CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2012 series

5090 BIOLOGY

5090/22 Paper 2 (Theory), maximum raw mark 80

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1 **(a)** A – tongue;
B – larynx/voice box; [2]

(b) peristalsis; [1]

(c) closes/covers;

trachea/windpipe/air passage/larynx/voice box/B;

helped by raising of larynx **AW**;

preventing the entry of food / preventing food going to lungs or respiratory system / prevents choking **AW** / allows food to enter oesophagus **AW**; [Max 3]

(d) **(i)** digestion / enzymatic action / hydrolysis;

& **(ii)** amylase;

(from) saliva / salivary glands;

starch;

to maltose;

neutralisation / ref. pH; [Max 4]

(each marking point allowed under **(i)** or **(ii)**)

[Total: 10]

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2 **(a)** genes / mutation / named common mutagen;

environment / habitat / named environmental factor; [2]

(b) evolution / speciation; [1]

(c) different/changed environment;

mutation(s);

variations + advantageous **AW** / better adapted;

survive;

reproduce / passed on;

cumulative effect / over many generations;

leading to change in phenotype / appearance / or e.g.; [Max 4]

(d) difference in genes/DNA;

difference in chromosomes;

ref to problems with fertilisation;

no sexual attraction / incompatible;

geographical separation; [Max 2]

[Total: 9]

3 **(a)** any 2 correct ions;;

any correct function for each ion;;

e.g.

nitrate;

protein / amino acid production / named protein / DNA;

magnesium;

chlorophyll; [Max 4]

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(b) decomposition/decay/putrefaction/enzyme action;

*by bacteria;

*fungi;

of named chemical in plant leaves;

nitrification (or described); [Max 4]

(c) chlorophyll/chloroplasts + absorbs light/photosynthesis;

leaves do not receive enough light/in shade **AW**;

to absorb water/moisture/water vapour;

water store/retains water/dead leaves lack water; [Max 3]

[Total: 11]

4 (a) (i) pulse (beat);

in artery in leg;

increased pressure;

ref. one pulse beat/kick for every heart beat; [Max 4]

(ii) adrenaline/heart beats faster; [1]

(b) blood + legs/feet;

in veins;

no use of leg muscles ;

blood not pushed from one set of valves to the next;

increases mass/weight of the (lower) leg; [Max 4]

[Total: 9]

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5 **(a)** 10/11 minutes; [1]

(b) smoker/has recently smoked/passive smoking; [1]

(c) Any 2 from:

carbon monoxide/CO;

affect on O_2 carriage/fatty deposits in walls of bvs;

carbon dixide/CO_2;

prevents loss of CO_2 from blood;

tar;

carcinogenic properties/lung cancer/inhibits gaseous diffusion/damages alveolar walls or cilia; [4]

(d) **(i)** increase;

followed by decrease;

reading from graph with units; [Max 2]

(ii) arterial constriction, fat deposits or diameter reduction/heart rate increases/heart pumps harder or faster AW; [1]

(iii) prolonged raised pressure/cumulative effect;

damage to capillaries/ref. thin walls of capillaries;

any relevant effect e.g. damage to kidneys/brain/heart/blood vessels; [Max 2]

[Total: 11]

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6 (Fig. 6.1)

xylem;

strengthened/lignified;

for support/keep firm or straight+ **G**/wall AW;

*carries water;

*ions/salts/minerals; [Max 5]

(Fig. 6.2)

palisade (mesophyll);

for photosynthesis/to make carbohydrates;

J + (cell) membrane;

partially/differentially/selectively/semi– + permeable;

controls or allows entry into/out (of cell);

water + osmosis/diffusion;

K/space + vacuole/cell sap;

ref. water potential/concentration difference;

ref. turgidity **AW**; [Max 5]

[Total: 10]

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7 **(a)** removal from organism/body;

toxic/poisonous;

waste (products);

from metabolism or described; [Max 3]

(b) filters/removes substances from + blood;

using partially permeable membrane **AW;**

ref. dialysis fluid;

urea/nitrogenous products;

salt(s)/ions/small molecules;

toxins/poisons;

ref. relative concentrations **AW**;

excess water/ref. osmoregulation;

large molecules stay in blood;

such as proteins;

ref. diffusion; [Max 7]

[Total: 10]

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8 **(a)** active site (of enzyme);

of particular/special/complementary/exact + shape;

fits substrate molecule/ref enzyme-substrate complex;

splitting or joining of substrate molecule(s)/products formed;

(the idea) molecule(s) or product released*;*

enzyme ready to be used again/unchanged;

ref. specificity; [Max 5]

(b) *reaction becomes faster with higher temperature;

faster movement of molecules/more collisions;

*ref. maximum/optimum;

*slows rapidly;

*stops;

(heat has) changed/destroyed (shape) of active site;

denatured/lost 3D structure;

substrate no longer fits; [Max 5]

[Total: 10]

9 **(a)** it is a diagram;

of traditional pyramid shape/wider at the bottom;

(showing) mass/weight;

of organisms/living things/plants + animals;

the larger the block the greater the mass;

at each trophic level;

ref. producers;

consumers/herbivores/carnivores;

in an ecosystem/food web/food chain;

shows change in mass/is relative; [Max 6]

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(b) represents number;

of individual (organisms);

different organisms differ in mass;

one organism may have many others (feeding) on it;

*thus shape may be different;

not that of a pyramid;

plausible drawing; [Max 4]

[Total: 10]

[Paper Total: 80]

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