

Organisation part 1

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Name: _____

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Time: **84 minutes**

Marks: **77 marks**

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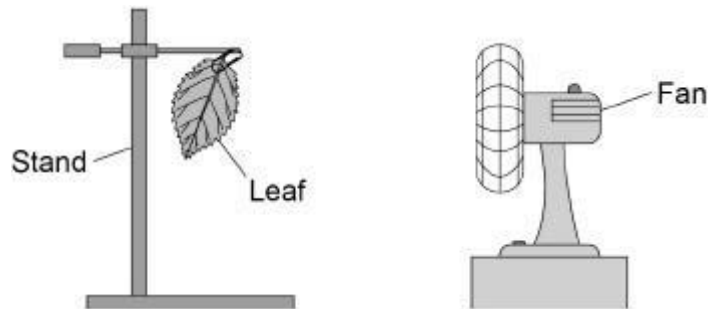
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Q1.

A student investigated the loss of mass from leaves that were placed in winds of different speed.

The student used an electric fan to create different wind speeds.

The figure below shows the apparatus.



This is the method used.

1. Record the mass of one leaf taken from a plant.
2. Attach the leaf to a stand.
3. Leave for 1 hour with the fan off.
4. Record the final mass of the leaf.
5. Repeat steps 1 to 4 with the fan set at different speeds. Use leaves of a similar size each time.
6. Calculate the loss of mass for each leaf.

The table below shows the results.

Fan setting	Loss of mass in grams
Off	0.06
Low speed	0.15
Medium speed	0.23
High speed	0.31

(a) Why did the student do one experiment with the fan off?

(1)

(b) How does **increasing** fan speed affect the loss of mass from the leaves?

Use the table above.

(1)

(c) Explain why the mass of the leaves decreased at all fan speeds.

(3)

(d) The student repeated the investigation in a room at a higher temperature.

Complete the sentence.

Choose the answer from the box.

smaller	the same	greater
----------------	-----------------	----------------

At a higher temperature the loss of mass from the leaves

would be _____ .

(1)

(e) How could the student check the repeatability of the results?

Tick (✓) **one** box.

Do the investigation again using a different method.

Do the investigation again using a different type of plant.

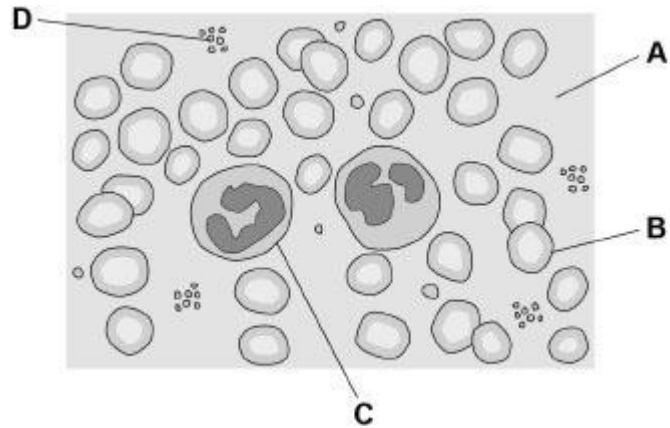
Do the investigation again using the same method.

(1)

(Total 7 marks)

Q2.

The figure below shows different parts of blood.



(a) Which letter shows a white blood cell?

Tick (✓) **one** box.

A	<input type="checkbox"/>	B	<input type="checkbox"/>	C	<input type="checkbox"/>	D	<input type="checkbox"/>
----------	--------------------------	----------	--------------------------	----------	--------------------------	----------	--------------------------

(1)

(b) Which part of the blood causes the blood to clot?

Tick (✓) **one** box.

Plasma	<input type="checkbox"/>
Platelets	<input type="checkbox"/>
Red blood cells	<input type="checkbox"/>

(1)

(c) Name **two** substances transported in the blood.

1 _____
—
2 _____
—

(2)

Healthy people can volunteer to donate blood.

The donated blood is then given to patients who need the blood.

When a volunteer donates blood:

- the volunteer's health is checked
- a needle is used to remove blood from a vein in the arm
- the volunteer rests for 15 minutes after the donation.

(d) Suggest **one** reason why blood is removed from a vein and **not** from an artery.

(1)

Patients may receive blood during a medical emergency.

Donating blood and receiving blood has risks.

(e) Suggest **one** advantage and **one** disadvantage to a patient who **receives** blood.

