AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



MARK SCHEME

4.2.2 ANIMAL TISSUES, ORGANS AND ORGAN SYSTEMS (PACK 5)

SCORE	PERCENTAGE
/190	%

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Mark schemes

Q1.

(a) hold <u>cells</u> together **or** prevent flow of <u>cells</u> **or** trap <u>cells</u>

1

(b) 12500

if correct answer, ignore working / lack of working

$\frac{100}{0.008}$ *for **1** mark*

ignore any units

2

(c) (i) size RBC approximately same size capillary **or**
no room for more than one cell **or**
<u>only</u> one can fit **or**
RBC is <u>too</u> big

allow use of numbers

*do **not** accept capillaries are narrow*

1

(ii) more oxygen released (to tissues) **or**
more oxygen taken up (from lungs)

1

and any **two** from:

- slows flow **or** more time available
- shorter distance (for exchange) **or** close to cells / capillary wall
- more surface area exposed

2

[7]

Q2.

<u>in correct sequence</u>:

breathing

1

diffusion

1

respiration

1

[3]

Q3.

(a) (i) liver

1

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(ii) <u>on diagram</u>:

'**X**' on liver

must be unambiguous (eg not overlapping gall bladder)
intersection of X in liver

1

(b) stomach

1

<u>small</u> intestine

accept duodenum or ileum
extra wrong answers cancel the mark,
eg small intestine (colon) = no marks

1

(c) amylase not produced by stomach

accept no starch digesting enzymes in the stomach
accept correct enzyme not in stomach
accept <u>only</u> proteases in stomach
*do **not** accept protease does not digest starch*

1

acid / low / wrong pH in stomach **or** enzyme would be denatured in stomach **or** amylase only works in neutral / alkaline conditions

incorrect extra information cancels mark
*do **not** accept amylase does not work in the stomach*

1

[6]

Q4.

(a) (i) haemoglobin / oxyhaemoglobin

must be phonetic

1

(ii) carries oxygen **or** forms oxyhaemoglobin

Ignore references to CO_2 / iron
cancel if extras like food / glucose

1

from lungs to tissues

1

(b) no nucleus **or** biconcave disc (described)

ignore references to size
ignore vague references to being
'round' / 'donut' shaped etc.

1

[4]

Q5.

an atrium

1

an artery

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1

a semi-lunar valve

1

[3]

Q6.

(a) (i) count the pulse **or** count beats in artery in wrist neck **or** feel the pulse **or** take the pulse **or** find the pulse

*accept use of heart monitor **or** heart meter*

1

(ii) 80

2 marks for correct answer

*1f answer incorrect allow **1** mark for showing 8000 divided by 100 **or** indicating cardiac output divided by stroke volume*

2

(iii) Increased activity stroke volume
falls / gets less / should get higher / reach a peak

*accept does not increase **or** changes from 134 cm^3 to 127 cm^3*

1

(iv) 1ncreased / more ventricle contractions

*accept heart beat faster **or** it beats faster **or** more powerful contractions*

1

(b) (stronger heart muscle) increases cardiac output **or** increases stroke volume

*accept pumps more blood (per beat) **or** pumps blood faster*

ignore heart bigger

1

so more (oxygenated) blood can be sent <u>to muscles</u>

accept more oxygen sent to muscles

1

[7]

Q7.

(i) oxygen into the blood stream

*arrow **must** start inside alveolus and finish outside the capillary*

1

(ii) carbon dioxide out of the blood stream

*arrow **must** start inside the capillary and finish inside the alveolus*

1

(iii) carries/takes up/releases oxygen or carbon dioxide

accept forms oxyhaemoglobin

1

[3]

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Q8.

