Cardinal Newman Catholic School

Holy Cross Catholic Multi Academy Company

Year 10

Summer 2023

Separate Science practice question booklet

FOUNDATION TIER ONLY

AQA

BIOLOGY PAPER 1

Name:

"Knowledge through the light of faith"

CARDINAL NEWMAN CATHOLIC SCHOOL

For each Topic in Paper 1 there are three practice questions.

How to use this booklet:

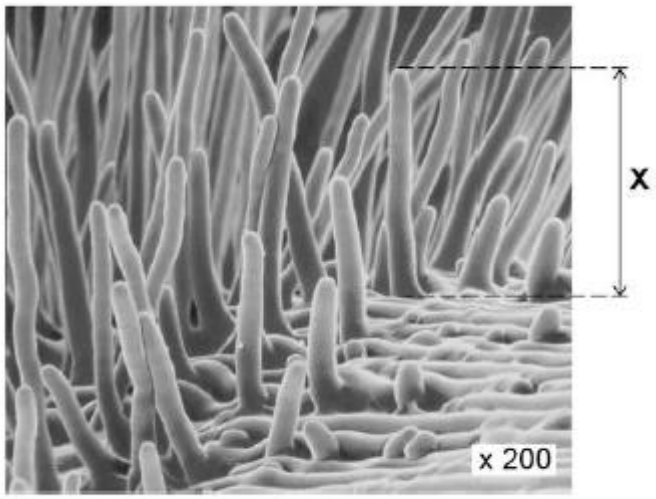
1. Complete revision for the topic first.
2. Put away your notes/resources and try to answer the questions.
3. Look at the mark scheme at the back of the booklet and compare it to your answer – add anything you have missed off in green pen.
4. Go back to the revision guide/your resources to go over anything you are unsure of.

Contents

B1 CELL BIOLOGY

Q1.

The image below shows part of a root from a cress plant.



(a) What type of microscope was used to create the image above?

_____

(1)

(b) The magnification of the cress root in the image above is × 200.
There are 1000 micrometres (µm) in a millimetre (mm).

Calculate the real length of the root hair, **X**.
Give your answer in micrometres (µm).

_____

_____

_____

_____

Real length **X** = _____ µm

(2)

(c) Root hair cells take up water from the soil.

Explain **one** way in which the root hair cell is adapted to this function.

_____

_____

_____

(2)

The table shows the water uptake by a plant's roots on two different days.

	Mean water uptake in cm^3 per hour
Cold day	1.8
Hot day	3.4

(d) Explain why the mean rate of water uptake is higher on a hot day than on a cold day.

(3)

(e) The concentration of mineral ions in the soil is lower than in root hair cells.
Root hair cells take up mineral ions from the soil.
Root hair cells contain mitochondria.

Explain why root hair cells contain mitochondria.

(4)
(Total 12 marks)

Q2.

Cells, tissues and organs are adapted to take in different substances and get rid of different substances.

The table shows the concentration of four ions outside cells and inside cells.

Ion	**Concentration outside cells in mmol per dm^3**	**Concentration inside cells in mmol per dm^3**
Sodium	140	9
Potassium	7	138
Calcium	2	27
Chloride	118	3

(a) Use information from the table above to complete the following sentences.

Sodium ions will move into cells by the process

of _____ .

Potassium ions will move into cells by the process

of _____ .

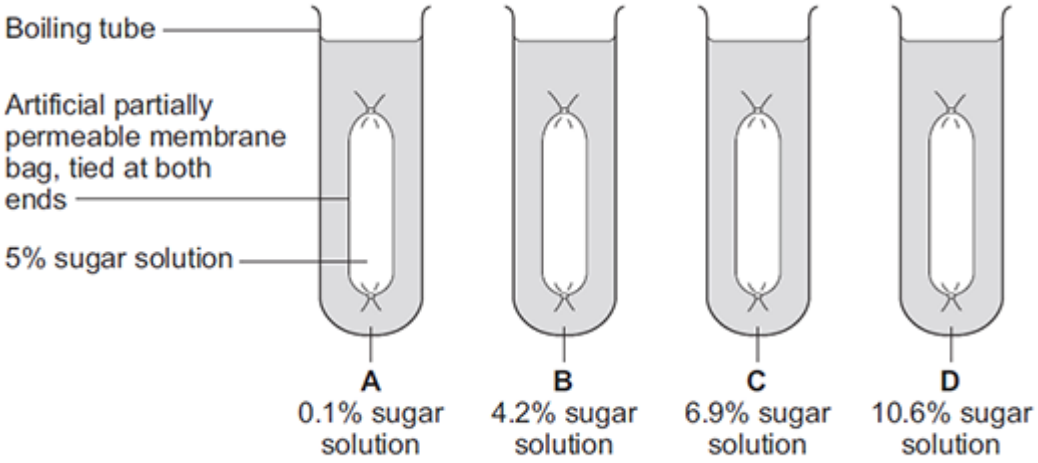
(2)

(b) Some students investigated the effect of the different concentrations of sugar in four drinks, **A**, **B**, **C** and **D**, on the movement of water across a partially permeable membrane.

The students:

- made four bags from artificial partially permeable membrane
- put equal volumes of 5% sugar solution in each bag
- weighed each bag containing the sugar solution
- placed one bag in each of the drinks, **A**, **B**, **C** and **D**
- after 20 minutes removed the bags containing the sugar solution and weighed them again.

The diagram below shows how they set up the investigation.



(i) The bag in drink **A** got heavier after 20 minutes.

Explain why.

_____

_____

_____

_____

(3)

(ii) In which drink, **A**, **B**, **C** or **D**, would you expect the bag to show the smallest change in mass?

Tick (✔) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(iii) Explain why you think the bag you chose in part **(b)(ii)** would show the smallest change.

_____

_____

_____

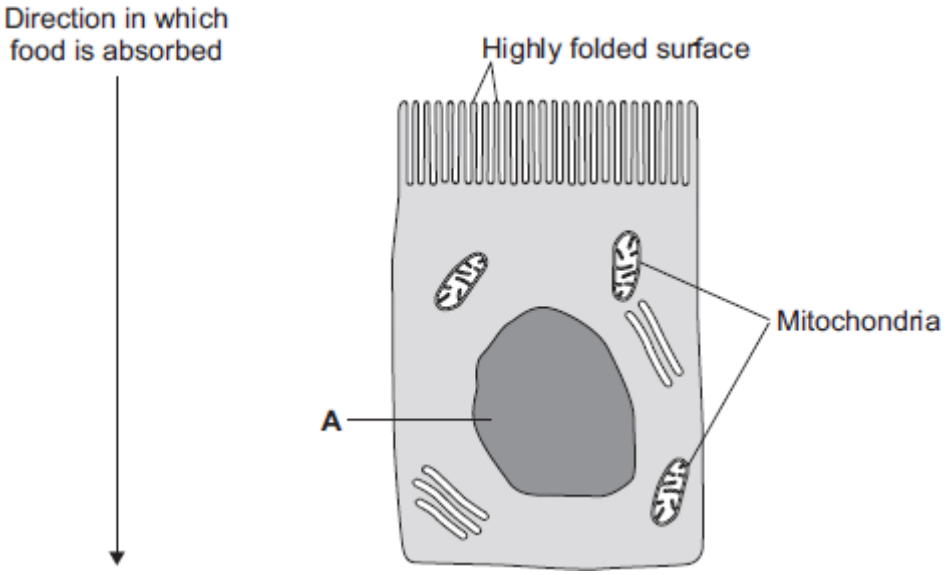
_____

(2)

(Total 8 marks)

Q3.

The image below shows an epithelial cell from the lining of the small intestine.



(a) (i) In the image above, the part of the cell labelled **A** contains chromosomes.

What is the name of part **A**?