Advantage _____

Disadvantage _____

—

(2)

(f) Suggest **one** advantage and **one** disadvantage to the volunteer who **donates** blood.

Advantage _____

Disadvantage _____

—

(2)

(Total 9 marks)

Q3.

This question is about disease.

Gonorrhoea is a sexually transmitted disease.

(a) Which is a symptom of gonorrhoea?

Tick (✓) **one** box.

Damaged immune system

Pain when urinating

Reduced body temperature

(1)

The table below shows the number of reported cases of gonorrhoea for 5 cities.

City	Number of reported cases of gonorrhoea per 100 000 of the population
A	124
B	118
C	40
D	130
E	40

(b) The number of cases of gonorrhoea in each city might **not** be accurate.

Suggest **one** reason why.

(1)

(c) Which is the best way to present the data from the table above?

Tick (✓) **one** box.

Bar chart

Line graph

Scatter diagram

(1)

(d) The data is given as per 100 000 of the population and **not** as the total number of people with gonorrhoea.

Suggest why.

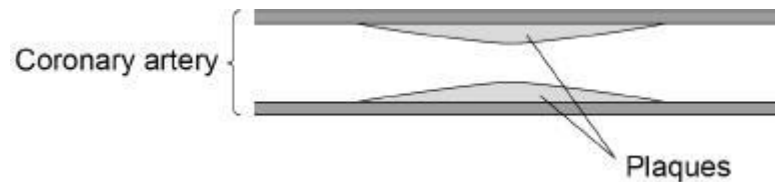
(1)

Deposits can form in coronary arteries.

The deposits are called plaques.

Plaques cause damage to the arteries.

The figure below shows plaques in a coronary artery.



(e) Which **two** factors **increase** the risk of plaques forming in the coronary artery?

Tick (✓) **two** boxes.

High fat diet

Low blood glucose

Regular exercise

Smoking

Taking statins

(2)

(f) Which treatment can be used for the plaques in the above figure?

Tick (✓) **one** box.

A placebo

A stent

An antibiotic

(1)

(g) A heart attack can happen when plaques block a coronary artery.

During a heart attack muscle cells in the heart die.

Explain how the blockage can lead to the death of muscle cells in the heart.

(3)

(Total 10 marks)

Q4.

Drinks contain different substances.

A drinks company claims that a drink contains sugar, protein and fat.

- (a) Glucose and fructose are different sugars.

Fructose has a much sweeter taste than glucose.

Suggest **two** reasons why the drinks company uses fructose in the drink rather than using glucose.

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

1 _____

—

2 _____

—

(2)

- (b) Describe how a student could test the drink for **sugar**.

Give the colour of a positive result.

Test _____

Colour of positive
result _____

(3)

- (c) Describe how a student could test the drink for **protein**.

Give the colour of a positive result.

Test _____

Colour of positive
result _____

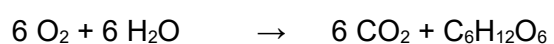
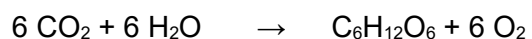
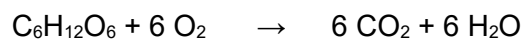
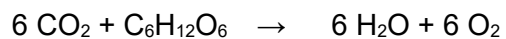
(2)

Q5.

This question is about photosynthesis.

(a) What is the symbol equation for photosynthesis?

Tick (✓) **one** box.



(1)

A student investigated the relationship between temperature and the rate of photosynthesis.

The student measured the volume of gas produced by an aquatic plant in 1 hour.

The student collected the gas in a measuring cylinder.

The table below shows the results.

Temperature in °C	Volume of gas produced in 1 hour in cm ³
10	1
15	2
20	4
25	8
30	16
35	16
40	2
45	0

(b) Describe the effect of increasing temperature on the **rate** of photosynthesis.

Use data from the table above.

(3)

(c) Explain why no gas was produced by the plant at 45 °C.

(2)

(d) How could the student increase the accuracy of the results?

Tick (✓) **one** box.

Repeat the investigation, collecting the gas for 24 hours.

Repeat the investigation, measuring the volume of gas to 0.5 cm³.

Repeat the investigation using a different aquatic plant.

Repeat the investigation, using temperatures of 5 °C and 50 °C.

(1)

A person grows tomatoes in a greenhouse.

- (e) The mean temperature of the greenhouse is 15 °C.

A heater would keep the temperature of the greenhouse at 25 °C.

Suggest **two** reasons **against** using a heater set at 25 °C in the greenhouse.