(a) **A** white blood cell/leucocytes / phagocytes / lymphocytes

SEPARATE MARKING POINTS

1

make/contain antibodies/antitoxins
or
destroy/engulf/kill bacteria

*do **not** accept fight infection*
*do **not** accept fight disease*

1

B platelets

1

help clot the blood

*do **not** accept stick together*
*do **not** accept from scabs*

1

C plasma

1

carries/transports all the cells/digested food/waste products/hormones/carbon dioxide/platelets/dissolved minerals/antibodies/antitoxins/water

allows blood to flow

1

(b) any four from:

(oxygen) diffuses

1

has affinity for/combines with oxygen / forms oxy-haemoglobin

*do **not** accept absorbed*

1

in areas of high oxygen concentration

n.b. 'pick up oxygen' is stem of question

1

in conditions of low oxygen concentration it breaks down and releases the oxygen

low oxygen concentration can be implied e.g. active muscles

1

[10]

Q9.

(a) capillaries

1

(b) (oxygen) in red blood cells **or**
haemoglobin

*the candidate **must** make clear which substance is which for **2** marks*

1

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(carbon dioxide dissolved in) the plasma

accept in haemoglobin in regions of high carbon dioxide concentration

*accept for **1** mark oxygen + CO_2 is transported by red blood cells **or** haemoglobin*

*do **not** credit red + white blood cells **or** combinations of right + wrong answers*

1

(c) **one** mark for each up to a maximum of **three**

red blood cells

*award **1** mark for blood cells if no red or white*

white blood cells (or named white blood cell up to **2**)

platelets

urea

accept nitrogenous waste

*do **not** credit waste substances **or** products*

minerals (**or** one named mineral)

*accept ions **or** salts*

vitamins

water

hormones (named hormone up to 3)

protein (named blood proteins up to 2)

glucose

accept other named soluble sugar

*do **not** credit sugar(s) **or** blood sugar **or** sucrose*

fatty acids **or** glycerol

amino acids

digested food **or** nutrients (if individual foods not credited)

*do **not** credit starch **or** carbohydrates*

*do **not** credit nutrition **or** food*

*do **not** credit oxygen*

*do **not** credit haemoglobin*

carbon dioxide

accept nitrogen

antibodies

antitoxins

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drugs **or** toxins (named up to 2)

bacteria **or** viruses

cholesterol

3

[6]

Q10.

one;

1

diffuse;

1

narrow;

1

lowered;

1

[4]

Q11.

(a) liver

1

mouth or salivary glands **or**
duodenum **or** small intestine **or**
pancreas

1

pancreas

*accept duodenum **or** ileum **or** small intestine*

*do **not** accept stomach*

1

stomach **or** duodenum **or** ileum **or**
small intestine **or** pancreas

1

(b) teeth breakdown food

accept chewing

1

amylase **or** saliva (breaks down starch)

1

(c) produces <u>bile</u> (salts)

1

emulsifies (fat) **or** produces droplets
or disperses fat)

1

[8]

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Q12.

(i) liver

1

(ii) liver **or** B stores glycogen
or pancreas **or** D makes insulin

1

clear description of link

1

[3]

Q13.

X – oxygen

accept O_2

Y – carbon dioxide

accept CO_2

[2]

Q14.

(i) any **two** from:

urea

carbon dioxide

water

lactic acid

2

(ii) higher concentration of glucose **or** more glucose in blood than cells

1

<u>diffuses</u> across

1

[4]

Q15.

(a) (i) transport of substances **or** named substance **or** blood around the body
each for 1 mark

2

(ii) breaks down *(**not digests**)* food absorption (into blood)
each for 1 mark

3

(b) water filtered from blood
smaller proportion reabsorbed
therefore larger volume
of dilute urine produced
each for 1 mark

4

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[9]

Q16.

(a) A – artery
B – capillary
C – vein

3

(b) transport OWTTE

1

(c) increased oxygen decreased carbon dioxide

2

[6]

Q17.

(i) eyes as sense organs/detector/receptors in eye,
electrical signals (impulses),
to co-ordinator,
then to leg muscles/effector

for 1 mark each

4

(ii) affects the nervous system and slows down the reactions

for 1 mark

1

[5]

Q18.