_____

(1)

(ii) How are most soluble food molecules absorbed into the epithelial cells of the small intestine?

Draw a ring around the correct answer.

diffusion **osmosis** **respiration**

(1)

(b) Suggest how the highly folded cell surface helps the epithelial cell to absorb soluble food.

_____

_____

(1)

(c) Epithelial cells also carry out active transport.

(i) Name **one** food molecule absorbed into epithelial cells by active transport.

_____

(1)

(ii) Why is it necessary to absorb some food molecules by active transport?

_____

_____

(1)

(ii) Suggest why epithelial cells have many mitochondria.

_____

_____

_____

_____

(2)

(d) Some plants also carry out active transport.

Give **one** substance that plants absorb by active transport.

_____

(1)

(Total 8 marks)

B2 ORGANISATION

Q4.

Lipase is an enzyme that digests fat.

(a) (i) Complete the equation to show the digestion of fat.

Use the correct answer from the box.

glucose	**glycerol**	**glycogen**

fat $\xrightarrow{\text{lipase}}$ fatty acids + _____

(1)

(ii) Name **one** organ that makes lipase.

_____

(1)

(b) Some students investigated the effect of bile on the digestion of fat by lipase.

The students:

1 mixed milk and bile in a beaker
2 put the pH sensor of a pH meter into the beaker
3 added lipase solution
4 recorded the pH at 2-minute intervals
5 repeated steps 1 to 4, but used water instead of bile.

Suggest **two** variables that the students should have controlled in this investigation.

1. _____

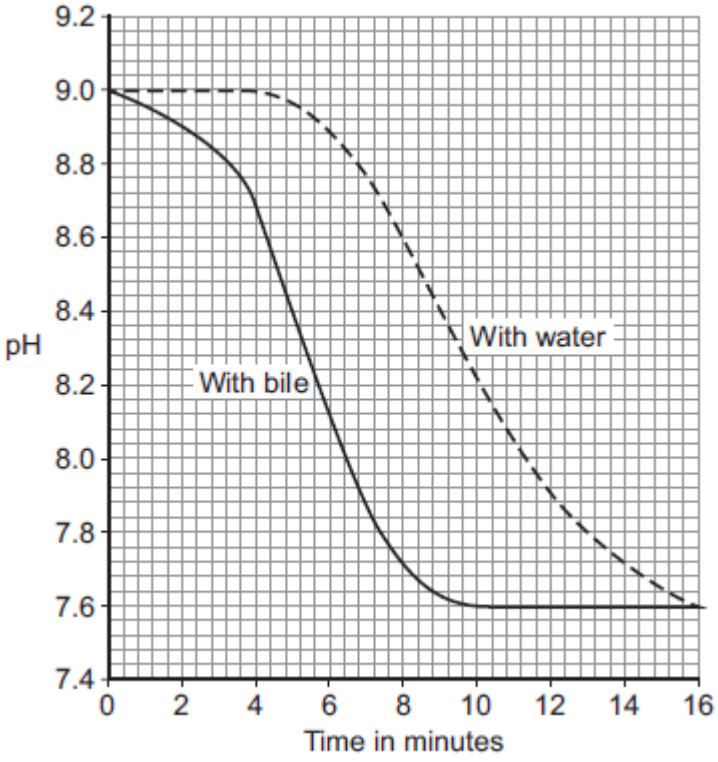
_____

2. _____

_____

(2)

(c) The graph shows the students' results.



(i) Why did the pH decrease in both investigations?

_____

_____

(1)

(ii) Bile helps lipase to digest fat.

What evidence is there in the graph to support this conclusion?

_____

_____

(1)

(iii) Suggest **one** reason why the contents of both beakers had the same pH at the end of the investigations.

_____

_____

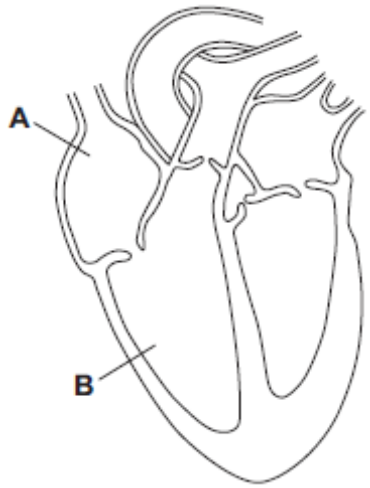
(1)

(Total 7 marks)

Q5.

Diagram 1 shows a section through the heart.

Diagram 1



(a) Use words from the box to name the structures labelled **A** and **B** on **Diagram 1**.

aorta	**atrium**	**pulmonary artery**	**ventricle**

A _____

B _____

(2)

(b) The tissue in the wall of the heart contracts.

(i) What type of tissue is this?

Tick (✓) **one** box.

muscular ☐

glandular ☐

epithelial ☐

(1)

(ii) What does the heart do when this tissue contracts?

_____

_____

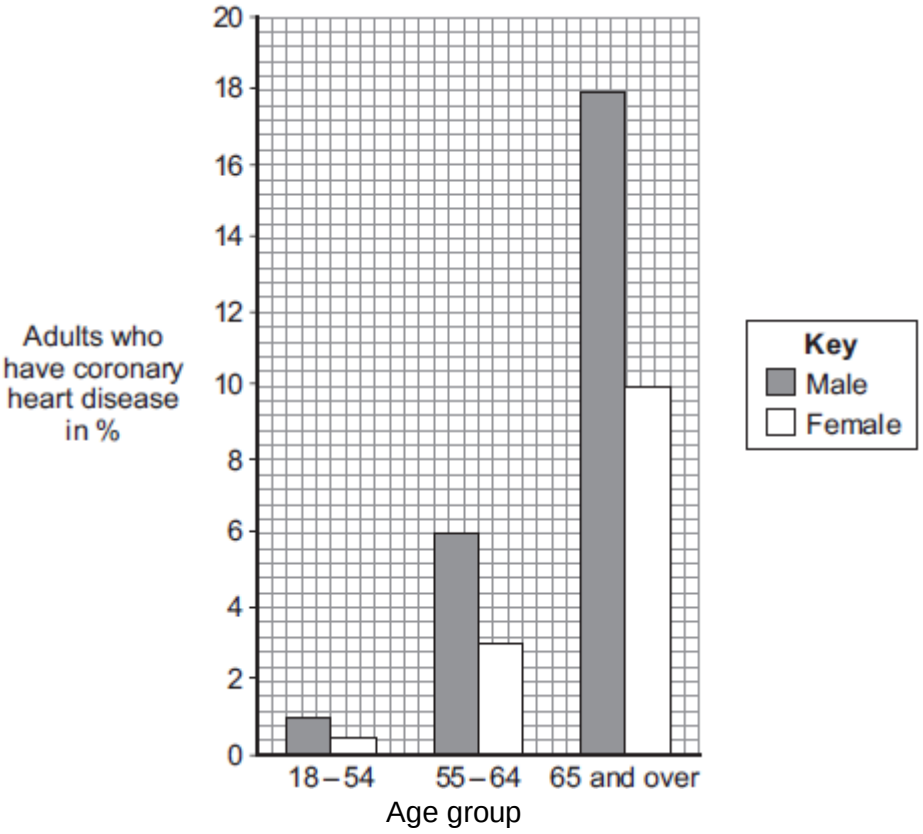
(1)

(c) Draw arrows on **Diagram 2** to complete the route taken by deoxygenated blood through the heart.

Diagram 2

(2)

(d) The graph shows the percentage (%) of adults in the UK who have coronary heart disease.



(i) Look at the graph.

Which group of people is **most** at risk of having coronary heart disease in the UK?

_____

(2)

(ii) Explain what happens to the heart in coronary heart disease.

_____

_____

_____

_____

_____

_____

(3)

(Total 11 marks)

Q6.