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

1 _____

–

2 _____

–

(2)

- (f) The person cut a stem from one of the tomato plants.

The cut stem was placed in soil to grow new roots.

Which tissue in the cut stem will differentiate into new root cells?

Tick (✓) **one** box.

Epidermis

Meristem

Mesophyll

Phloem

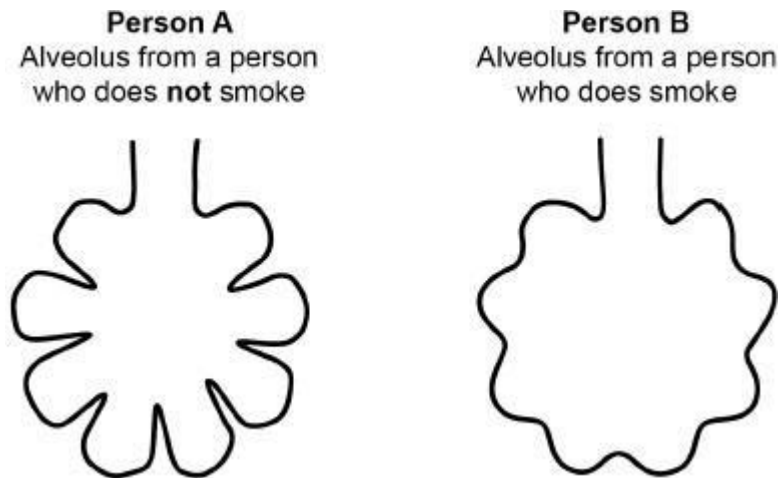
(1)

(Total 10 marks)

(c) Smoking can damage the lungs in different ways.

Figure 2 shows alveoli from the lungs of two people.

Figure 2



Person **A** and person **B** do the same exercise.

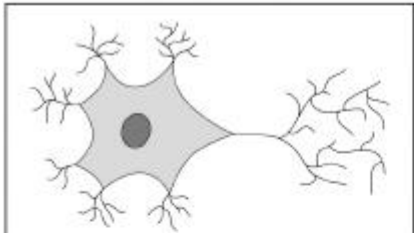


Explain why person **B** breathes much faster than person **A** during the exercise.

(4)
(Total 11 marks)

Q8.

The human body is made of different types of cell.

(a) Draw **one** line from each type of cell to the organ system where the cell is found.

Type of cell	Organ system
 <p data-bbox="497 600 622 633">Brain cell</p>	<p data-bbox="1066 477 1315 510">Circulatory system</p>
 <p data-bbox="466 947 655 981">Red blood cell</p>	<p data-bbox="1082 716 1299 750">Nervous system</p>
 <p data-bbox="491 1294 630 1328">Sperm cell</p>	<p data-bbox="1050 956 1331 990">Reproductive system</p>
	<p data-bbox="1059 1193 1321 1227">Respiratory system</p>

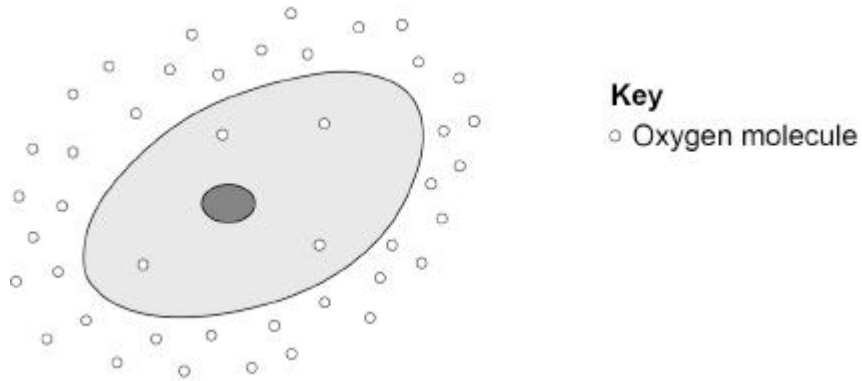
(3)

(b) Explain **one** way a sperm cell is adapted for its function.

(2)

The figure below shows a cell.

Oxygen molecules are shown inside and outside the cell.



(c) Give **one** way you can tell that the cell in the figure above is **not** a plant cell.

_____ (1)

(d) Which part of a cell controls the movement of substances into and out of the cell?

Tick (✓) **one** box.

