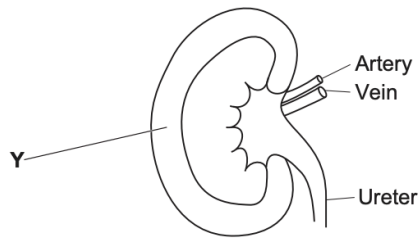


Q1. (2018)

19 Look at the diagram.

It shows a vertical section through a kidney.



(b) The kidney is important for water balance.

The table shows the measurements of water balance for two patients in hospital.

	Volume of water (ml)	
	Patient A	Patient B
Water taken into body in food and drinks	2500	2500
Water made in the body during respiration	200	200
Total input =	2700	2700
Water lost from kidneys in the form of urine	1900	1700
Water lost through skin, lungs and digestive system	1000	1000
Total output =		

A)

(i) Calculate the total output for Patient A and Patient B.

Patient A

Patient B

[1]

B)

(ii) Which patient needs treatment for their kidneys?

Explain the reasons for your choice.

.....

.....

.....

.....

[2]

Q2. (2019)

4 Which part of the eye does not function correctly in colour blindness?

- A Cornea
- B Iris
- C Lens
- D Retina

Your answer

☐

[1]

Q3. (2019)

7 Light travels through different parts to reach the back of the eye.

Which structure does light pass through first when it enters the eye?

- A Cornea
- B Lens
- C Pupil
- D Retina

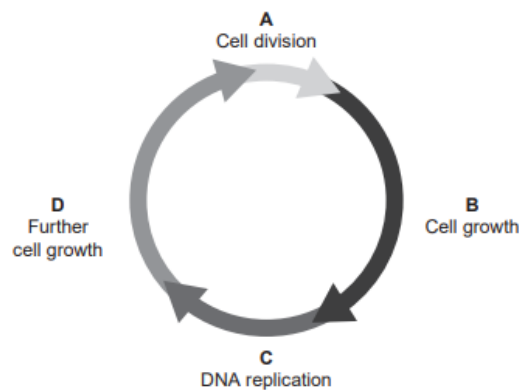
Your answer

☐

[1]

Q4. (2019)

8 During which phase of the cell cycle does mitosis happen?



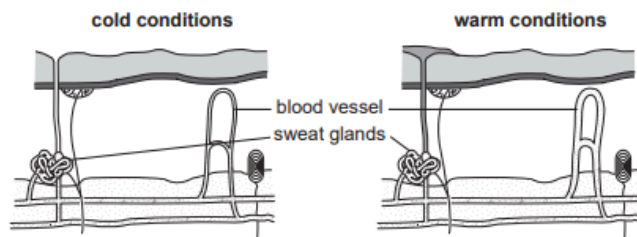
Your answer

☐

[1]

Q5. (2019)

- 9 The diagrams show changes in the skin as a person moves from cold to warm conditions.



Which processes happen in the skin as a result of the change from cold to warm conditions?

- A Blood vessels widen and sweat is released.
- B Blood vessels narrow and sweat is released.
- C Blood vessels widen and sweat production stops.
- D Blood vessels narrow and sweat production stops.

Your answer

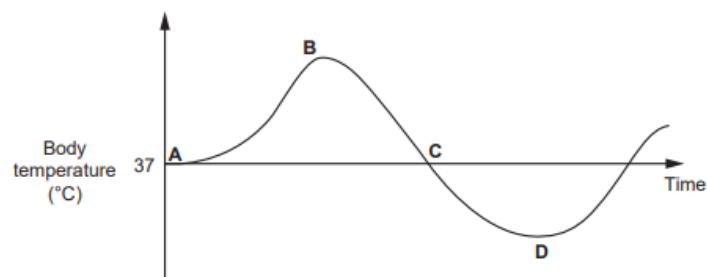
☐

[1]

Q6. (2019)

- 10 The graph shows changes to body temperature during temperature regulation.

Which letter on the graph shows when shivering is occurring?



Your answer

☐

[1]

Q7. (2019)

- 11 Which part of the brain controls the heartbeat and breathing?

- A Cerebrum
- B Hypothalamus
- C Medulla
- D Pituitary

Your answer

☐

[1]

Q8. (2019)

A)

19 Plant hormones are involved in controlling some processes in plants.

(a) Which processes in plants are controlled by plant hormones?

Tick (✓) **three** boxes.

