

Mark schemes

1	(a) opaque / less transparent / blue <i>allow mixture becomes dark / black</i> <i>ignore thicker</i>	1
	(b) (i) 7 (minutes) or in range 6.7 to 7 <i>award 2 marks for correct answer</i> if answer is incorrect evidence of selection of 40(% light intensity) either in working or in graph 2 for 1 mark	2
	(ii) any two from: <ul style="list-style-type: none"> • slower / takes longer at lower temperatures • (40 °C is) optimum / best temperature <i>allow near to 37°C / body</i> <i>temperature where enzymes work best</i> • enzyme denatured / destroyed / damaged at higher temperatures <i>allow description of denaturation</i> 	2
	(c) (i) isomerase <i>allow phonetic spelling</i>	1
	(ii) fructose is sweeter than glucose needed in smaller quantities or less is needed	2
		[8]

2	(a) (i) artery	1	
	(ii) capillary	1	
	(b) alveoli	1	
	red blood cells	1	
	nucleus	1	[5]

3	(a) (i) 19 800		
	<i>for correct answer ignore working or lack of working 165 × 120 but no answer / wrong answer = 1 mark (ignore extras)</i>	2	
	(ii) any two from:		
	• for respiration <i>ignore oxygen debt</i>		
	• energy released <i>allow energy produced</i>		
	• prevents anaerobic respiration		
	• prevents build-up of lactic acid	2	

(b) any **two** from:

- increased breathing rate(*)
- increased depth of breathing **or** deep breathing(*)
()more breathing is max 1 mark*
ignore increase in heart rate
allow heavier breathing
*do **not** allow harder breathing*
- dilation of arteries / vasodilation
allow blood vessels dilate
*do **not** allow veins / capillaries dilate*
- blood diverted from elsewhere
ignore name of organ

2

[6]

4

(a) transpiration / evaporation / diffusion

ignore osmosis

1

(b) (i) D

1

(ii) any **two** from:

- more / faster diffusion **or** evaporation **or** transpiration
- molecules move faster
- maintains concentration gradient
or keeps water concentration low in the air
or brings in more dry air
or removes damp air / water

2

[4]

5

(a) any **two** from:

- age
- gender
- mass
- number in group
- time

2

(b) any **two** from:

- highest (mean) mass loss on Rosemary Conley **or** Rosemary Conley most effective
- least (mean) mass loss in control group **or** mean

2

(c) (Atkins)

costs least

1

mass loss very similar to other diets **or** second highest mass loss
or as effective as other diets

1

(d) any **two** from:

- (exercise) increases metabolic rate / respiration
ignore sweating
- (exercise) needs / uses energy / calories
allow burns fat / calories
*do **not** accept energy for respiration*
- (this) energy comes from food / fat
- less food / energy/ calories converted to fat

2

[8]

6

(a) (i) B

1

(ii) any **one** from:

- largest area of / most digestion (of lipid)
allow agar / jelly / mixture broken down / digested
*do **not** allow digestion of bacteria / lipase*
*ignore digestion **by** bacteria*
- largest clear area

1

(b) any **two** from:

- effect of pH / pH described
- effect of temperature
- effect on different types of lipid / fat
- cost **or** allergic reactions **or** effect on skin / fabrics / **or** environment **or** interaction with other chemicals in powder **or** shelf life

2

(c) enzymes / named enzyme denatured / destroyed

allow active site(of enzyme) altered

1

[5]

7

(a) A = alveolus

allow air sac / alveoli

1

B = diaphragm

ignore labelling of C and D

1

- (b) A 1
- (c) (i) red blood cells 1
- (ii) plasma 1

[5]

8

- (a) A

*no mark – can be specified in reason part
if B given = no marks throughout
if unspecified plus two good reasons = 1 mark*

high(er) pressure in A

*allow opposite for B
do not accept 'zero pressure' for B*

1

pulse / described in A

*accept fluctuates / 'changes'
allow reference to beats / beating
ignore reference to artery pumping*

1

- (b) (i) 17

1

- (ii) 68

accept correct answer from candidate's (b)(i) × 4

1

- (c) (i) oxygen / oxygenated blood

*allow adrenaline
ignore air*

1

glucose / sugar

*extra wrong answer cancels eg
sucrose / starch / glycogen / glucagons / water
allow fructose as an alternative to glucose
ignore energy
ignore food*