Cell membrane	<input type="checkbox"/>
Cytoplasm	<input type="checkbox"/>
Nucleus	<input type="checkbox"/>

(1)

(e) What is the name of the process that moves oxygen molecules into the cell in the figure above?

Give the reason for your answer.

Tick (✓) **one** box.

Active transport	<input type="checkbox"/>
Diffusion	<input type="checkbox"/>
Osmosis	<input type="checkbox"/>

Reason _____

(2)

(f) Name **two** substances that move **into** most cells in the body from the blood.

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

1 _____

2 _____

(2)

(Total 11 marks)

Mark schemes

Q1.

- (a) (as a) control

allow to show the effect of fan / wind
*do **not** accept control variable*

or

(to) compare (the other results to)

1

- (b) (loss of mass / water) increases

allow mass of leaves decreases more
allow more (mass / water) is lost

1

- (c) loss of water

1

(because water) evaporated

allow by transpiration
allow diffusion

1

from stomata / stoma

ignore from guard cells

1

- (d) greater

1

- (e) do the investigation again using the same method

1

[7]

Q2.

- (a) **C**

1

- (b) platelets

1

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

- oxygen
- hormones
- urea
- carbon dioxide
- water
- glucose

allow sugar

- amino acids
- fatty acids
- glycerol

- antibodies
- lactic acid
- minerals
- vitamins

allow 2 named minerals / vitamins / hormones / drugs for 2 marks

allow other correctly named substances such as proteins

2

(d) any **one** from:

allow converse if clearly referring to arteries

- blood is under lower pressure
- easier to stop the bleeding

allow less bleeding (after the donation)

- easier to puncture the vein

allow (veins) have thinner walls

- easier to access (vein / blood)

allow (veins) are closer to the surface (of the skin)

- less painful
- blood flows smoothly

ignore references to safety

ignore references to oxygenated and deoxygenated blood

1

(e) (advantage)

any **one** from:

- improved quality of life
- lives are saved **or** deaths are reduced
- reduced anaemia
- restores blood levels (following severe burns / blood-loss)

ignore more blood unqualified

1

(disadvantage)

any **one** from:

- risk of infection
- risk of rejection

allow blood type must match

allow wrong blood type given

- allergic reaction
- bruising

ignore religion

1

(f) (advantage)

any **one** from:

- (pleasure from) helping others **or** (happiness from) saving lives

allow feel good factor

- reveal potential health problems

allow examples such as HIV

1

(disadvantage)

any **one** from:

- pain (when donating)

- risk of infection
- time (spent while donating)
- feeling unwell (after donation)
 - allow dizzy / hot / sweating / trembling / nauseous / fainting*
- bruising (from the donation site)
- reduced physical activity for the rest of the day
 - allow fatigue*
- possibility of rebleeding
 - ignore religion*

1

[9]

Q3.

(a) pain when urinating

1

(b) any **one** from:

- not all cases are reported / recorded
 - allow people may not know they have it*
- (there may be) false positives / negatives
 - allow idea of misdiagnosis*
- references to population numbers only being estimates

1

(c) bar chart

1

(d) to compare

or

different cities have different population sizes

allow cities are different sizes

1

(e) high fat diet

1

smoking

1

(f) a stent

1

(g) less / no blood (flow)

1

(so) less / no oxygen (to heart muscle / cells)

1

(so) less / no respiration

allow less energy available ignore reference to lactic acid

1

[10]

Q4.

- (a) any **two** from:
- less (fructose / sugar) needed
ignore fructose is sweeter than glucose
 - cheaper to produce / buy the drink
allow less (sugar) tax
allow more profit
ignore cheaper unqualified
 - less energy in the drink (so people are more likely to buy it)
allow less calories / J / kJ in the drink
allow less (fructose / sugar) needed so would be cheaper for 2 marks
- 2
- (b) add Benedict's (reagent / solution)
- 1
- heat reagent / solution
- allow appropriate method of heating*
if a temperature is given, must be at least 60 °C
ignore warm
- 1
- green / yellow / orange / brown / (brick) red
- ignore starting colour*
- 1
- (c) add Biuret (reagent / solution)
- allow add Biuret A **and** Biuret B*
*allow add potassium / sodium hydroxide solution **and** copper sulfate solution*
- 1
- mauve / purple / lilac / pink-purple
- ignore starting colour*
- 1
- (d) **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.
- 4–6
- Level 1:** Facts, events or processes are identified and simply stated but their relevance is not clear.
- 1–3
- No relevant content**
- 0
- Indicative content**
- Protein**
- protease
 - (protein) broken down into amino acids
 - (protease) produced in the stomach
 - (protease) produced in the pancreas
 - (protease) produced in the small intestine
 - (hydrochloric) acid provides the correct pH for protease (in the stomach)

