

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B 4 - TEST 1

BIOENERGETICS

Beginner

Mark schemes

1.

(a) respire

1

oxygen / glucose
glucose / oxygen } each once only

2

blood

1

carbon dioxide / heat
heat / carbon dioxide } each once only

2

[6]

2.

(a) photosynthesis

do not accept other additional processes

1

(b) (i) any **three** from, eg:

ignore time / apparatus

- mass of pondweed
type of pondweed = max 2
accept amount / volume / length / size
ignore number / surface area of leaves / pondweed unqualified
- volume of water
accept amount
- other reasonable features of the water
- light intensity
accept distance between light source and tube / pondweed
- light colour
accept light if neither colour nor intensity is given
- carbon dioxide
- temperature
- pH

3

- (ii) any **one** idea from, eg:
- ignore reference to cost*
- how much oxygen they give off
 - is pondweed poisonous to fish
 - will fish eat pondweed
 - is pondweed harmful to environment
 - how long the pondweed lives
 - growth rate / size of pondweed
 - reference to appearance / aesthetics
 - availability

1

- (c) magnesium / Mg
- accept iron / Fe*
- ignore ion and ⁺ or ⁻*
- ignore nitrate*

1

[6]

3.

- (a) oxygen
- allow O₂ / O2*
- do **not** accept O² or O*

1

- (b) (i) light

1

- (ii) chlorophyll

1

- (iii) decrease

1

(c) any **three** from:

- for respiration / energy
do not accept use energy for photosynthesis
- to make cellulose / starch
accept named carbohydrate other than glucose
- to make lipid / fat / oil
accept fatty acid / glycerol
- to make protein
accept named protein / amino acid / named amino acid
- to build big molecules from small molecules / metabolism
if no other marks awarded for making molecules allow 1 mark for growth / repair / new cells

3

[7]

4.

(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]

5.

(a) 40 – 60 hours

1

(b) (i) decrease

1

1st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to 0 / faster after 4 – 10h

1

(ii) oxygen after glucose

extra box ticked cancels 1 mark

1

oxygen less than glucose

1

(iii) respiration

1

[6]

6.

(a) water

1

oxygen

in this order only
accept correct chemical symbols
allow H₂O / OH₂

1

(b) allow light (in / through) / need light

do not accept attracts light
ignore heat / moisture / carbon dioxide
ignore so the plants can be seen
accept the converse, ie the black plastic bag would not let light in
(1)

1

for photosynthesis / make sugar / glucose
so there would be no photosynthesis (1)
do not allow make food unqualified

1

(c) Increase (in leaves / new leaves)

ignore growth unqualified

1

(then) level off **or** number of (new) leaves (then) stays the same

1

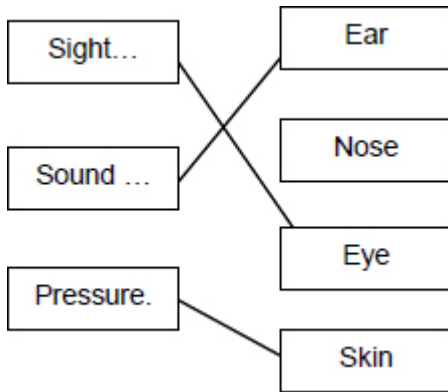
numerical statement eg max at 3 tablets / 5 (new) leaves
should refer to one of the first two marking points
for every extra tablet get 1 extra leaf = 2 marks
for every extra tablet get 1 extra leaf then it levels off = 3 marks

1

[7]

7.

(a) (i)



1 mark for each line
do not award a mark for a 'change' that has two lines

3

(ii) receptor cells 1

(b) used to provide (extra) energy 1
allow (more) used in respiration
allow suitable reference to muscles
do not accept used for sweat

(c) (i) growth of muscles 1

(ii) (these drugs have) possible side / harmful effects
or
answers that refer to 'fairness of competition' e.g. cheating 1

[7]

8.

(a) (LHS) water / H₂O 1
allow H₂O
do not accept H²O

(RHS) glucose / sugar / C₆H₁₂O₆ 1
allow starch / carbohydrate
allow C₆H₁₂O₆
do not accept C⁶H¹²O⁶

(b) (i) 1 arbitrary unit 1
extra box ticked – cancel

(ii) 210 1

(iii) carbon dioxide / CO₂ / CO₂ 1
or
temperature / heat / warmth
do not accept CO²
ignore mineral ions
ignore water

[5]

9.

(a) (i) glycogen 1

(ii) respiration 1

(b) (i) 483 kJ 1

- (ii) oxygen 1
- (iii) dilate 1
- (c) supplies more / a lot of oxygen **or** removes more carbon dioxide
or release more energy / faster respiration 1

[6]

10.

- (a) add mineral ions to the soil
extra box ticked cancels the mark 1
- (b) increasing the temperature
each extra box ticked cancels 1 mark 1
- turning lights on at night 1

[3]

11.

- (a) (i) 150 1
- (ii) any **two** from:
accept correct use of numbers
accept pulse rate
- lower resting rate
 - lower rate during exercise
 - recovers faster after exercise
- allow a general statement about lower rate if neither of the first two points given* 2
- (b) glucose 1
- oxygen 1

[5]

12.

(i) respiration

1

(ii) oxygen **or** O₂

do not accept O or O²

1

(iii) carbon dioxide **or** CO₂

do not accept CO²

1

[3]