1

(ii) carbon dioxide / CO₂ / lactic acid

allow CO₂ / CO²

ignore water

1

[7]

9

(a) guard (cell)

ignore stoma / stomata

1

(b) Species A:

- stomata open in dark / at night **or** close in light / in day
- stomata closed during warm(est) period **or** open when cool(er)
- heat (energy) / warmth increases evaporation / transpiration
must give explicit link between heat and transpiration
- reduces water loss / evaporation / transpiration
ignore photosynthesis
allow converse points for species B

1

1

1

1

[5]

10

(a) any **two** from:

- neutralises acid / makes conditions alkaline / raises pH
- enzymes (in small intestine) work (more/most effectively)
or stop/prevents enzymes being denatured
- emulsifies fats/lipids **or** description of emulsification
*do **not** accept breakdown unqualified*
- larger surface area

2

- (b) (i) bile / bilirubin / pigment / broken down haemoglobin /
substance / cholesterol linked to movement **or** effect

1

does **not** get to the intestine / food / faeces
or cannot leave liver **or** effect not happening (in intestine)

1

- (ii) bilirubin / pigment / broken down haemoglobin
not 'bile' alone

1

(deposited) in skin

*only award if bilirubin / pigment / broken down haemoglobin given
allow carried in the blood*

1

[6]**11**

- (a) B = rib

1

C = diaphragm

1

- (b) (i) D

allow lower case

1

- (ii) carbon dioxide

1

[4]

12

- (a) (i) A or C
allow lower case 1
- (ii) B or D
allow lower case 1
- (b) (i) 60 1
- (ii) 4 1
- (c) red blood cells 1

[5]

13

- (a) (i) on diagram:
arrow drawn from cell X, through air space and out through
stoma above stoma 1
- (ii) transpiration 1
- (b) (i) 13 – 15
ignore units 1
- (ii) any **two** from:
 - warmest / hottest / brightest time of day
accept warmer / hotter or sun higher in sky
 - water evaporates fastest
 - stomata open / more open
 2

[5]

- 14** (a) (i) increased / thick(er)
allow more / wide(r) / broad 1
- (ii) decreased 1
- (b) 1
- IGNORE working or lack of working
correct figures from table 2.1 and 1.1 but no answer / wrong answer
= 1 mark* 2
- [4]

15

- (a) any **three** from:
- rose rapidly (during exercise) / use of approximate figures
 - then more slowly (during exercise)
accept rate (of increase) slows down
 - to max 126 / at 5 minutes / end of exercise
 - rapid fall (during recovery) **or** use of approximate numbers
 - then less rapid fall / use of approximate numbers
 - returned to resting rate (60 bpm) by 11 minutes
- 3
- (b) arteries dilate / widen
accept muscle in wall relaxes 1

(c)

any **four** from:

- muscles using more energy **or** more energy released
- muscles respire faster
- supply more oxygen
- supply more glucose / sugar
- remove more CO₂
- remove lactic acid
- remove heat / to cool

do **not** accept energy produced

allow for aerobic respiration
or to prevent anaerobic respiration

'more' needed ONCE
only for full marks

4

[8]

16

(a) any **two** from:

- transport up / against concentration gradient / low to high concentration
- uses energy
- use of protein / carrier

2

(b) microvilli – large(r) surface area
accept have carriers

1

mitochondria – release energy **or** make ATP
do not accept 'makes energy'

1

[4]

17

(a) diet **or** description

1

(b) exercise
or group meetings
or same number of kilocalories per day
or time
or group size

1

(c) any **two** from: eg

- scientists didn't observe amount of exercise
or volunteers cheated on exercise(*)
- scientists didn't observe the amount of food
or volunteers cheated on food(*)
*(*if no marks awarded for first 2 bullet points allow don't stick to plan **or** cheated for 1 mark*
- mass of subjects not controlled
- age of subjects not controlled
- gender of subjects not controlled
- occupation of subjects not controlled
- different proportions of subjects completed course
allow not all completed course
- low number of subjects
ignore not repeated

2

(d) any **two** from: (yes)

