formation;

ref to tissue fluid reabsorption;
AVP;

[max 5]

[Total: 15]

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Section C

9 (a) max 3 from:

- (both) living ;
- tissues ;
- composed of cells ;
- and (non-living) matrix ;
- tough / AW;
- give shape to arm;
- AVP;

[max 3]

(b) max 8 from:

bone:

- collagen;
- fibres;
- forms shape of bones;
- calcium phosphate/calcium salts/mineral salts; **I calcium alone**

- hard / rigid / non-elastic;
- as reinforcement;
- act as levers;
- for protection;
- ref. to making red / white blood cells ;
- fat storage ;

[max 6]

cartilage:

- (more) flexible / softer; **I soft / elastic**
- water-filled matrix;
- forms covering, at ends of bones / in joints;

- cushion like / absorbs shock / load-spreading;
- reduces friction;

[max 8]

(c) max 4 from:

tendons:

- (white) collagen;
- inelastic; **A non-elastic**
- attach muscles to bones;

ligaments:

- (yellow) elastin;
- elastic;
- attach bone to bone;

[max 4]

[Total: 15]

* allow once only

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10 (a) max 5 from:

contract;
biceps / triceps / other muscles;
antagonistic action ;
origin / point of attachment fixed;
insertion / (other end) moves when muscle under tension;
named bone moved by a named muscle ;

bones act as levers;
flexion / extension (straighten) / rotation;
energy from respiration;

[max 5]

(b) (i) max 5 from:

voluntary / conscious / thought involved / not automatic ;
(action) initiated in brain / cerebrum;
impulses passed; **I messages/signals**
synapse / synaptic transmission / detail explained;*

to other side of body / via motor area;
down spinal cord;
to intermediate / relay neurone;
to motor neurone;

to muscle / effector;
e.g. biceps/triceps;

another impulse;
to antagonistic muscle/other named;
repeated;
AVP ; out at root / part of spinal nerve/peripheral ns

[max 5]

(ii) max 5 from:

reflex / no thought involved / automatic / involuntary / not under conscious control ;

receptor detects the heat stimulus;
impulse passed along sensory neurone;
(spinal) nerve ;
to spinal cord;
to intermediate / relay neurone;
synapse / synaptic transmission / detail explained;*
to motor neurone;
to muscle / effector / biceps;
quick(er);
single action / once only;

[max 5]

[Total: 15]