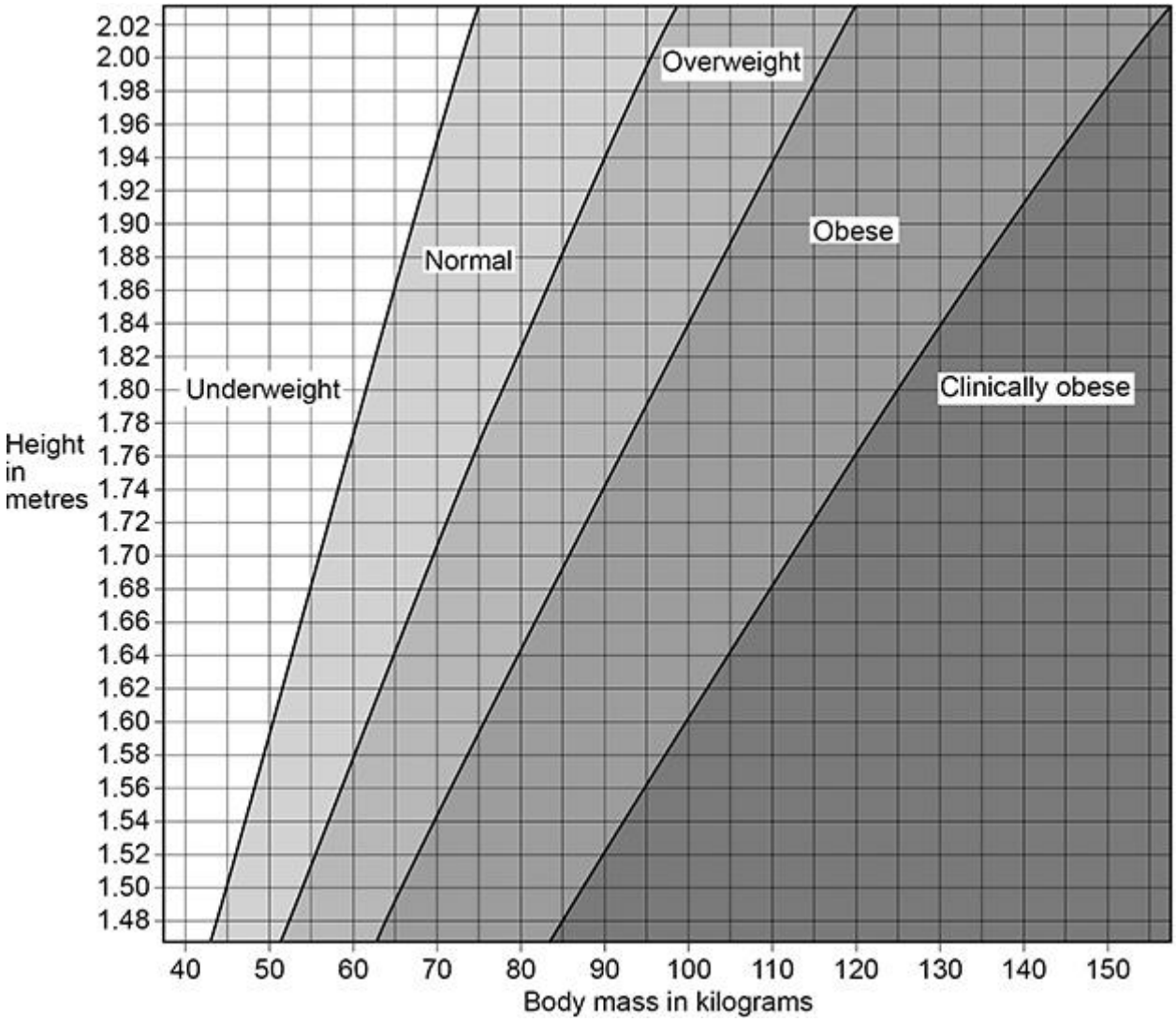
Body Mass Index (BMI) is a way of finding out if a person's body mass falls within a healthy range for their height.

Table 1 shows information about two people.

Table 1

Person	Body mass in kg	Height in m	BMI in kg/m^2
A	63	1.65	23.1
B	92	1.71	**X**

The graph below shows five BMI categories for adults.



(a) Which is the BMI category of person **A** in **Table 1**?

Tick (✓) **one** box.

Clinically obese ☐

Normal ☐

Obese ☐

Overweight ☐

Underweight ☐

(1)

(b) Calculate value **X** in **Table 1**.

Use the equation:

$$\text{BMI} = \frac{\text{body mass}}{\text{height}^2}$$

Give your answer to 3 significant figures.

_____

_____

_____

_____

_____

_____

X = _____ kg/m^2

(3)

Scientists think there is a link between BMI and life expectancy.

Table 2 shows information about predicted life expectancy of men after the age of 50.

Table 2

BMI Category	**Predicted number of years living in good health after the age of 50**	**Predicted number of years living in bad health after the age of 50**
Normal	19.06	4.98
Overweight	18.68	5.32
Obese	16.37	7.08
Clinically obese	13.07	10.10

(c) Describe **two** patterns shown in **Table 2** about the effects of BMI category.

1 _____

_____

_____

2 _____

_____

_____

(2)

The number of people who are obese in the UK is increasing.

(d) Explain the financial impact on the UK economy of an increasing number of people who are obese.

_____

_____

_____

_____

(2)

(e) A person who is obese is more at risk of arthritis.

Arthritis is a condition that damages joints.

Suggest how arthritis could affect a person's lifestyle.

_____

_____

(1)

(f) A person who eats a diet high in saturated fat might become obese.

Name **two** health conditions that might develop if a person eats a diet high in saturated fat.

Do **not** refer to arthritis in your answer.

1 _____

2 _____

(2)

(Total 11 marks)

B3 INFECTION AND RESPONSE

Q7.

Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a) Painkillers do **not** cure infectious diseases.

Why?

_____

(1)

(b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.

In their investigation the scientists:

- chose 600 volunteers. The volunteers were all in pain
- gave 200 of the volunteers a standard dose of drug **A**
- gave 200 of the volunteers a standard dose of drug **B**
- gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

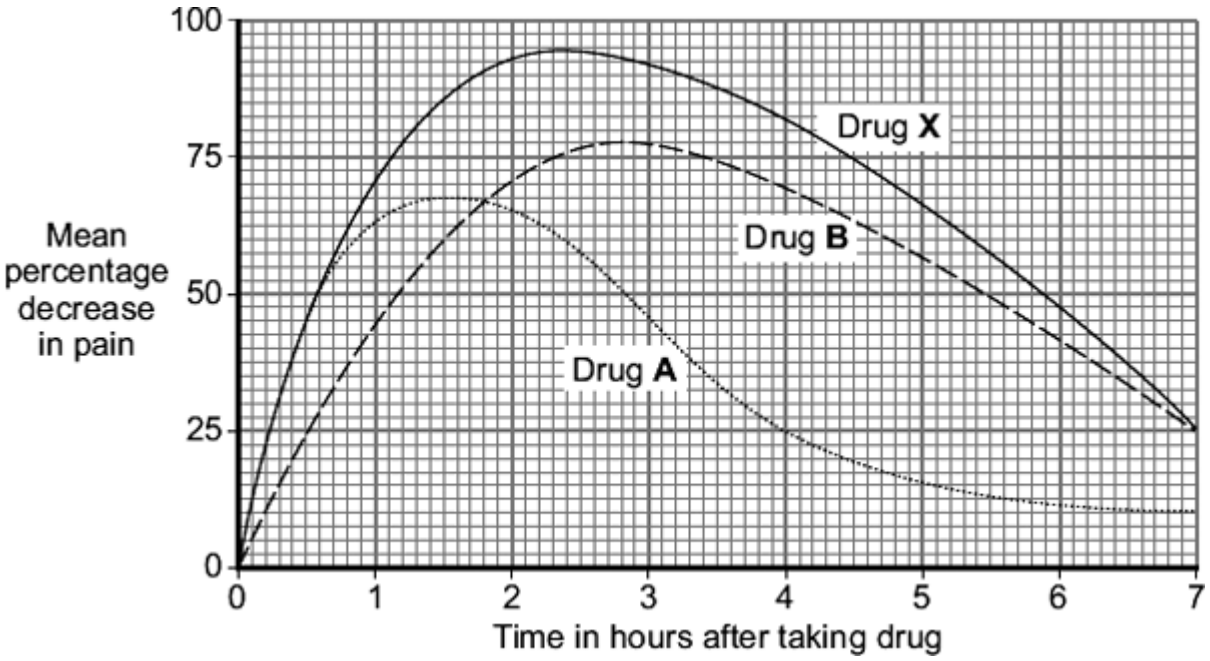
Suggest **two** of the factors that should be matched.