- low carbohydrate / Group 1 / people / they lost more mass
ignore more people lost weight
allow greater change in mass
- low carbohydrate / Group 1 / people / they lost more body fat
ignore more people lost body fat
allow greater change in body fat
- low carbohydrate diet / Group 1 / people / they resulted in more HDL
allow better HDL to LDL balance
allow greater change in HDL

2

[6]**18**

(a) lipase

allow phonetic spelling
allow lipidase

1

(b) (i) fall **then** rise owtte eg down **then** up

*allow faster **then** slower*

ignore explanations

1

minimum / least / fastest / best / optimum at 39–41(°C)

allow it falls to 40(°C)

if no other marks gained, 'falls to an optimum' gains 1 mark

1

(ii) (yes)

there is no mark for circling 'yes'

maximum 1 mark if No is circled

any **two** from:

- less heat / energy / electricity / power required / used / wasted
ignore lower temperature
- conserves fuel supplies
or less fuel used
- less pollution from power stations
owtte
accept less global warming
or
less CO₂ / carbon emissions / greenhouse gases
or
less SO₂ / acid rain
NB only direct effects
less pollution only is not enough

2

(c) any **two** from:

max 1 mark for reference to cell

- enzyme / lipase
accept any named enzyme
- destroyed / denatured
allow damaged / broken down
not 'killed'
- reference to (specific) shape changed
ignore detergent / it

2

[7]

19

(a) (i) red cell

1

(ii) diffusion

1

(iii) haemoglobin

1

(iv) a nucleus

1

(b) (on diagram) arrow from any part of blood to air

1

[5]

20

(a) any **two** from:

- large surface / area **or** many villi **or** have microvilli
accept big surface / area
- thin surface **or** thin wall **or** surface 1-cell thick **or** capillaries near surface **or** permeable **or** partially permeable
accept they are thin
*do **not** allow thin **cell** wall*
- many blood vessels **or** many capillaries **or** capillary network **or** good blood supply
ignore 'constant blood flow' owtte
ignore extras eg moist or reference to gases
- have enzymes
ignore release enzymes
 - *accept reference to lacteal as 5th point*
 - *allow reference to having mitochondria*

2

(b) (i) small(er) (surface area) / flat(ter) / short(er)

or not as folded**or** fewer capillaries owtte*allow small(er) lacteal**ignore references to wide / thick / spread out etc*

1

(ii) less absorption (of digested food) / less digestion / diffusion

*accept slower for less**accept description of less digestion**accept less food can get in**do **not** allow zero absorption**do **not** allow 'collection' of nutrients*

1

[4]

21

(a) B

1

(B has) low(est) number of stomata
or no stomata on upper surface
or only 800 (on lower surface)

1

less transpiration / evaporation / water loss owtte
or water (vapour) is lost via stomata

*only allow zero water loss if linked to no stomata on upper surface /
 linked to leaf B upper surface*

ignore references to leaf surface area

1

(b) reduce loss / amount of water (vapour)

accept converse

or

reduced transpiration (from upper surface)

*do **not** allow no water is lost*

1

warmer above leaf

accept converse

or wilted leaf folds over lower surface

or lower leaf in shade

ignore reference to dust

or less light / heat / sun on lower side

1

[5]

22

(a) being overweight

*do **not** accept fat unqualified*

allow BMI over 25

1

- (b) (i) rose 1
- by 8% / from 16% to 24% / by 50% / rapidly then more slowly 1
- (ii) any **two** reasonable suggestions
- e.g. less active
- accept e.g.s like fewer jobs / more cars / less physically demanding employment OWTTE*
- more food / take-aways / fast food 2
- (c) (i) high (blood) cholesterol
- do **not** accept combination of 2 labels*
- ignore references to LDL and HDL* 1
- (ii) answer in range 8-17 inclusive 1
- (iii) some deaths related to more than one factor 1

[8]

23

- (a) any **two** from:
- birth mass / growth reduced
 - smoke contains carbon monoxide
ignore references to poison
 - blood carries less oxygen / fetus receives less oxygen
*do **not** accept harder for fetus to breathe*
- 2

(b) (i) it may cause mental illness

1

it may be a 'gateway' drug to more harmful substances

three answers max 1

three answers max 0

1

(ii) it is less addictive than amphetamines, tobacco or alcohol

1

it is not associated with major sociological problems

three answers max 1

four answers max 0

1

[6]

