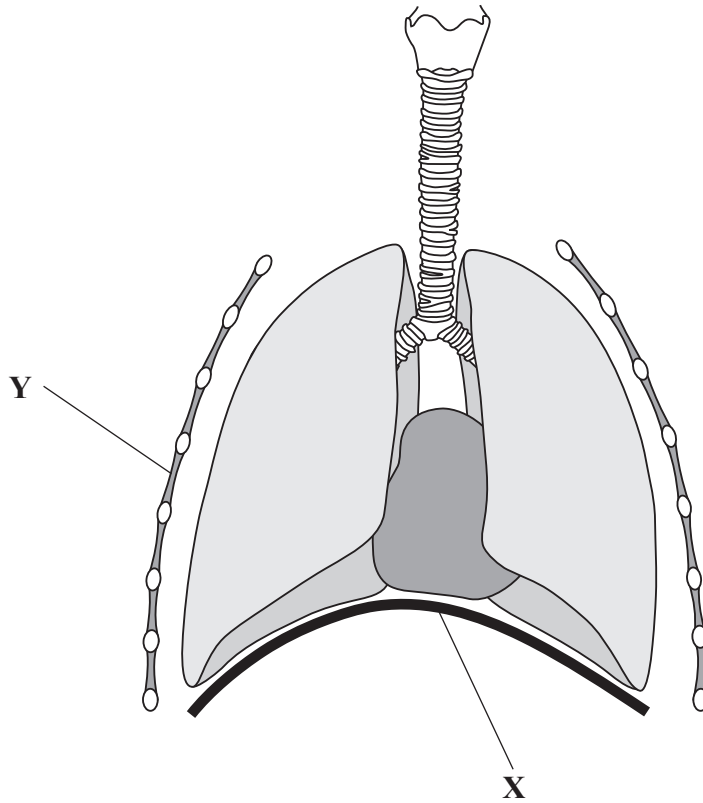


Answer ALL the questions.

1. The diagram below shows the human lungs and related structures.



(a) Name the parts labelled X and Y.

X

Y

(2)

(b) Describe and explain the role of structure X during breathing in.

.....
.....
.....
.....
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.....
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.....
.....

(4)



(c) Describe how and explain why the breathing of a man would change as he becomes more active.

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(3)

Q1

(Total 9 marks)



2. Fish farming is a way of providing protein for human and animal consumption.

(a) (i) Give the chemical elements present in protein.

..... (1)

(ii) Describe the role of protein in the human body.

.....
..... (1)

(iii) Describe a simple chemical test you could carry out to test a sample of fish for protein.

.....
.....
.....
..... (2)

(iv) What condition is shown by children who are unable to eat sufficient protein?

.....
..... (1)

(b) Fish farming has advantages over traditional ways of catching fish.

Give **two** advantages of farming fish.

1
.....
.....
2
.....
..... (2)



(c) Fish farming can, however, harm the local environment. Explain **two** harmful effects that fish farming might have on a local ecosystem.

1

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.....

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2

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.....

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(4)

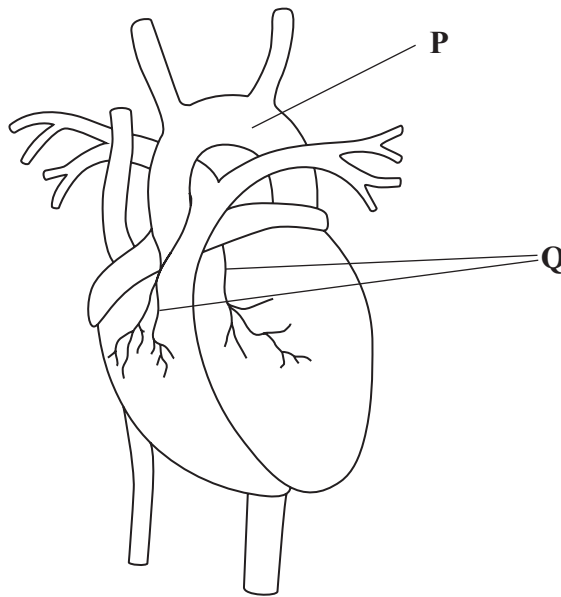
Q2

(Total 11 marks)

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3. The diagram below shows the human heart.