_____

_____

(2)

(c) The graph shows the results of the investigation.



(i) How much pain did the volunteers still feel, four hours after taking drug **A**?

_____ percent

(1)

(ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

_____

_____

(1)

(iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

_____

_____

_____

_____

(2)

(d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 10 marks)

Q8.

Scientists have trialled a new statin called rosuvastatin.

- 17 802 people took part in the trial.
- All of these people had high levels of a protein called CRP in their blood.
- The higher the level of CRP in the blood, the higher the risk of a heart attack.
- None of these people had heart conditions at the beginning of the investigation.
- None of these people had high LDL (low density lipoprotein) levels.
- All of these people were aged 50 or above.
- Half the people were given a rosuvastatin tablet each day; the other half were given a placebo.
- The trial was stopped 7 months early when it was found that the people given rosuvastatin were 54% less likely to have a heart attack than people given the placebo.

(a) Give **two** control variables in this investigation.

1. _____

2. _____

(2)

(b) What would the placebo be in this investigation?

_____

_____

(1)

(c) The trial gave reliable results.

Give **one** reason why.

_____

_____

(1)

(d) The trial was stopped 7 months early.

Give **one** reason why.

_____

_____

(1)

(e) The manufacturers of rosuvastatin paid for the trial.

However, the manufacturers took no part in the trial.

Suggest **one** reason why the manufacturers did not take part in the trial.

_____

_____

(1)

(f) The table shows some of the results of the trial.

Substance	**Concentration in blood in mg per 100 cm^3 after 3 years of trial**	
	People given rosuvastatin	People given placebo
LDL cholesterol	53	106
HDL cholesterol	50	49
Saturated fats	106	123

Rosuvastatin reduces the risk of heart attacks.

Use the data in the table to explain why.

_____

_____

_____

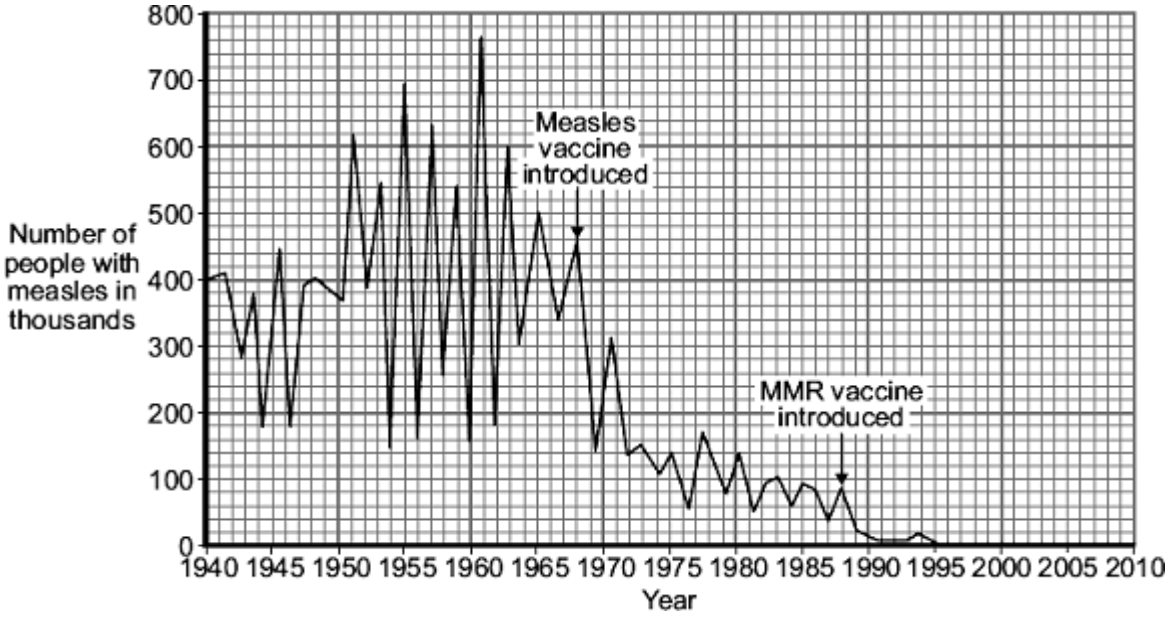
_____

(2)

(Total 8 marks)

Q9.

The graph shows the number of people with measles in the UK between 1940 and 2010.



(a) Compare how effective introducing the measles vaccine was with introducing the MMR vaccine.

Use data from the graph.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(b) The MMR vaccine was introduced in 1988.

Other than measles, which **two** diseases does the MMR vaccine protect against?

1. _____

2. _____

(2)

(c) To immunise someone against measles, a small quantity of the inactive measles pathogen is injected into the body.

Describe what happens in the body after immunisation to stop a person catching measles in the future.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 8 marks)

B4 BIOENERGETICS

Q10.

Glucose is broken down in respiration.

(a) What is the chemical formula for glucose?

Tick **one** box.

$C_6H_6O_6$ ☐

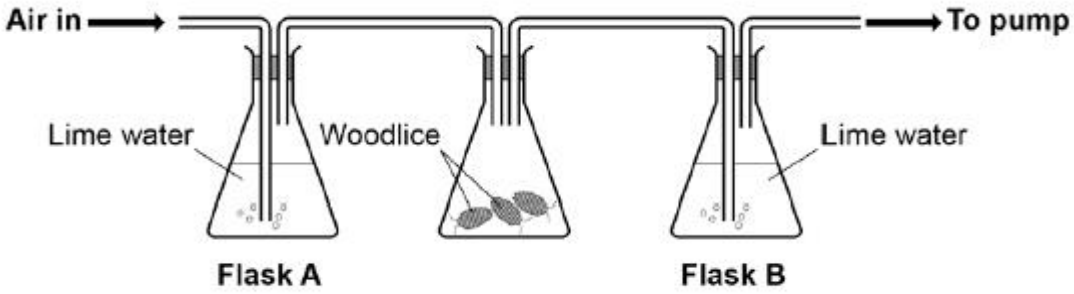
$C_3H_6O_3$ ☐

$C_6H_{12}O_6$ ☐

$C_6H_{10}O_6$ ☐

(1)

The diagram shows the apparatus a student used to investigate aerobic respiration.



Limewater goes cloudy when carbon dioxide is added to it.

(b) After 10 minutes the limewater in flask **B** was cloudy, but the limewater in flask **A** remained colourless.

Explain why.

_____

_____

_____

_____

(2)

(c) Flask **A** acts as a control in this investigation.

What is the purpose of a control?

_____

_____

(1)

(d) The student repeated the investigation with no woodlice.

Describe the appearance of the limewater in flask **A** and flask **B** after 10 minutes.

Flask **A** _____

_____

Flask **B** _____

_____

(2)

Anaerobic respiration is another form of respiration in living organisms.

(e) What is produced during anaerobic respiration in humans?