24

(a) any **three** from:

- water

allow breathing / oxygen / carbon dioxide

- ions / minerals / salts

allow sodium / chloride, other ions neutral

- temperature

allow heat

- blood sugar

- heart rate

- blood pressure

ignore urea

3

(b) contraceptive drug

1

fertility drug

1

- (c) (i) eg nicotine, alcohol, cocaine, heroin, painkillers, tranquilisers, LSD

allow cannabis / weed or other alternative names

allow tobacco

ignore smoking / ecstasy

1

- (ii) alters body chemistry **or** craving / needing / dependence

allow psychological dependence

1

withdrawal symptoms on stopping

allow withdrawal described

allow 'feel ill without it'

1

[8]

25

red (blood cell)

1

platelet

1

white (blood cell)

1

plasma

1

[4]

26

- (a) correctly labelled on diagram

- (i) 'X' on an alveolus

*centre of X on the alveolus wall or
inside the alveolus*

not if the centre is outside

1

- (ii) arrow pointing downwards

accept anywhere but must point down

1

- (b) in sequence
- 1 trachea
 - 2 bronchi
 - 3 bronchioles
 - 4 alveoli
- (c) diffusion
- accept positive indicator*

1

1

[4]

27

- (a) in sequence
- starch
 - sugar
 - protein
 - amino acids
- (b) (too) large **or** insoluble
- do **not** accept "breaking up"*
- do **not** accept complex*
- accept 'need to make molecules smaller / soluble' – reverse argument*
- cannot be absorbed **or**
cannot enter blood **or**
cannot pass through wall / lining of
intestine / gut or villi
- "body" not enough*
- not** large intestine*

1

1

1

1

1

1

(c) mouth

accept positive indication

1

(d) enzymes

*allow catalysts**do **not** accept catalase*

1

[8]**28**

(a) lipase

1

(b) fatty acid

ignore glycerol

1

(c) (i) 0.25 or $\frac{1}{4}$ *if correct answer ignore working or lack of working*

$$\frac{(8.7 - 7.7)}{4} \text{ for 1 mark}$$

2

(ii) fats emulsified **or** described re. Small droplets **or** large S.A.
(for enzyme action) **or** fats 'mix' better with water*do **not** allow breakdown / breakup unqualified*

1

[5]**29**

thicker surface

1

reduced surface area

accept fewer alveoli

1

[2]

- 30** (i) On diagram:
- oxygen arrow to blood from air **and** CO₂ arrow to air from blood 1
- oxygen arrow to red blood cell 1
- CO₂ arrow from plasma 1
- (ii) diffusion 1
- (iii) large surface **or** large area
do not accept space 1
- [5]

- 31** (a) (i) protease
- accept peptidase **or** named protease*
e.g. pepsin / trypsin
allow 'proteinase' 1
- (ii) amino acids
- accept peptides / polypeptides / peptones* 1

(b) points plotted accurately

$$\pm \frac{1}{2} \text{ square}$$

deduct **1** mark per error

2

best fit curve **or** ruled point-to-point

if double line within $\frac{1}{2}$ square

allow sharp apex

do **not** allow single straight line

if no points line defines points

if (5,0) not plotted only penalise **1** mark

bar graph wide bars – **no** marks

bar graph $\pm \frac{1}{2}$ square max **2** for points

1

(c) (i) 2 **or** correct from candidate's graph

$$\pm \frac{1}{2} \text{ square}$$

1

(ii) stomach

1

(d) proteins are large / product is small

1

proteins (may be) insoluble / product is soluble

1

cannot be absorbed / cannot enter blood **or** cannot pass through gut lining

accept reverse referring to product

1

[10]

32

- (a) (i) lower – **B** loses less (water / mass) than **C**
or
 described in terms of petroleum jelly
accept converse re Leaf C

1

- (ii) yes - **B** and **C** lose less than **D** **or**
B and **C** lose more than **A** **or**
D loses the most **or**
A loses the least
*do **not** accept just 'all leaves lose some weight'*

1

- (b) (i) **X** = stoma
accept stomata / stomatal pore
*do **not** accept air space*

1

Y = guard cell

1

- (ii) petroleum jelly blocks stomata / pores
or petroleum jelly prevents water loss
or petroleum jelly waterproofs
*allow pores are blocked in **B***