Flower opening	☐
Germination	☐
Photosynthesis	☐
Pollination	☐
Respiration	☐
Shedding of leaves	☐

[3]

B)

(d) The lining of the uterus is shed during menstruation.

New cells are needed to replace the lining of the uterus.

Describe the processes that occur to make these new cells.

.....

.....

.....

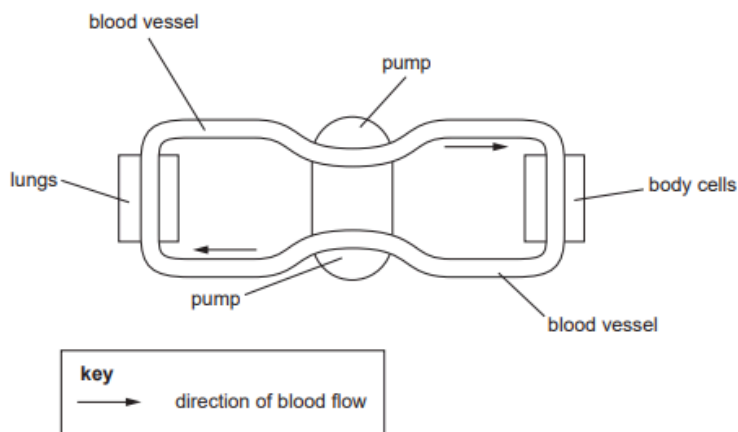
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..... [3]

Q9. (2019)

21 Look at the diagram. It represents the human circulatory system.



A)

(a) Describe how the diagram shows that humans have a double circulatory system.

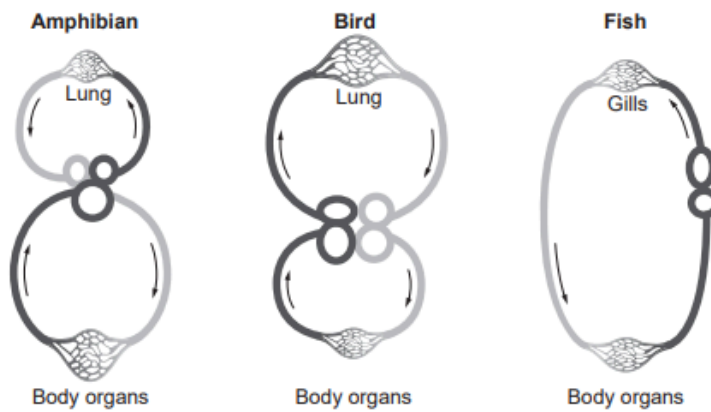
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..... [2]

B)

(b) Look at the diagrams of the circulation systems in an amphibian, bird and fish.



Which of these has a circulatory system most similar to humans?

Tick (✓) **one** box.

Amphibian	☐
Bird	☐
Fish	☐

Explain your choice.

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[3]

C)

- (c) Scientists investigate how exercise affects blood flow to different organs in the body.

This is their method.

- Ask a healthy person to sit in a room at 20°C
- Measure the blood flow to different organs in the person's body
- Repeat this with the person exercising at a constant speed on a treadmill in the same room.

The table shows the scientists' results.

Organ	Rate of blood flow (ml per minute)	
	Sitting	Doing exercise
Brain	750	750
Heart muscle	250	1000
Muscles	1200	22 000
Skin	500	600
Other organs	3100	650
Total	5800	25 000

- (i) By how many times has the **total** blood flow increased by doing exercise?

Give your answer to the **nearest whole number**.

D)

- (ii) The table shows that blood flow to other organs has decreased by nearly 5 times when a person is **doing exercise**.

The blood flow to the muscles has increased by more than eighteen times.

Explain these changes to blood flow rate.

.....

.....

.....

..... [2]

Q10 (2020)

- 11 Plants growing in swamps have special roots that grow **upwards** through waterlogged soil to get oxygen from air.

What type of response do these roots show?

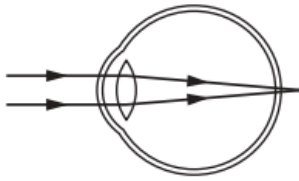
- A Negative germination
- B Negative gravitropism
- C Positive germination
- D Positive gravitropism

Your answer

☐

[1]

Q11 (2020)

14 Look at the diagram showing an eye defect.

What is the defect and which lens could be used to correct it?