Tick **one** box.

Carbon dioxide ☐

Carbon dioxide and lactic acid ☐

Lactic acid ☐

Oxygen and water ☐

(1)

(f) Complete the equation for anaerobic respiration in yeast.

glucose → carbon dioxide + _____

(1)

(Total 8 marks)

Q11.

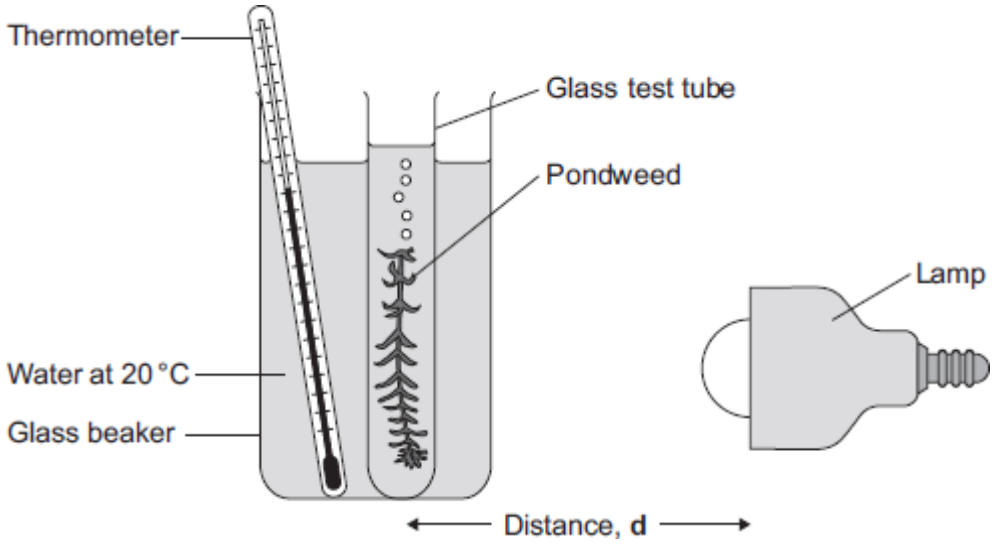
(a) Complete the equation for photosynthesis. Draw a ring around each correct answer.

Carbon dioxide + (hydrogen / nitrogen / water) → light energy → (alcohol / glucose / methane) + oxygen

(2)

Some students investigated the effect of light intensity on the rate of photosynthesis in pondweed.

The diagram shows the apparatus the students used.



The closer the lamp is to the pondweed, the more light the pondweed receives.

The students placed the lamp at different distances, **d**, from the pondweed.

They counted the number of bubbles of gas released from the pondweed in 1 minute for each distance.

(b) A thermometer was placed in the glass beaker.

Why was it important to use a thermometer in this investigation?

_____

_____

_____

_____

_____

_____

(3)

(c) The students counted the bubbles four times at each distance and calculated the correct mean value of their results.

The table shows the students' results.

Distance d in cm	**Number of bubbles per minute**				
	1	**2**	**3**	**4**	**Mean**
10	52	52	54	54	53
20	49	51	48	52	50
30	32	30	27	31	30
40	30	10	9	11	

(i) Calculate the mean number of bubbles released per minute when the lamp was 40 cm from the pondweed.

_____

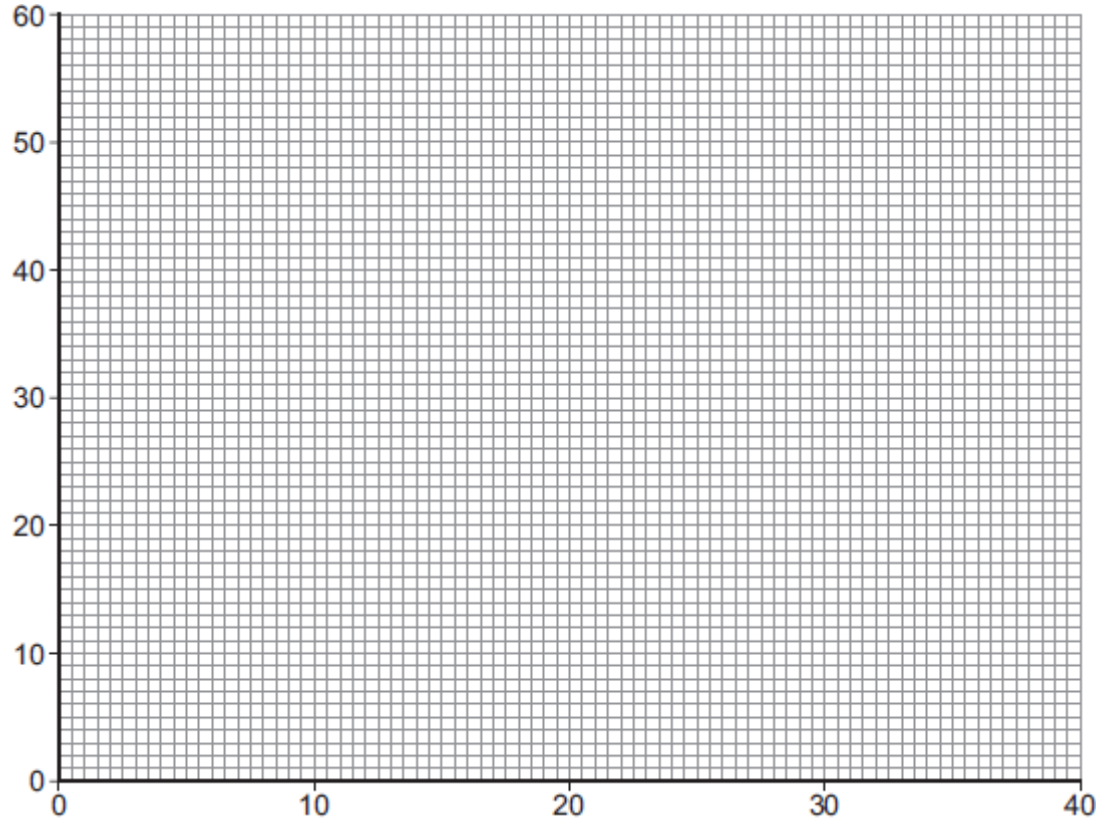
_____

Mean number of bubbles at 40 cm = _____

(2)

(ii) On the graph paper below, draw a graph to show the students' results:

- add a label to the vertical axis
- plot the **mean values** of the number of bubbles
- draw a line of best fit.



Distance **d** in cm

(4)

(iii) One student concluded that the rate of photosynthesis was inversely proportional to the distance of the lamp from the plant.

Does the data support this conclusion?

Explain your answer.