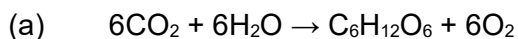
Fat

- lipase
 - (fat) broken down into fatty acids
 - (fat) broken down into glycerol
 - (lipase) produced by the pancreas
 - (lipase) produced by the small intestine
- bile
 - (bile) produced by the liver
 - (bile) released from the gall bladder
 - emulsification of fats
 - larger surface area for lipase
 - neutralises acid to provide the correct pH for enzymes

For **Level 2**, answers must describe digestion of fat **and** protein linked to correct type of enzyme for both

[13]

Q5.



1

- (b) (as temperature increases) the rate of photosynthesis increases **then** (the rate of photosynthesis) decreases

ignore references to volume unqualified

1

fastest rate between 30 °C **and** 35 °C

allow a fastest rate at a temperature above 30 °C and below 35 °C

allow reaches an optimum temperature between 30 °C and 35 °C

1

up to 30 °C the rate doubles every 5 °C increase

allow up to 30 °C the rate increases at an increasing rate

allow up to 30 °C the rate increases exponentially

1

- (c) enzymes (in the plant / chloroplast) become destroyed

allow enzymes become denatured

*do **not** accept enzymes are killed*

*do **not** accept cells / plants are denatured*

1

(because) active site changes shape

OR

the active site changes shape (1)

(so) the substrate no longer fits / binds (1)

OR

enzymes (in the plant / chloroplast) become destroyed (1)

allow enzymes become denatured
do not accept enzymes are killed
do not accept cells / plants are denatured

(so) the substrate no longer fits / binds (1)
ignore the plant is killed / dead

1

(d) repeat the investigation, measuring the volume of gas to 0.5 cm³

1

(e) any **two** from:

- may have too many tomatoes to eat / sell
allow the idea of a glut or all ripen at the same time
- other factors could limit photosynthesis
allow other named limiting factor could limit photosynthesis
allow factors could limit tomato production
- the optimum temperature might be above / below 25 °C
- greenhouses are poorly insulated
- pollution from the heater
allow increase carbon dioxide emissions
allow increase global warming
- increase the rate of transpiration
allow increase the water loss from the plant
- increased spread of plant disease(s)
if no other mark awarded allow it is a fire hazard for 1 mark

2

(f) meristem

1

[10]

Q6.

(a) DNA replicates

or

two copies of each chromosome form

allow a maximum of 3 marks if the stages are out of order

allow DNA duplicates / doubles

allow genetic material doubles

ignore genetic information replicates

do not accept DNA reproduces

1

one set of chromosomes is pulled to each end of the cell

allow one set of chromosomes is moved to each end of the cell

ignore half the chromosomes are moved to each end of the cell

1

nucleus divides

allow two (new) nuclei form

1

cytoplasm **or** cell membrane divides **and** two genetically identical cells form

	<i>allow cytokinesis and two genetically identical cells form</i>	
	<i>ignore names of phases of mitosis</i>	
	<i>if no other mark awarded allow 1 mark for mitosis</i>	1
(b)	uncontrolled cell division / growth	1
	invade neighbouring tissues	1
	(tumour) cells spread to different parts of the body / tissues in the blood / lymph	
	<i>allow tumour metastasises</i>	1
(c)	(need to breathe faster / deeper) to get more oxygen	
	<i>allow the converse if clearly stated</i>	1
	(because) smaller surface area	1
	(so) less oxygen in the blood	
	<i>allow (so) less oxygenation of haemoglobin</i>	1
	(so) less (oxygen for) respiration	
	<i>allow (so) anaerobic respiration increases</i>	
	<i>allow (so) lactic acid is produced</i>	
	<i>allow (so) an oxygen debt is created</i>	
	<i>do not accept energy produced / made / created</i>	1
		[11]

Q7.