- A** Long-sightedness, corrected with a concave lens
- B** Long-sightedness, corrected with a convex lens
- C** Short-sightedness, corrected with a concave lens
- D** Short-sightedness, corrected with a convex lens

Your answer

☐**[1]**

Q12 (2020) – 20c

A)

- (c) (i)** The skin is important for controlling body temperature.

Explain why overheating of the body may stop chemical reactions in cells.

.....

.....

.....

..... **[2]**

B)

(ii)* Look at **Fig. 20.2** which shows two people riding on boards.

Person A is riding a board on sand in a hot desert. **Person B** is riding a board on snow.

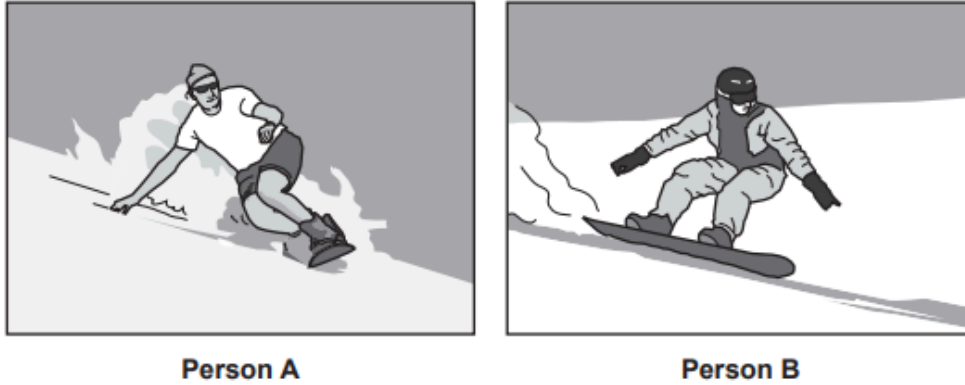


Fig. 20.2

Explain the different problems of temperature regulation for these two people and give examples of the ways their bodies solve these problems.

.....

Q13. (2021)

A)

17 The circulatory system and gas exchange system are linked.

Two male students investigate how the type of exercise affects breathing rate.

They each record their breathing rates at rest.

Student A then exercises for 5 minutes by jogging on the spot.

Student B exercises for 5 minutes by doing star jumps.

Both students measure their breathing rate each minute during the 5 minutes of exercise.

(a) What is the **dependent** variable in this investigation?

..... [1]

B)

(b) Write down **two** variables the students tried to control in their experiment.

1

2

[2]

C)

(c) Why is it important to first record the students' breathing rate at rest?

..... [1]

Q14. (2021) – 18d

(d) Growth in plants is controlled by plant hormones.

Write down **two** other processes in plants that are controlled by plant hormones.

1

2

[2]

Q15. (2021) – 19c, 19d

A)

(c) (i) Explain how changes in blood sugar levels caused by diabetes affect the water potential of the blood.

.....

.....

..... [2]

B)

- (ii) Explain how surrounding cells will be affected by these changes in water potential in the blood.

.....

 [2]

C)

- (d) Glucose may be found in the urine of people who have diabetes. This happens if their blood sugar levels are too high.

The diagram shows a kidney tubule (nephron).

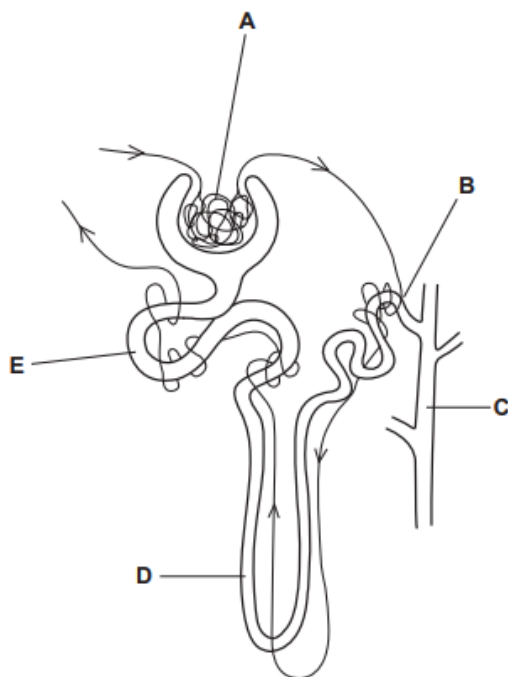


Table 19.2 shows some of the possible ways that diabetes can change kidney function.