_____

_____

_____

_____

_____

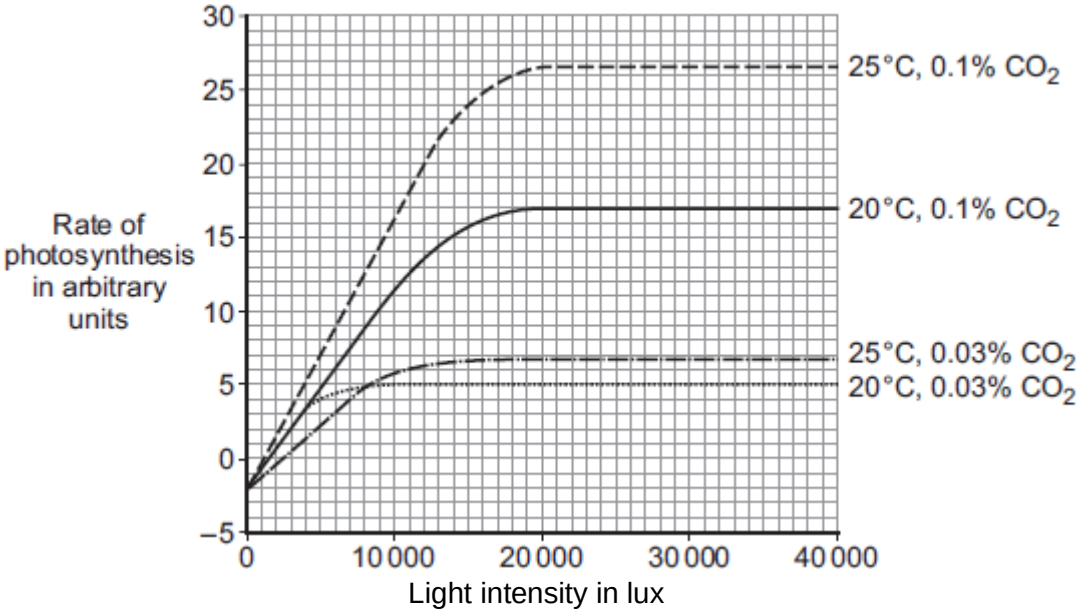
_____

(2)

(d) Light intensity, temperature and concentration of carbon dioxide are factors that affect the rate of photosynthesis.

Scientists investigated the effects of these three factors on the rate of photosynthesis in tomato plants growing in a greenhouse.

The graph below shows the scientists' results.



A farmer in the UK wants to grow tomatoes commercially in a greenhouse.

The farmer read about the scientists' investigation.

During the growing season for tomatoes in the UK, natural daylight has an intensity higher than 30 000 lux.

The farmer therefore decided to use the following conditions in his greenhouse during the day:

- 20°C
- 0.1% CO_2
- no extra lighting.

Suggest why the farmer decided to use these conditions for growing the tomatoes.

You should use information from the scientists' graph in your answer.

_____

_____

(4)

(Total 17 marks)

Q12.

This question is about photosynthesis.

(a) Complete the word equation for photosynthesis:

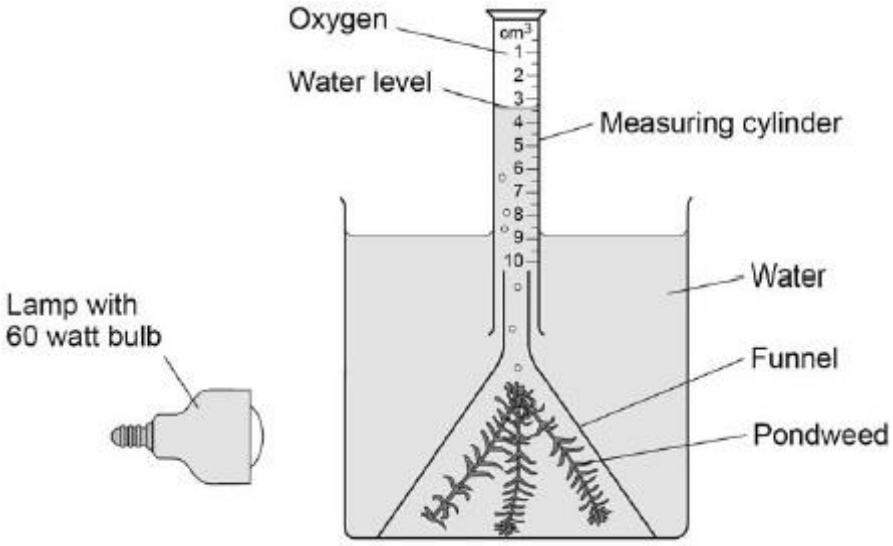
_____ + _____ → _____ + oxygen

(2)

A student investigated photosynthesis using pondweed.

Figure 1 shows the apparatus the student used.

Figure 1



This is the method used.

1. Set up the apparatus as shown in **Figure 1**.

2. Switch on the lamp.

3. After 20 minutes, record the volume of oxygen collected in the measuring cylinder.

4. Repeat steps 1–3 using bulbs of different power output.

(b) What was the independent variable in the investigation?

Tick (✓) **one** box.

Power output of bulb ☐

Rate of photosynthesis ☐

Time to collect oxygen ☐

Volume of oxygen collected ☐

(1)

(c) Suggest **two** ways the method could be improved so the results would be more valid.

1 _____

_____

2 _____

_____

(2)

The table below shows the student's results.

Power output of bulb in watts	**Volume of oxygen collected in 20 minutes in cm^3**	**Rate of photosynthesis in cm^3/hour**
60	0.5	1.5
100	0.8	2.4
150	1.1	**X**
200	1.2	3.6
250	1.2	3.6

(d) Calculate value **X** in the table above.

_____

_____

X = _____ cm^3/hour

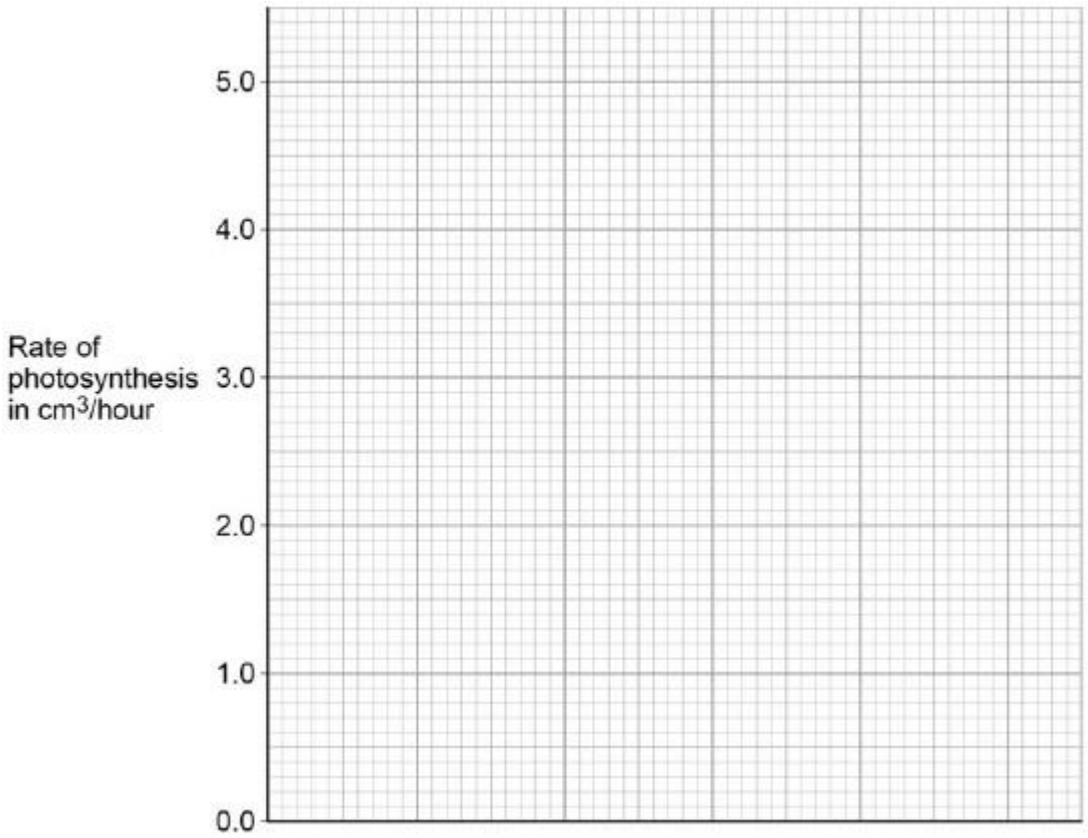
(1)

(e) Complete **Figure 2**.

You should:

- label the x-axis
- use a suitable scale
- plot the data from the table above and your answer to part (d)
- draw a line of best fit.

Figure 2



(4)

(f) Determine the expected rate of photosynthesis with a bulb of power output 75 watts.