(a) Name the parts labelled **P** and **Q**.

P.....

Q.....

(2)

(b) The heart can be damaged if the blood vessel labelled **Q** is blocked. This blood vessel supplies the heart muscle cells with oxygen. The blockage causes the heart muscle cells to respire without oxygen and produce a toxic acid that can kill muscle cells.

(i) Name the process by which cells respire without oxygen.

.....

(1)

(ii) Name the toxic acid that can kill muscle cells.

.....

(1)

(iii) Describe how blood vessel **Q** can become blocked.

.....

.....

.....

.....

(2)



- (c) Some cells, known as stem cells, are found in the bone marrow. They are unspecialised and have the ability to divide and develop into specific types of cell.

Doctors hope to use stem cells to replace dead heart muscle cells. In this technique, stem cells will be obtained from the bone marrow of a person with a damaged heart and then injected into the affected area of the heart.

- (i) Name the type of cell division that takes place when stem cells divide.

.....
(1)

- (ii) Suggest why it is better to use stem cells from the same person rather than stem cells from a different person.

.....
.....
.....
.....
(2)

(Total 9 marks)

Q3



4. The table below shows some of the major groups of living organisms, their features and an example of each group.

Complete the table by writing the name of the missing groups, **two** features of plants and **one** example of each group in the empty boxes.

Group	Features	One example
Plants	1	Broad Bean
	2	
	1 Multicellular 2 Can usually move 3 Do not have cell walls	
	1 Feed on dead and decaying organisms 2 Do not carry out photosynthesis 3 Extracellular digestion	
Viruses	1 Very small 2 Can reproduce only in other cells	

(Total 7 marks)

Q4



5. The passage below is about kidney function. Complete the sentences in the passage by writing a suitable word or words on each dotted line.

One function of the human kidneys is to remove the waste products of metabolism.

This process is known as The kidney is made of thousands of tubules called Blood enters the kidney through small blood vessels that carry the blood at pressure. This pressure causes small molecules such as urea to be filtered out of the blood. Larger molecules such as are not removed and stay in the blood. Some useful molecules that are required by the body, such as , are later taken back into the blood. This process is known as selective

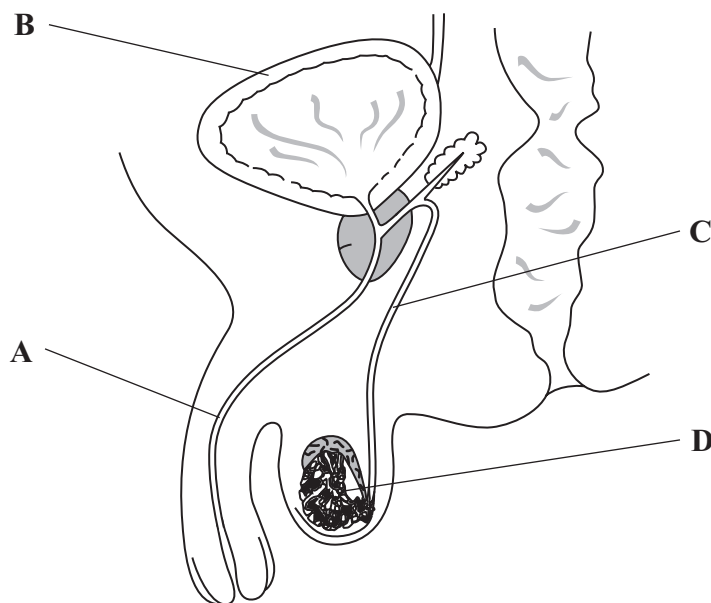
A second function of the kidneys is to control the water content of the blood. This is known as and is an example of , the maintenance of a constant internal environment. The hormone , released from pituitary gland, controls this process.