(a) A vein / venule
B capillary
C artery / arteriole

each for 1 mark

3

(b) *idea that* substances or named substance pass in or out / diffuses between blood and tissue

each for 1 mark
e.g. oxygen passes from blood to cells gains 2 marks

2

[5]

Q19.

(a) 10

for 1 mark

1

(b) digested / broken down / made soluble by protease / enzyme
in stomach / in small intestine / from stomach / from pancreas
into amino acids amino acids/smaller molecules/products of digestion absorbed into blood

any four for 1 mark each

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4

[5]

Q20.

(a) correctly labelled structures (i – iv)

each for 1 mark

(allow labels as words or numbers: allow without guidelines if unambiguously labelled)

4

(b) *ideas of*
diffusion
greater concentration of oxygen in alveolus / high to low oxygen concentration
membrane / alveolus permeability

any two for 1 mark each

2

[6]

Q21.

(a) digested / broken down / made soluble by protease enzyme
in stomach in small intestine / from stomach / from pancreas
into amino acids
amino acids / small molecules absorbed into blood

any four for 1 mark each

4

(b) *ideas that*
lipase / enzyme works best in alkaline / neutral conditions
acid denatures or inactivates enzyme / inhibits enzyme activity
bile emulsifies fat / bile produces larger surface area of fats / bile alkaline
for enzyme to work on / which increase activity of enzymes

any three for 1 mark each

3

[7]

Q22.

(a) (i) mitosis

for 1 mark

1

(ii) 1
fertilised egg cell has 1 albino gene from father splits to produce identical cells / produced by mitosis

each for 1 mark

3

(b) (i) less protection from UV light / UV radiation

for 1 mark

1

(ii) ideas of uncontrolled multiplication of mutated cells reject fast / rapid cell division cells invade of other parts / cells transported in blood

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each for 1 mark

2

[7]

Q23.

(i) increase in CO_2 concentration leads to increase in volume of air inhaled
increase of % carbon dioxide has little effect over most of range / large increase when % carbon dioxide > 5.6 %

each for 1 mark

2

(ii) *idea that*
depth of breathing changes at low % carbon dioxide, in crease in % CO_2 results in volume of each breath increasing without increase / little increase in number of breaths

each for 1 mark

2

[4]

Q24.

(a) trachea / windpipe
bronchus
alveoli
diaphragm

for 1 mark each

4

(b) alveoli / air sacs (*reject* capillaries)

for one mark

1

(c) respiration

for one mark

1

[6]

Q25.

pancreas produces lipase
which breaks down / digests fats into fatty acids and glycerol
liver produces bile / hydrogen carbonate
which neutralises acids / makes alkaline
provides optimum / best / most effective pH for lipase / enzyme action
bile emulsifies fats / description
increasing the surface area for lipase / enzyme to act on

any five for 1 mark each

(digestion is in stomach / liver / pancreas – penalise only once)

[5]

Q26.

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(a) allow carbon dioxide to enter / gaseous exchange (oxygen neutral) (transpiration neutral)

for one mark

1

(b) guard (cells)

for one mark

1

(c) stops / reduces the rate of water loss / transpiration (*reject* if dark initiated)
stops / reduces wilting / description e.g. drooping / maintains turgor

for 1 mark each

2

[4]

Q27.

(a) any **three** from

(concentration of) oxygen increases

by 60 (units)

allow oxygen more than doubles for 2 marks

(concentration of) carbon dioxide decreases

from 46 to 40 by 6 units

allow 'by a small amount'

N.B. usually the first 2 marks will be for the change in oxygen and carbon dioxide.

The third mark will be for a quantitative comment on one of these changes

3

(b) plasma

1

red (blood) cell / haemoglobin / oxyhaemoglobin

1

[5]

Q28.