Use **Figure 2**.

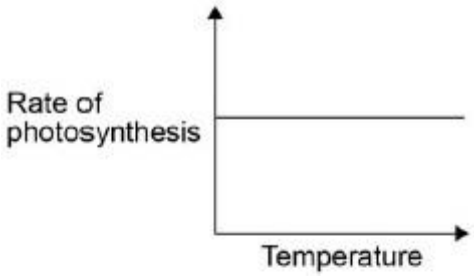
_____

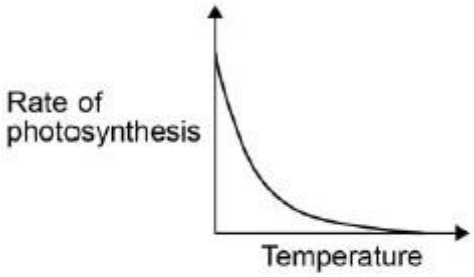
Rate of photosynthesis at 75 watts = _____ cm^3/hour

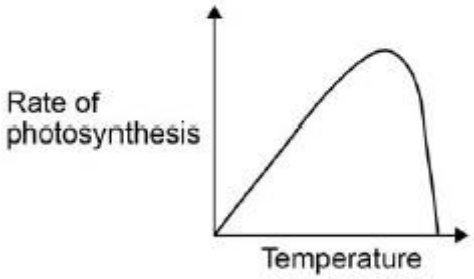
(1)

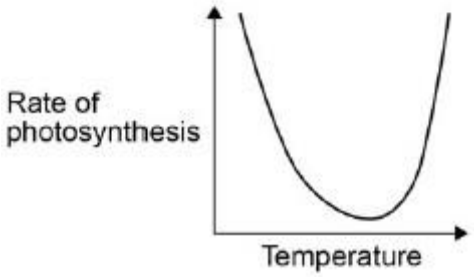
(g) Which graph shows the effect of temperature on the rate of photosynthesis?

Tick (✓) **one** box.









(1)

(Total 12 marks)

Q1.

(a) electron (microscope)

1

(b) $\frac{30000}{200}$

*an answer of 150 (µm) scores **2** marks*

1

150 (µm)

*if answer is incorrect allow for **1** mark sight of 0.015 / 0.15 / 1.5 / 15*

*allow ecf for incorrect measurement of line **X** for max **1** mark*

1

(c) **either**

large surface area

allow (vacuole contains) cell sap that is more concentrated than soil water (1)

1

for more / faster osmosis

create / maintain concentration / water potential gradient (1)

or

allow thin (cell) walls

for short(er) diffusion distance

1

(d) (on hot day) more water lost

allow converse for a cold day if clearly indicated

1

more transpiration
or
more evaporation

1

so more water taken up (by roots) to replace (water) loss (from leaves)

1

(e) (aerobic) respiration occurs in mitochondria

*do **not** accept anaerobic respiration*

1

(mitochondria / respiration) release energy

*do **not** accept energy produced / made / created*

1

(energy used for) active transport

1

to transport ions, against the concentration gradient

or
from a low concentration to a high concentration

1

[12]

Q2.

(a) <u>diffusion</u>

1

<u>active transport</u>

1

this order only

(b) (i) concentration (of sugar) in the bag was higher (than in the drink)

allow concentration (of sugar) in the drink was lower (than in the bag)

or

higher concentration of <u>water</u> outside the bag **or** in the drink / boiling tube

*allow higher <u>water</u> potential outside the bag **or** lower <u>water</u> potential inside the bag*

1

(so) <u>water</u> moved in (to the tubing)

*allow <u>water</u> moves down **its** concentration gradient*

*do **not** allow sugar moving*

1

by osmosis

allow diffusion (of water)

*do **not** allow sugar moving by osmosis **or** water moving by active transport*

1

(ii) **B**

1

(iii) close(st) to the concentration in the bag **or** to 5%

*allow small(est) diffusion gradient **or** close(st) to an equilibrium*

1

(so rate of) diffusion / osmosis is slow

allow (so) less water moves in (to the bag)

ignore ref. to sugar

1

[8]

Q3.

(a) (i) nucleus

1

(ii) diffusion

1

(b) increases / larger surface area (for diffusion)

ignore large surface area to volume ratio

1

(c) (i) sugar / glucose

accept amino acids / other named monosaccharides

1

(ii) against a concentration gradient
or
from low to high concentration

1

(iii) (active transport requires) energy

1

(from) respiration

1

(d) minerals / ions

accept named ion ignore nutrients
do not accept *water*

1

[8]

Q4.

(a) (i) glycerol

1

(ii) pancreas / small intestine

accept duodenum / ileum
ignore intestine unqualified

1

(b) any **two** from:

- type of milk
- volume / amount of milk
- vol. bile equals vol. water
- volume of lipase
- concentration of lipase
- temperature

ignore time interval
ignore solution unqualified
*do **not** allow pH*
ignore starting pH
ignore volume / amount of bile / water
ignore concentration of bile
accept amount of lipase if neither volume nor concentration given

2

(c) (i) fatty acid (production)

1

(ii) faster reaction / digestion (with bile)

or
pH decreases faster (with bile)
or
takes less time (with bile)
or
steeper fall / line (with bile)
allow use of data
ignore easier

1

(iii) all fat / milk digested
or
same amount of fatty acids present
or
(lower pH) denatures the enzyme / lipase
allow all reactants used up
ignore reference to neutralisation
allow enzyme won't work at low pH
*do **not** allow enzyme killed*

1

[7]

Q5.

(a) A - atrium
ignore references to right / left

1

B - ventricle

1

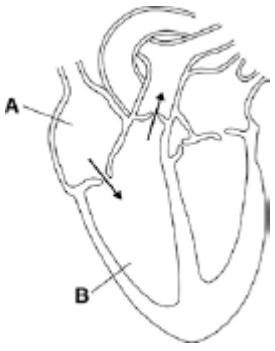
(b) (i) muscular

1

(ii) push blood
accept pump / force

1

(c)



arrows approx as indicated

1

arrow(s) showing flow from A to B
from B out / up / to artery

1

(d) (i) male

1

65 and over

1

(ii) fatty deposits / material in (coronary) arteries

allow correct points made about heart attacks

1

narrows / blocks / reduces flow

1

decreases oxygen supply (to heart muscle)

1

[11]

Q6.

(a) normal

1

(b) $92 \div 1.71^2$

1

31.46(…)

allow correctly calculated value using 92 ÷ 1.71

1

31.5

1

(c) any **two** from:

allow 'more overweight' or 'more obese' for higher BMI category throughout

- the higher the BMI (category) the lower the number of years living in good health

  allow the lower the BMI (category) the higher the number of years living in good health

- the higher the BMI (category) the higher the number of years living in bad health

  allow the lower the BMI (category) the lower the number of years living in bad health

- the higher the BMI (category), the lower total life expectancy

  allow the lower the BMI (category), the higher total life expectancy

  *if no other marks awarded, allow for **1** mark idea that as BMI increases, quality of life decreases*

2

(d) costs the NHS / UK health service / Government / hospitals more money

(because need to pay for) additional surgery / medication / hospital stay to treat stroke / diabetes

allow other correct named conditions e.g. heart attack / immobility / disability / arthritis

1

or

more time off work (if in hospital / unwell) (1)

allow more people unable to work

(so) employer / Government have to give financial support (1)

allow (so) decreased productivity (in workplace)

1

(e) allow any **one** from:

- movement issues

  allow example of movement issue

- loss of job / income
- disability
- mental health impact of lack of movement
  or
  mental health impact of pain
- need to visit the doctor / take medication regularly
- may need surgery

1

(f) type 2 diabetes

allow atherosclerosis

1

CVD / CHD
or
heart attack / disease
or
stroke

*allow **two** named vascular conditions for **2** marks from heart attack **or** stroke **or** high blood pressure **or** high (blood) cholesterol*

allow cancer

allow liver disease

1

[11]

Q7.