(Total 9 marks)

Q5



6. The diagram below shows the male reproductive system and part of the urinary system.



(a) Name the structures labelled **A**, **B** and **C**.

A

B

C

(3)

(b) Name **two** fluids that pass down tube **A**.

1

2

(2)

(c) (i) Give **two** functions that **D** carries out.

1

2

(2)

(ii) Suggest why structure **D** lies outside the body cavity.

.....

.....

(1)



(d) Explain why it is important that the female reproductive system has separate reproductive and urinary passages.

.....
.....
.....

(1)

Q6

(Total 9 marks)



7. (a) Describe the function in plants of each of the following mineral ions.

(i) Magnesium

.....
.....
.....
.....

(2)

(ii) Nitrate

.....
.....
.....
.....

(2)

(b) Explain how mineral ions are absorbed into the plant.

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.....
.....

(4)



(c) A farmer adds excess inorganic fertiliser to a field. Explain the harmful effects this may have on the crop.

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(4)

Q7

(Total 12 marks)

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8. Protein digestion produces amino acids. Phenylalanine is an amino acid that, in high concentrations, is harmful to nerve tissue. This causes a condition called phenylketonuria (PKU).

Fortunately, most people have a dominant allele (**D**) that makes an enzyme to convert phenylalanine into harmless tyrosine. The recessive allele (**d**) cannot make the enzyme. This means that people with the homozygous recessive genotype are at risk of PKU.

(a) (i) What is meant by the term homozygous?

.....
(1)

(ii) What are the **two** different genotypes of people who do not have PKU?

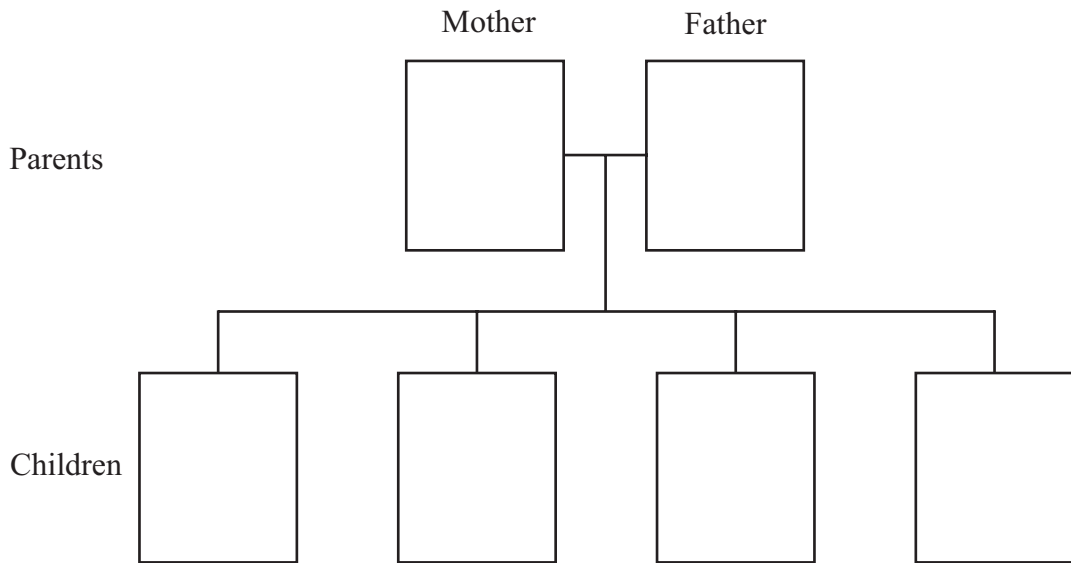
1

2

(2)



(b) (i) In the boxes below give the genotypes of the parents, and all the possible children, for a cross between a heterozygous mother and a heterozygous father. You should use the symbols **D** for the dominant allele and **d** for the recessive allele in your answer.