1

water (mainly) lost via stomata / pores / **X**
or stomata on lower surface only

1

[6]

33

- (a) hold cells together **or** prevent flow of cells **or** trap cells

1

- (b) 12500

if correct answer, ignore working / lack of working

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

ignore any units

2

- (c) (i) size RBC approximately same size capillary **or**
 no room for more than one cell **or**
only one can fit **or**
 RBC is too 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]

34

in correct sequence:

breathing

1

diffusion

1

respiration

1

[3]

35

Quality of written communication

for ideas given in a sensible order;
comparison made for geranium and cactus for each feature
(ie not just list for geranium followed by list for cactus)
 + linking of feature & explanation

1

any **four** features + explanations from:

cactus has:

accept converse points for geranium plant

Feature	Explanation
thicker cuticle	waterproof / keeps water in
smaller surface area	less water loss / less heat absorbed
fewer stomata	less water loss
stomata open at night / closed in day	(closed when warmest) – so less water loss
more widespread roots	quickly absorbs water (after rain) / access to bigger area for absorbing water / absorb more water
more water <u>storage tissue</u>	little water available in environment / can survive drought / avoids dehydration

4

[5]

36

(a) (i) liver

1

(ii) on diagram:

'X' on liver

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

1

(b) stomach

1

small 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 only 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]**37**

(a) (i) haemoglobin / oxyhaemoglobin

must be phonetic

1

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

*Ignore references to CO₂/ 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]

38	an atrium	1	
	an artery	1	
	a semi-lunar valve	1	[3]

39	(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 <i>accept use of heart monitor or heart meter</i>	1	
	(ii) 80 <i>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</i>	2	
	(iii) Increased activity stroke volume falls / gets less / should get higher / reach a peak <i>accept does not increase or changes from 134 cm³ to 127 cm³</i>	1	
	(iv) 1ncreased / more ventricle contractions <i>accept heart beat faster or it beats faster or more powerful contractions</i>	1	
	(b) (stronger heart muscle) increases cardiac output or increases stroke volume <i>accept pumps more blood (per beat) or pumps blood faster ignore heart bigger</i>	1	
	so more (oxygenated) blood can be sent <u>to muscles</u> <i>accept more oxygen sent to muscles</i>	1	[7]

40	(i) oxygen into the blood stream <i>arrow must start inside alveolus and finish outside the capillary</i>	1	
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- (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]

41

- (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/transport 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]**42**

(a) water [1]

oxygen [1]

(sun) light or solar [1]

do not accept sun's

chlorophyll [1]

do not accept chloroplasts

4

(b) any **two** from:

stored as fructose

stored as sucrose

stored as starch

stored as oil **or** lipid

moved or transported away in the phloem

do not accept "stored" by itself

respired or burnt up for energy or

fuel changed to protein

changed to cellulose

changed to fructose

changed to starch

changed to oil or lipid

do not accept "food for plant"

do not accept "used up" by itself

2

(c) (i) roots or root hair (cells)

1

(ii) the mineral salts are (dissolved) in water [1]

water transports salts throughout the plant

or water enables osmosis or diffusion to take place [1]

2

- (d) (i) plants grow better with some nutrients than none
or
 plants grow better with nitrates than without
comparison is needed
accept "faster" as equivalent to "better"
accept don't grow well with only water 1
- (ii) 0.14(g)
*units **not** needed* 1
- (iii) making protein **or** amino acids
*do **not** accept help them grow*
*accept named protein **or** DNA **or** chlorophyll* 1
- any **two** from:
- (iv) type **or** variety **or** starting weight **or** 2
- (iii) size of seedlings
keep the environment the same
*only if light **or** temperature **or** day*
length not already credited
- light
 temperature not heat
 time of growth
*do **not** accept the same equipment*
*do **not** accept help them grow* 1
- day length
 amount of culture solution **or**/size of
accept named protein, DNA chlorophyll
- boiling tube
 number of seedlings per tube
 pH
 CO₂
 humidity

[15]

43

- (a) capillaries 1

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

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

1

(carbon dioxide dissolved in) the plasma

accept in haemoglobin in regions of high carbon dioxide concentration

*accept for 1 mark oxygen + CO₂ 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

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

bacteria **or** viruses

cholesterol

3

[6]