(a) don't kill pathogens / bacteria / viruses / microbes / microorganisms

allow don't contain antibiotics

ignore antibodies / attack / fight

allow only treat symptoms / pain

ignore kill disease / germs

1

(b) any **two** from:

- age
- gender

- extent / severity of pain
  or how long had pain <u>before trial</u>
- type of pain / illness / site of pain
  *accept 'the pain' for **1** mark, if neither extent or type given*
  ignore pain threshold
- (body) mass / weight / height
  allow body size / physique
- other medical issues / drugs taken / health / fitness
- ethnicity

2

(c) (i) 75

ignore calculations / %

1

(ii) fast<u>er</u> pain relief / decrease
allow pain relief soon<u>er</u>
***or** it works quick<u>er</u>*

***or** more pain relief at start / in first 1 / 1$\frac{3}{4}$ hours*

1

(iii) decrease of pain higher / more

ignore more effective unless qualified by time > 1$\frac{3}{4}$ hours allow effect lasts longer

1

decrease of pain is longer lasting

1

(d) any **three** from:

ignore yes or no

(Yes because)

- rapid pain relief (from A)
- long lasting pain relief (from B)
- and it costs less
- the sum of the pain relief (from A + B) is greater (than X)

(No because)

- drug X gives more pain relief
- (A + B / they) might interact with each other
- could result in overdose

- could be more / new side effects
  if neither points gained
  allow (more) dangerous

3

[10]

Q8.

(a) any **two** from:

- (high) CRP / protein
- (no) heart condition
  allow health
- (not high) LDL
- over 50 / age
- number of tablets (each day)
  ignore time
  ignore placebo / rosuvastatin
  ignore number of people

2

(b) any **one** from:

- tablet with no drug
  allow fake (pill) / dummy (pill) / sugar / chalk (pill)
- tablet that has no effect
  allow drug that has no effect
- tablet without chemicals
  ignore vitamin / mineral pill
- tablet that people thought contained statin **or** reference to psychological effect
  ignore control / different statin

1

(c) 17802 / large number of people **or** enough people
  ignore control group / fair test / control variables
  ignore time / repeats

1

(d) any **one** from:
  ignore cost

- placebo group at risk of heart attack **or** to allow statin to be given to everyone
- statin group 54% less likely to get heart attack **or** showed that statin worked **or** showed trial (very) successful
  ignore reliable
- sufficient information gained / results conclusive

ignore got results early

- unethical / unfair to carry on trial

1

(e) to avoid bias **or** show impartiality **or** show results independent

allow manufacturers could cheat

ignore reliability

ignore could be sued / blamed if trial went wrong

ignore manufacturer would know which group got statin / placebo

1

(f) any **two** from:

- reduction in LDL

  *allow improves LDL:HDL balance **or** LDL and HDL concentrations equal*

  ignore less cholesterol

  ignore more HDL

  *do **not** accept less HDL*

- reduction in (saturated) fats

- reduces deposition of fat / cholesterol / LDL in walls of blood vessels
  or
  blood vessels less likely to be blocked with fat / cholesterol / LDL

2

[8]

Q9.

(a) both lead to reduction / fall (in measles cases)

can be implied

1

measles vaccine caused a big drop **or** correct use of figures

1

MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures.

1

(b) mump(s)

1

rubella / german measles

either order

allow phonetic spelling

1

(c) white blood cells

allow lymphocytes / leucocytes

ignore memory cells

1

(wbc) produce antibodies

ignore antitoxins / antigens / antibiotics / engulfing

1

in future / if re-infected antibody production rapid / fast(er) / quick(er)

allow ecf from antitoxins / antigens / antibiotics

ignore engulfing

ignore reference to specificity

1

[8]

Q10.

(a) $C_6H_{12}O_6$

1

(b) atmospheric air contains less carbon dioxide than exhaled air

allow converse

1

(flask B goes more cloudy because) carbon dioxide is produced in (aerobic) respiration (by woodlice)

*do **not** accept anaerobic respiration*

1

(c) for comparison / to compare

allow answers in the context of the investigation e.g.

or

to check that no other factor / variable is influencing the results

to prove that the results obtained were due to the woodlice respiring and nothing else

or

to prove that the woodlice produced the carbon dioxide and nothing else

1

(d) (flask **A**) would remain colourless

ignore references to clear

allow not cloudy

1

(flask **B**) would remain colourless

1

(e) lactic acid

1

(f) alcohol / ethanol

1

[8]

Q11.

(a) LHS = water

1

RHS = glucose

1

(b) any **three** from:

- (measure) temperature
  ignore reference to fair test
- to check that the temperature isn't changing
- rate of reaction changes with temperature
- temperature is a variable that needs to be controlled
  allow lamp gives out heat

3

(c) (i) 10

*correct answer = **2** marks*

*allow **1** mark for:* $\frac{(10+9+11)}{3}$

*allow **1** mark for correct calculation without removal of anomalous result ie 15*

2

(ii) graph:

*allow ecf from **(c)(i)***

label on y-axis as 'number of bubbles per minute'

1

three points correct = **1** mark
allow ± 1 mm

four points correct = **2** marks

2

line of best fit = smooth curve

1

(iii) as distance increases, rate decreases – pro
allow yes between 20 – 40

1

but should be a straight line / but line curves – con / not quite pro
allow not between 10 – 20
if line of best fit is straight line, allow idea of poor fit

1

(d) any **four** from:

- make more profit / cost effective
- raising temp. to 25 °C makes very little difference at 0.03% CO_2
- (at 20 °C) with CO_2 at 0.1%, raises rate
- (at 20 °C with CO_2 at 0.1%) → >3x rate / rises from 5 to 17
- although 25 °C → higher rate, cost of heating not economical
- extra light does not increase rate / already max. rate with daylight
  accept ref to profits c.f. costs must be favourable

4

[17]

Q12.

(a)

words take precedence over symbols

LHS:

carbon dioxide **and** water

1

RHS:
glucose

1

allow correct symbols (ignore balancing)
in any order
*do **not** accept starch*
ignore carbohydrates / sugar

(b) power output of bulb

1

(c) any **two** from:

- repeat **and** calculate a mean
  or
  repeat **and** to eliminate anomalies
  ignore do a control experiment unqualified
- control the (water) temperature
  allow a method of controlling (water) temperature
- control the concentration of carbon dioxide
  allow a method of controlling carbon dioxide concentration
- control the distance of the bulb from the pondweed
- control the mass / length / species / age of the pondweed
  allow use the same piece of pondweed
- give pondweed time to equilibrate
  allow do experiment with the bulb off / in the dark

2

(d) 3.3 (cm^3/hour)

1

(e)

*max **3** marks for bar chart*

correct scale **and** axis labelled

1

all points plotted correctly
allow points plotted to within ± ½ small square
*allow 3 or 4 correct plots for **1** mark*
*allow correct plot from incorrect value calculated in part **(d)***

2

correct curved line of best fit
ignore line extended beyond 60 / 250 (W)

ignore line joined point to point with straight lines

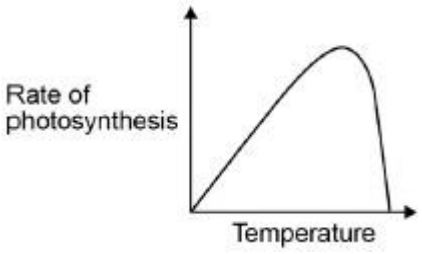
1

(f) correct answer from their line drawn on **Figure 2**

allow ± ½ small square tolerance
allow 1.8 / 1.9 if no line of best fit or incorrect graph is drawn

1

(g)



1

[12]