(a) 11

accept 10.5 – 11.5

1

(b) ideas of

increase / rises

1

frequently / often

1

energetically / violently

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1

[4]

Q29.

(a) (i) all plots correct

Tolerance ± $\frac{1}{2}$ square
allow 1 mark for 2 correct plots

2

(ii) 6

correct answer with no working = 2
allow 1 mark for (60 ÷ 100) × 10
N.B. correct answer from incorrectly recalled relationship / substitution = 0

2

(b) lungs

1

liver

1

kidneys

1

[7]

Q30.

(a) falls

1

from 0.25

1

to 0.19

but by 0.06 gains two marks

if <u>neither</u> figure given, accept steadily / at constant rate for one mark
accept mass of oxygen inversely related / negative correlation to height above sea level for 2 marks

1

(b) (i) 1.8

accept correct readings from graph for (5 and 6.8) if subtraction incorrect for one mark
allow one mark for correct subtraction from incorrect readings

2

(ii) (blood can carry) <u>more</u> oxygen

1

[6]

Q31.

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(a) (i) trachea

accept windpipe

1

(ii) (left) lung **or** lungs

do not credit right lung

1

(b) carbon dioxide **or** water <u>vapour</u>

do not credit just 'water'

1

oxygen

answers in terms of used air or fresh air or of temperature differences are not acceptable

1

[4]

Q32.

(a) (i) the three features correctly labelled on cheek cell (which are referred to in part (ii)

label lines should touch or end very close to part no marks if leaf cell labelled

nucleus

cytoplasm

cell membrane

mitochondrion

accept mitochondria or one of these could be labelled vacuole

3

(ii) any **three** from

feature	**function**
nucleus	controls cell *accept contains genetic material **or** genes **or** chromosomes **or** stores information* *do not credit the brain of the cell*
cytoplasm	where respiration occurs *accept contains food **or** mitochondria* **or** reactions occurs
membrane	less water **or** chemicals *accept surrounds the cell or lets some things in but not others*

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*do not credit keeps things out **or** protection*

in and **or** out

mitochondria where energy released

ecf from leaf cell labelling
*accept chloroplasts make sugar **or** glucose*
accept vacuole contains sap
*accept if cell wall mis labelled on cheek cell, support **or** hold together*

3

(b) fight **or** ingest **or** kill bacteria **or** germs **or** viruses **or** microbes

accept produce antitoxins or antibodies fight disease (organisms)
do not credit fungus

1

(transport) oxygen **or** carry haemoglobin

*accept transport carbon dioxide **or** helps form scabs*

1

[8]

Q33.

(a) (i) oxygen

do not credit air

1

(ii) lung(s)

*do not credit blood **or** nose or windpipe alone but accept as a neutral answer if included with lungs*

1

(b) oxygen

1

lactic acid

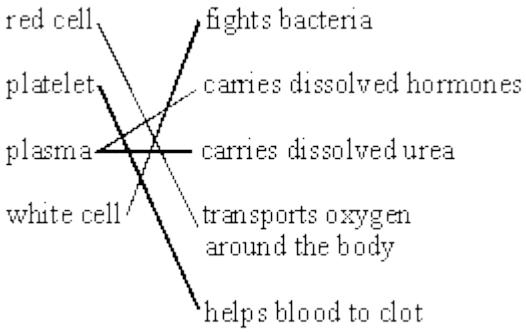
both words required

1

[4]

Q34.

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ticks or crosses on the RHS

[5]

Q35.

(a) (i) mouth **or** saliva

accept small intestine

1

starch

1

maltose **or** glucose

do not credit sugar

1

(ii) small intestine

*accept duodenum **or** jejunum*

do not credit intestines

1

fats **or** lipids **or** oils

fatty acids **or** glycerol

2

(b) (i) salivary

accept pancreas

1

(ii) pancreas

*accept small intestine **or** ileum*

1

[8]

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