CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2013 series

5090 BIOLOGY

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

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1 (a) (i) vein; [1]

(ii) valve; [1]

(b) a valve shown with flaps touching;

vessel widest at correct side of valve + walls shown both before and after valve**;** [2]

(c) (vein) empty / no blood flowing through;

blood has been pushed out of (vein);

* blood cannot flow back (due to valve / from B);

* finger on the right / at D + prevents blood flowing;

walls of vein thin thus not visible beneath skin **AW**; [max 4]

(d) muscle + contraction(s);

increase blood pressure;

increases circulation / blood flow / helps fill (vein) with blood; [2]

[Total 10]

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2 **(a)** damage **/** breaks **AW** (cells / tuber);

ref. cell wall / membrane;

releasing (cell) contents / starch;

kills cells / denatures enzymes / stops metabolic reactions; [max 2]

(b) amylase / carbohydrase;

digests / breaks down / hydrolyses + starch;

(to) <u>maltose</u>; [3]

(c) **(i)** fermentation / anaerobic respiration; [1]

left hand side of equation
glucose / $C_6H_{12}O_6$;

right hand side of equation
$2C_2H_5OH + 2CO_2$ / alcohol/ethanol + carbon dioxide; [2]

(ii) fungus / yeast ; [1]

(d) yeast (cells) + reproduce / increase in number / multiply;

(sediment contains) yeast (cells) / bacteria / chewed tuber **AW**

yeast (cells) dead + sugar / food used up / alcohol is toxic **AW**; [max 2]

[Total 11]

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3 (a) (i) (cell 4) - root hair;

(cell 5) - sperm(atozoon) / male gamete; [2]

(ii) (root hair) increases surface area;

(for) absorption / movement (A correct named method of molecular transport) into **AW**;

minerals / ions / salts (or named);

water;

oxygen;

(cell wall) gives mechanical support / allows turgor; [max 3]

(b) cell 1 (RBC) – **F**;

cell 2 (WBC) – **K**;

cell 3 (palisade) – **G**;

cell 5 (sperm) – **J**;

cell 6 (spongy) – **H** ; [5]

[Total 10]

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4 **(a)** for photosynthesis / to make food/carbohydrate/starch/ glucose/sugar; [1]

(b) * limited nitrates / nitrates not topped up;

limited protein production;

* limited magnesium + for chlorophyll;

limited carbon dioxide ;

limited photosynthesis / limited production of food/ carbohydrate/starch/glucose/sugar;

limited space / volume / area; [max 3]

(c) ref. respiration + photosynthesis (occurring in jar);

respiration + releases CO_2;

CO_2 + used for photosynthesis;

photosynthesis + releases O_2;

O_2 + used for respiration;

ref. microorganisms / bacteria / fungi / decomposers + in soil; [max 4]

(d) water from leaves/transpiration **AW** / water from soil evaporates;

respiration + produces/releases water;

*returned to soil / condenses;

*absorbed **AW /** used by plants; [max 3]

[Total 11]

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5 **(a)** food web / food chain / ecosystem / community; [1]

(b) natural selection;

white animals better suited to environment **AW**;

white not removed/eaten / black removed/eaten **AW**;

(more) white reproduce / (less) black reproduce;

ref. allele / gene + inherited / passed on;

white become more common / black become less common; [max 3]

(c) **(i)** gene mutation;

chromosome mutation;

codominance; [max 2]

(ii) better adapted (to new condition) / example of better adaptation;

protection against hawk/predator / less eaten; [max 2]

[Total 8]

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6 (a) loss of water;

involves evaporation / as vapour;

to the atmosphere / surroundings;

cooling effect;

through pores **AW**;

in epidermis;

both affected by temp / humidity / wind (speed); [max 3]

(b) (Accept reverse arguments where relevant)

occurs in animals;

sweating ref. (loss of) urea / ions / salts / minerals;

under nervous control;

ref. homeostasis / determined by body temperature;

(sweat) glands / ducts;

sweat extracted from blood;

(from) skin;

transpiration from leaves / stems;

(helps to) bring ions up stem/xylem / to leaves/cells;

(helps to) bring water up stem/xylem / to leaves/cells;

consequence of stomata open for photosynthesis; [max 7]

[Total 10]

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7 **(a)** CO_2 / water;

from body **AW**;

waste product / toxic material;

respiration;

metabolic (process); [max 3]

(b) homeostasis / osmoregulation;

salts / ions / minerals / urea;

water;

from blood;

ref. reabsorption into blood;

in varying quantities / excess;

depending on food/water intake;

and on loss in sweating;

tissue fluid therefore at constant concentration;

water would otherwise enter or leave cells;

osmosis / diffusion;

effect on cell appearance (e.g. swell / burst / shrink);

affect on enzyme action / metabolism; [max 7]

[Total 10]

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8 **(a)** contains female gamete / female nucleus / egg cell;

in ovary;

fertilized / fuse;

(by the) male gamete / male nucleus;

(to form) zygote / embryo;

surrounded by integuments/testa;

seed + germinates (to form new plant); [max 4]

(b) produces haploid;

ovum / egg;

fertilization + ref. zygote/embryo;

oestrogen;

progesterone;

any two functions of oestrogen (e.g. devpt. of sex organs / secondary sexual characteristics / thickening of uterus lining / stimulates production of LH);;

any two function of progesterone (maintains uterus lining / inhibits FSH / inhibits LH AW);; [max 6]

[Total 10]

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9 **(a)** screening blood;

being HIV tested / contact tracing;

avoidance of needle/syringe sharing;

needle exchange schemes / sterilising needles;

condoms / femidoms;

limited partners / no intercourse with prostitutes (who may have multiple partners);

abstinence;

ref. education (about how HIV is spread);

take drugs / follow treatment prescribed (to prevent spread within body); [max 4]

(b) mosquito (vector);

removal of breeding ground **AW** …
+
drain swamps / prevent stagnation of water **AW**;

kills eggs / larvae / pupae …
+
any two of add insecticide to water / oil on water / put fish/bacteria into ponds;;

bite prevention …
+
any two of sleep under nets / screens on windows / wear long-sleeved clothes / insect repellent;;

discourage (mosquito) …
+
any two of insect repellent / paint walls white / wear light clothing;;

insecticide/pesticide / coils in houses + to kill;

release irradiated males + infertile eggs laid ; [max 6]

[Total 10]

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