44

one;

1

diffuse;

1

narrow;

1

lowered;

1

[4]

45

(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 bile (salts)

1

emulsifies (fat) or produces droplets
or disperses fat)

1

[8]

46

(a) (i) light or solar

*do not credit sun's energy
do not credit radiant*

1

(ii) chlorophyll

1

(iii) chloroplast

1

(iv) $\text{CO}_2 + \text{H}_2\text{O}$ *reactants identified (accept words)*

1

 $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$ *products identified (accept words)*

1

 $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ *balanced equation*

1

(b) any **two** from:

increased CO₂ concentration

increased water supply

increased temperature (up to a point)

increased light intensity

*do **not** accept heat or warmth*

altered light quality by less green **or**

increasing other colours

2

(c) any **four** points

- palisade (mesophyll)
- lots of chloroplasts **or** chlorophyll
or main site for photosynthesis
or absorb maximum amount of light
- guard cells
- CO₂ in **or** O₂ out **or** water vapour out
- controls size of stoma **or** pores in leaf

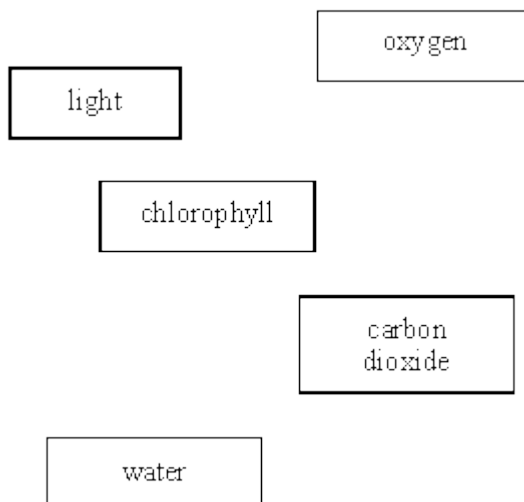
allow stomata

4

[12]

47

(a)



5

- (b) (i) sugar **or** carbohydrate 1
- (ii) it can be stored **or** it is insoluble
accept it has no osmotic effect 1
- (iii) any **one** from:
respires it **or** releases **or** transfers
energy
turns it **or** stores it as fructose **or**
sucrose **or** lipid **or** protein **or**
cellulose 1
- (c) (i) photosynthesis 1
- (ii) any **one** from:
flat surface
stomata
thin
chloroplasts
veins
large surface area
air spaces
do not accept chlorophyll 1
- 48** (i) the mass got less
accept it got lighter
award 1 mark for water was lost from the plant 1
- water was taken into the plant **or** roots
absorbed water
do not accept soaked into plant 1
- and lost through transpiration **or** the
leaves **or** evaporated from the leaves
or stomata 1

[10]

- (ii) to check the effect of the plant **or** to act as a control **or** to show that it was not due to evaporation from water

*do **not** accept to keep it fair **or** to check that it was fair
do **not** accept fair test*

1

[4]**49**

- (i) liver

1

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

1

clear description of link

1

[3]**50**

X – oxygen

accept O_2

Y – carbon dioxide

accept CO_2

[2]**51**

- (i) any **two** from:

urea

carbon dioxide

water

lactic acid

2

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

1

diffuses across

1

[4]

52

- (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

[9]

53

- (a) mesophyll / / / / (all correct) sperm / / x / (all correct)
for 1 mark each

2

- (b) (i) absorbs light/to produce food/photosynthesis
(allow references to gaseous exchange)
for 1 mark

1

- (ii) has chlorophyll/chloroplasts to absorb light/produce food
for 1 mark each
*(if linked to gas exchange allow – moist surface/
dissolve gases)*

2

[5]

- 54** (a) A – artery
B – capillary
C – vein
3
- (b) transport OWTTE
1
- (c) increased oxygen decreased carbon dioxide
2
- [6]**
-
- 55** (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]**
-
- 56** (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]**
-
- 57** (a) quick
cheap / many can be produced from one plant
cuttings produce plants identical (to parents) / outcome known
any two for 1 mark each
2

- (b) *idea that provides damp atmosphere / less likely to wilt
reduces or stops transpiration or water loss / keeps it warmer
(reject prevents animals eating it)*

for 1 mark

1

[3]