Level 3: Relevant points (factors / effects) are identified, given in detail and logically linked to form a clear account. 5-6

Level 2: Relevant points (factors / effects) are identified and there are attempts at logical linking. The resulting account is not fully clear. 3-4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking. 1-2

No relevant content 0

Indicative content

causes of angina / CHD:

- high cholesterol / fat (in blood / diet), obesity
- a lack of exercise

- smoking / alcohol
- increasing age
- a family history of atherosclerosis or heart problems

explanation of symptoms:

- fatty deposits in coronary arteries
- narrowing of the coronary arteries
- reduced blood / oxygen / glucose to the heart (muscle / tissue / cells)
- reduced blood / oxygen / glucose to the body
- less oxygen / glucose for respiration
- less energy released
- (more) anaerobic respiration
- lactic acid formed
- muscle fatigue

treatment using GTN:

- more blood to the heart (muscle / tissue / cells)
- more oxygen / glucose to the heart (muscle / tissue / cells)
- increased (aerobic) respiration

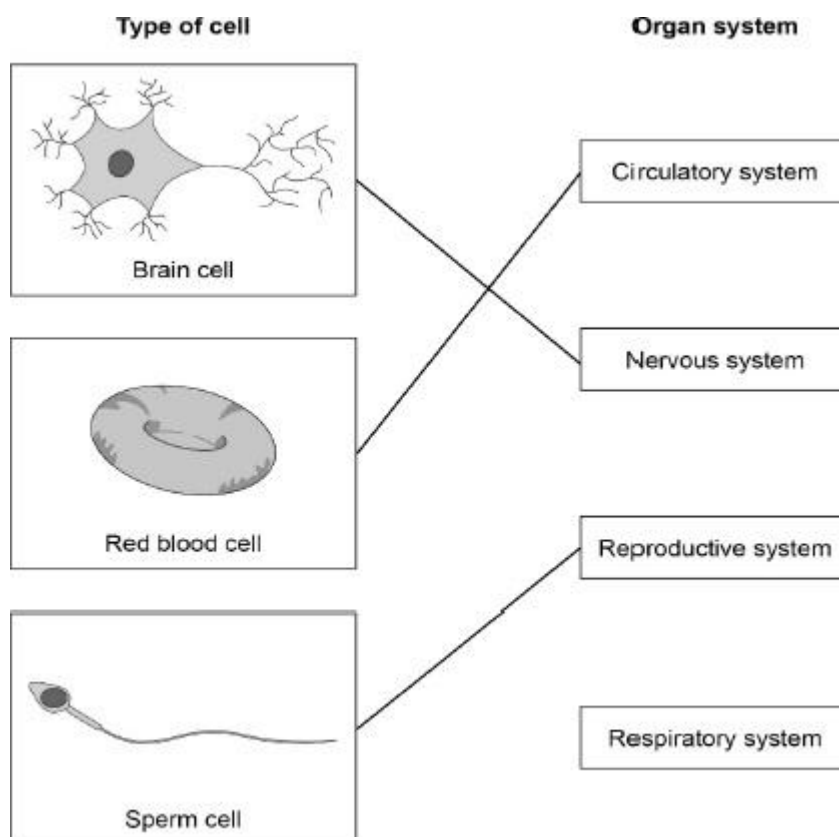
For **Level 1** explanation(s) of the symptoms of angina **or** the treatment using GTN must be included

For **Level 3** explanations must include the causes of angina, explanations of the symptoms of angina and treatment using GTN

[6]

Q8.

(a)



do **not** accept more than one line from a box on the left

3

(b) has a tail

allow has flagellum

1

(so) it can swim

allow so it can move / travel

OR

has (many) mitochondria (1)

to transfer / release / energy (for sperm to swim) (1)

allow for energy

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

OR

has enzyme(s) (1)

to penetrate into the egg (1)

OR

is streamlined (1)

to swim faster (1)

OR

has 23 chromosomes (1)

to produce 46 chromosomes in fertilised cell (1)

allow a correct adaptation (1)

and linked explanation (1)

1

(c) any **one** from:

(cell in the figure) does **not** have

- a (cell) wall
- a (large) vacuole
- chloroplasts

ignore chlorophyll

1

(d) cell membrane

1

(e) diffusion

1

Reason:

concentration (of oxygen) is greater outside the cell

or

concentration (of oxygen) is lower inside the cell

allow (oxygen moves) from a high concentration to a low concentration

allow there is more (oxygen) outside the cell (than inside the cell)

allow there is less (oxygen) inside the cell (than outside the cell)

ignore oxygen moves along a concentration gradient

1

(f) any **two** from:

ignore oxygen

- glucose / sugar
- water

allow H₂O

- amino acids
- fatty acids
- glycerol
- mineral ions

allow minerals / salts / vitamins / hormones

allow named ion / mineral / vitamin / hormone

ignore carbon dioxide

ignore urea

2

[11]