For each change in function, write **A**, **B**, **C**, **D** or **E** to identify where in the kidney tubule each change occurs.

Change to kidney function	Part of tubule where change occurs
Glomerulus filters too much glucose from the blood.	
Proximal convoluted tubule only reabsorbs some of the glucose back into the blood.	
Collecting duct transports urine containing glucose.	

Table 19.2

[3]

Q16 (2022)

A)

- 19 A boat with ten people onboard capsizes and all ten people are found in the sea.

The first aiders at the scene take the body temperature of each of the ten people.

Rescued person	Body temperature after rescue (°C)
1	35.2
2	35.0
3	34.9
4	34.8
5	35.1
6	35.1
7	34.8
8	34.9
9	35.0
10	34.9

- (a) (i) Calculate the mean temperature of the ten people rescued.
Give your answer to 1 decimal place.

Mean temperature = °C [2]

B)

- (ii) If a person's body temperature is below 35 °C, they are classed as hypothermic.
What percentage of those rescued would be classed as hypothermic?

Percentage hypothermic = % [2]

C)

- (iii) Describe how the body responds to hypothermia.

.....
.....
.....
..... [3]

D)

- (iv) The body needs to maintain a constant body temperature.

Write down **one** other feature of the internal environment of the body that should be kept constant.

..... [1]

E)

- (b) A study in the British Medical Journal looked at 35488 people to see if there were differences in individuals' normal body temperatures.

They found the following:

- the mean body temperature was 36.6°C
- 95% of the population had a body temperature between 35.7°C and 37.3°C.

The study did **not** include people with infections or severe illnesses.

- (i) The British Medical Journal is a peer-reviewed journal.
Explain why scientists publish their results in peer-reviewed journals.

.....
.....
.....
..... [2]

F)

- (ii) Explain why the study did **not** include people with infections or severe illnesses.

.....
.....
..... [2]

G)

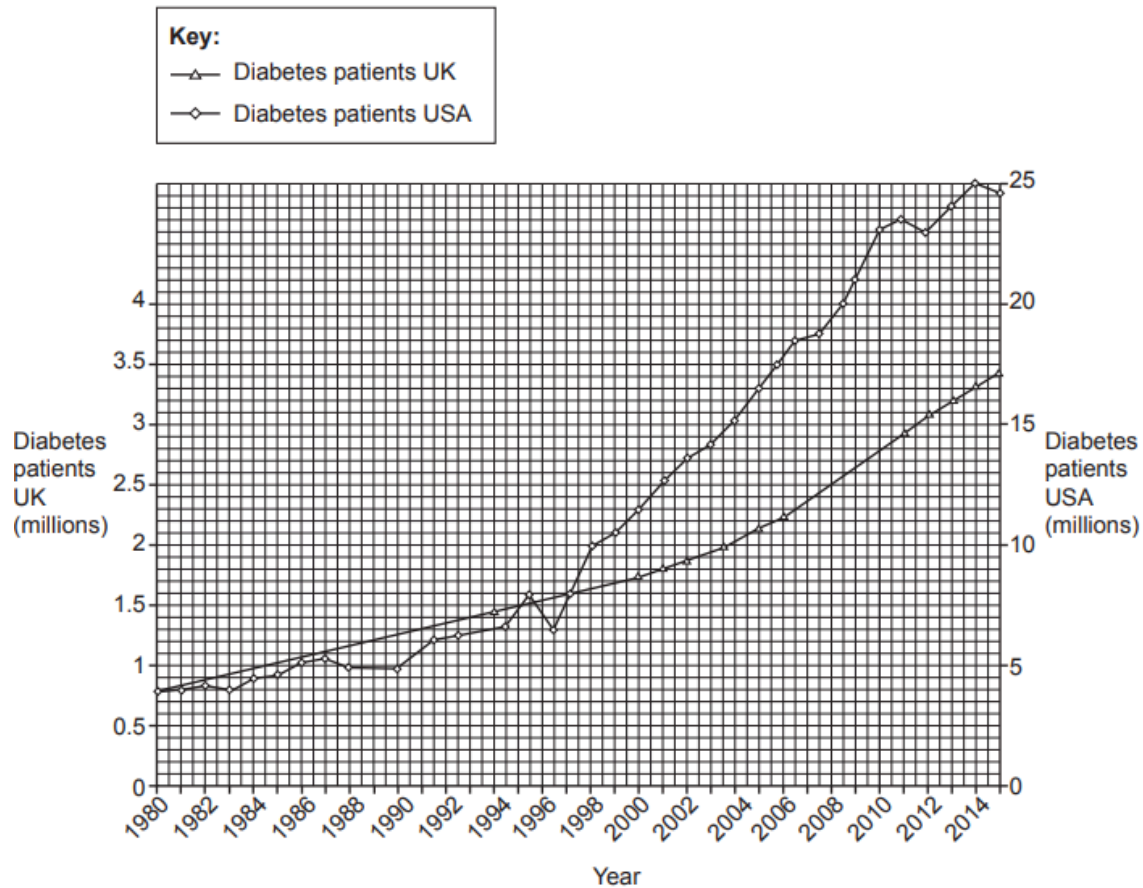
- (iii) Give **one** reason why a study such as this should have a large sample size.

