

Homeostasis

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.5 Homeostasis and Response
Sub-Topic	Homeostasis
Difficulty Level	Gold Level
Booklet	Mark Scheme

Time Allowed: 56 minutes

Score: / 56

Percentage: /100

Grade Boundaries:

M1.(a) (concentration high) in the hepatic portal vein is blood with glucose absorbed from the intestine

1

concentration is lower in the hepatic vein because insulin

1

(has caused) glucose to be converted into glycogen

1

or

allows glucose into liver cells

(b) (i) (after 6 hours) most of the glucose has been absorbed from the intestine
or from food into the blood

1

(ii) because glucagon (made in the pancreas) causes
if biological terms incorrectly spelt they must be phonetically accurate
do **not** accept glucagon made / produced by the liver

1

glycogen to be converted into glucose

1

glucose released into blood
allow the liver maintains the correct / constant level of glucose in the blood

1

[7]

M2. only 24 students tested **or** only one test **or** reference to lack of controls eg gender / age

1

students could drink as much water as they wanted

or

some students drank more water than others

or

some students drank water and beer

1

differences only slight

ignore effects of beer or promotion of beer drinking

1

[3]

M3. (a) (i) (wholemeal bread)
any **two** from:

lower maximum / peak / less change

1

slower rise / change

*ignore references to rate of fall **or** first to peak*

need to take less insulin / less likely to hyper

no mark for identifying the type of bread but max 1 mark if not identified

1

(ii) any **four** from:

- amylase / carbohydrase

- starch to sugar

allow starch to glucose

- (sugar) absorbed / diffused / passes into blood
- correct reference to pancreas
allow once only as rise or fall
- insulin produced
- glucose (from blood) into cells / tissue / organ **or** named tissue / organ
allow glucose to glycogen
- glucose used in respiration / for energy
max 3 for explaining rise
max 3 for explaining fall

4

(b) any **three** from:

advantages (compared to insulin injections):

- (may be) permanent / cure
- no / less need for self monitoring
- no / less need for insulin / injections
ignore reference to cost
- no / less need for dietary control

disadvantages (compared to insulin injections):

- low success rate
- (may) still need insulin / dietary control
- operation hazards
- risk of infection from donor
- rejection / need for drugs to prevent rejection
*max 2 if only advantages **or** only disadvantages discussed*
can give converse if clear that it relates to insulin injections

3

[9]

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(b) protease
allow proteinase

(c) (i) (same) enzymes / named enzymes produced in other parts /
named parts of digestive system
if named, enzymes and part must be correct

(ii) diet / activity varies / amount of glucose in blood varies
accept too much insulin leads to coma / hypo / low blood sugar
accept too little insulin leads to coma / hyper / high blood sugar

(d) any **two** from:

pros

- less / no experimentation on humans
- dogs (more) similar to humans (than lower / named organisms)
- it allows us to find a treatment **or** improves medical understanding
accept allows us to find a cure

cons

- harmful / cruel to dogs
accept kills dogs
- dogs may not be (metabolically) like humans

conclusion justified by argument 1

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- M5.**
- (a) (i) blood sugar rises because insufficient insulin secreted by body
for 1 mark each 2
- (ii) increase in rate of conversion of glucose to glycogen
in liver
for 1 mark each 3
- (iii) muscles use more glucose from blood in respiration to release
energy needed for exercise
for 1 mark each 3
- (b) 3 of
sugar soluble
therefore absorbed
quicker than starch
which has to be digested
any 3 for 1 mark each 3
- (c) increased secretion of glucagons by pancreas
results in increases rate of conversion of glycogen into glucose
for 1 mark each 3
- (d) 3 of eg
higher blood sugar level results in increased secretion of insulin
effect of insulin is to lower blood sugar
which in turn reduces rate of insulin secretion
overall result is to keep fluctuations in sugar level to a minimum
any 3 for 1 mark each 3

- M6.** *idea:*
glucose level rises
pancreas releases insulin
glucose → glycogen (in liver)/removes xs glucose
glucose level falls/returns to normal
for 1 mark each

[4]

- M7.** (a) *idea:*
more (fossil) fuel burned (do not credit simply more people/cars/industry)
deforestation = less photosynthesis
deforestation = more respiration/burning
each for 1 mark

3

- (b) *idea:*
climate change
for 1 mark

warmer/colder/drier/wetter
food production affected/starvation
mayor ecosystems destroyed/damaged
any two for 1 mark each

6

sea level rise
for 1 mark

low land flooded
less food grown/starvation
homes/factories flooded
any two for 1 mark each

Allow

polar ice caps melt
sea water expands

[9]