(2)

(ii) What is the probability of these parents producing a child with PKU?

..... (1)

(iii) What is the phenotype ratio of the children produced?

..... (1)

(c) When babies are born, a blood sample is taken by a doctor to test for PKU. Name the chemical substance in the blood sample that doctors want to measure.

..... (1)

(Total 8 marks)

Q8



9. The warning below was found on the side of a cigarette packet.

Smoking seriously damages your health and the health of those around you

(a) (i) Suggest why governments place warning notices on the sides of cigarette packets.

.....
.....
.....
.....

(2)

(ii) Describe ways in which smoking can damage ‘your health and the health of those around you’.

.....
.....
.....
.....
.....
.....
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.....
.....

(4)

(iii) Suggest why smokers find it hard to stop smoking.

.....
.....
.....
.....

(2)



(b) Mothers who smoke risk producing smaller babies than mothers who do not smoke. This is because cigarette smoke contains carbon monoxide.

Suggest how carbon monoxide can lead to the birth of smaller babies.

.....
.....
.....
.....

(2)

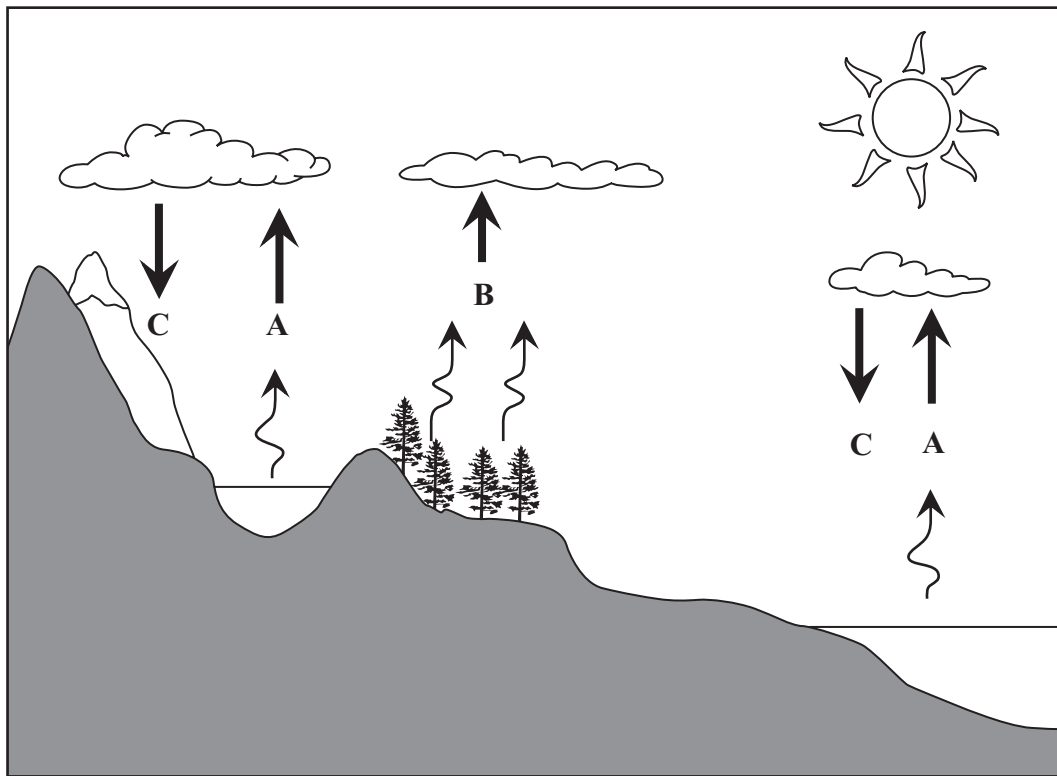
Q9

(Total 10 marks)

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10. The diagram below shows the water cycle.