.....
..... [1]

Q17 (2022)

A)

22 The graph shows the number of patients with diabetes in the UK and the USA from 1980 to 2015.



(a) How many patients had diabetes in the UK in the year 2000?

Number = million [1]

B)

(b) Calculate the difference between the number of patients with diabetes in the UK and the number with diabetes in USA for the year 2000.

Number = million [2]

C)

(c) Describe how the number of patients with diabetes has changed in **both** countries from 1980 to 2015.

.....

.....

.....

..... [2]

D)

- (d) The numbers presented in this graph may not be accurate.

Suggest why.

..... [1]

Q18 (2023)

- 6 A lizard **cannot** regulate its body temperature in the same ways as a human.

Which method can a lizard use to **increase** its temperature?

- A Its blood vessels can constrict.
- B It can lie in the sun.
- C It can shiver.
- D It can sweat less.

Your answer

☐

[1]

Q19 (2023)

A)

- (b) (i) Stem cells are found in human embryos.

Describe what happens to stem cells as the embryo develops into a baby.

.....
.....
..... [2]

B)

- (ii) It takes one cell 12 hours to divide to produce two cells.

Starting with one cell, calculate how many cells there will be after 2 days.

Number of cells = [3]

Q24. (2024)

- 6 Which sentence describes the effect of gravity on the roots and shoots of a plant?

- A Both the roots and shoots grow downwards.
- B Both the roots and shoots grow upwards.
- C The roots grow downwards, and the shoots grow upwards.
- D The roots grow upwards, and the shoots grow downwards.

Your answer

☐

[1]

Q25. (2024)

17 An athlete is running a 10km race. They need to produce ATP in their cells during the race.

A)

(b) During the race, the athlete's body temperature increases.

Which of these responses will cool them down?

Tick (✓) **two** boxes.

Response	
Hairs stand up	
Increases sweat production	
Shivering	
Vasoconstriction of blood vessels	
Vasodilation of blood vessels	

[2]

B)

(e) Draw a line to connect the boxes that describe the urine produced by the athlete after the race.

Draw only **one** line.

High volume

Very concentrated urine

Low volume

Dilute urine

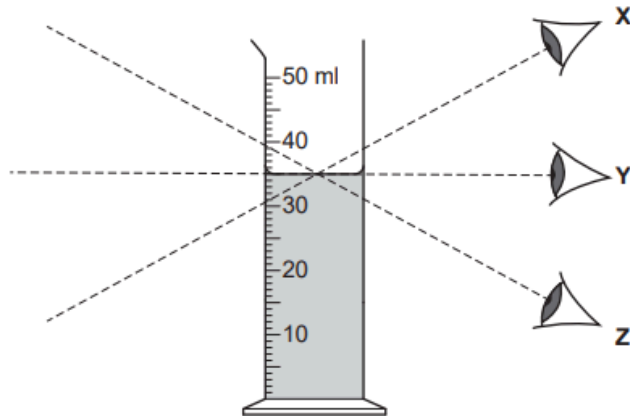
[1]

C)

- (f) A student records some data on the volume of urine produced by different athletes after the race.

Each athlete's urine is collected in a different measuring cylinder.

The diagram shows three eye positions where the student could view the level of the urine to measure the volume produced by a particular athlete.



Complete these sentences.

Put a ring around each correct option.

The student should always view the level of liquid from position **X / Y / Z**.

Viewing the liquid from different positions for the different athletes would introduce

sampling / random / systematic error into the measurement.

[2]