(a) Name the processes **A**, **B** and **C** shown in the diagram.

A

B

C

(3)

(b) Explain the role condensation plays in the water cycle.

.....

.....

.....

.....

(2)



(c) Give **two** functions of water in animals.

1

.....

2

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(2)

(d) Explain the role of water in the germination of a seed.

.....

.....

.....

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.....

(3)

Q10

(Total 10 marks)

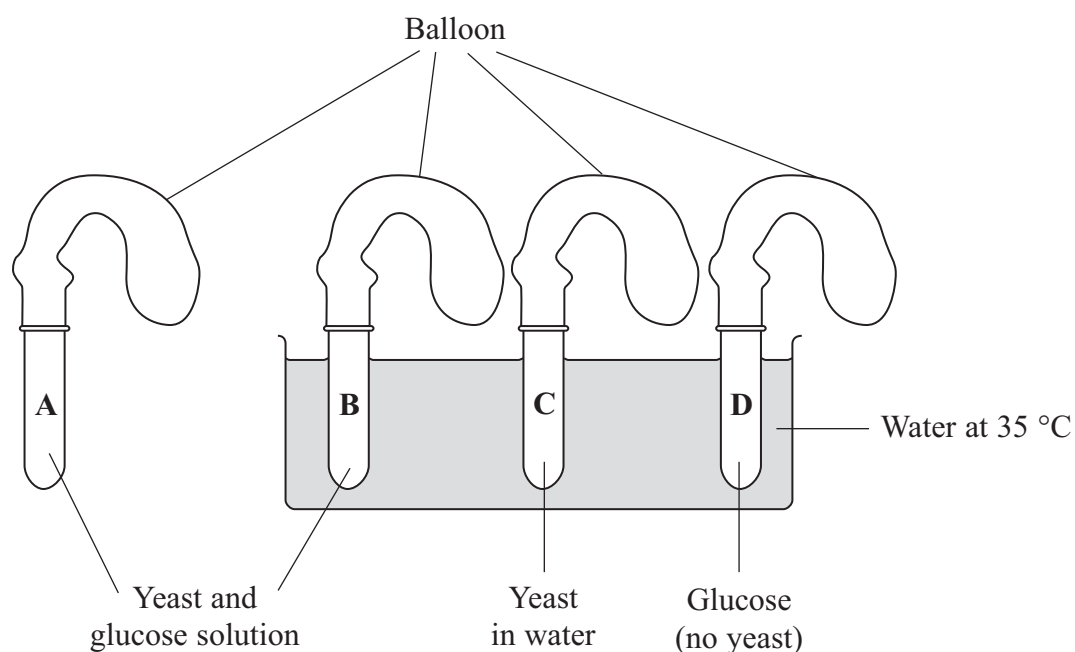
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11. The diagram below shows the apparatus at the start of an investigation into the ability of yeast to produce the gas that makes bread rise.

Test tubes A and B each contained the same volume of yeast mixed with glucose solution. Test tube C contained yeast in water, but no glucose. Test tube D contained glucose solution, but no yeast.

Test tube A was placed in room temperature at 20 °C. The other test tubes were placed in a warm water bath at 35 °C. A balloon was put over the opening of each tube.



The table describes the appearance of the balloons after 15 minutes. Some inflate (fill up with gas), others do not.

Tube	Appearance of balloon after 15 minutes
A	slightly inflated
B	very inflated
C	no change
D	?



(a) (i) Explain why the balloons on tubes **A** and **B** inflated (filled with gas).

.....
.....
.....
.....

(2)

(ii) Explain why the balloon on tube **B** inflated more than the balloon on tube **A**.

.....
.....
.....
.....

(2)

(b) Why did the balloon on tube **C** not show any change?

.....
.....

(1)

(c) Describe the appearance you would expect the balloon on tube **D** to have at the end of the experiment.

.....

(1)

Q11

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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