

Leave
blank

Answer ALL the questions.

1. The table below shows some features that may or may not be present in four main groups of organisms.

Complete the table to match the features to the groups.

Write **Always** if they all have the feature, **Never** if none of them have the feature or **Sometimes** if some examples have the feature and some do not.

Group	Are multicellular	Have cell walls	Can carry out photosynthesis
Plants			Always
Animals	Always		
Fungi	Sometimes		
Bacteria		Always	

Q1

(Total 4 marks)



Leave
blank

2. The table below shows various diseases, the organisms that cause them and how the diseases are spread.

Complete the table by writing a suitable word or words in each empty box. Some have been done for you.

Disease	Type of organism	How spread
Athlete's foot	Fungus	Contact
AIDS		
Cholera		
Amoebic dysentery		Water

Q2

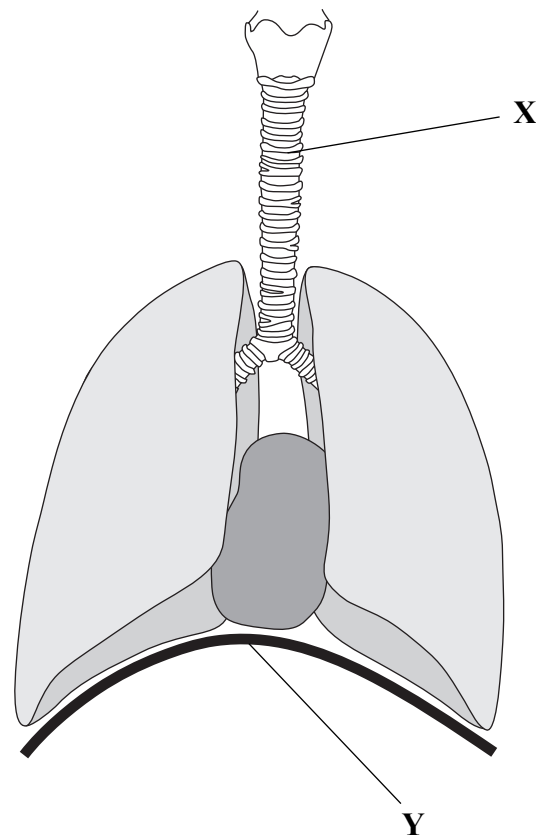
(Total 5 marks)

3

Turn over



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



(a) Name the parts labelled X and Y.

X

Y

(2)

(b) The table below shows the concentration of oxygen and of carbon dioxide in blood entering and leaving the lungs.

Gas	Concentration of the gas in cm ³ per 100 cm ³ of blood	
	Blood entering lungs	Blood leaving lungs
Oxygen	10.6	19.0
Carbon dioxide	58.0	50.0



BLANK PAGE



Leave blank

4. The technique of genetic modification can be used to produce proteins useful to humans.

The table below shows the steps taken during the genetic modification of bacteria to enable them to produce human insulin.

(a) Complete the table by using numbers to show the correct order of the steps. The first and last steps have been done for you.

Step	Order of step
Restriction enzyme cuts human DNA	1
Transgenic bacteria cultured in a fermenter	
Ligase used to join pieces of DNA together	
Large amounts of insulin manufactured	6
Restriction enzyme cuts plasmid DNA	
Recombinant plasmid inserted into bacteria	

(4)

(b) Explain how insulin produced by genetically modified bacteria can help certain people who produce too little insulin.

.....

.....

.....

.....

.....

.....

(3)

Q4

(Total 7 marks)



5. John used the internet to find out about global warming.



Why are people worried about global warming?

He found out that the problem is due to an increase in the greenhouse effect. This effect is caused by an increase in the gases that prevent infrared radiation escaping from the atmosphere into space.

The table below shows the relative contribution made to the greenhouse effect by five common greenhouse gases. Each contribution depends upon the abundance of the gas in the atmosphere multiplied by its 'greenhouse factor'. The greenhouse factor is a measure of its effectiveness as a greenhouse gas.

Gas	Abundance in atmosphere (% by volume)	Greenhouse factor	Relative contribution to greenhouse effect
Water vapour	1	0.1	0.1
Carbon dioxide	0.037		0.037
Methane	0.00018	20	
Nitrous oxide	0.000031	310	0.00961
CFCs	0.000000026	3800	0.0000988

(a) (i) Complete the table by writing in the empty boxes the greenhouse factor for carbon dioxide and the relative contribution to the greenhouse effect made by methane. (2)

(ii) Which gas contributes the most to the greenhouse effect?

..... (1)



Leave
blank

(b) Reducing the amount of these gases being released into the atmosphere would reduce the greenhouse effect and its contribution to increased global warming.

(i) Give **two** different ways in which the amount of carbon dioxide released into the atmosphere could be reduced.

1

.....

2

.....

(2)

(ii) Describe the consequences of global warming.

.....

.....

.....

.....

.....

.....

.....

.....

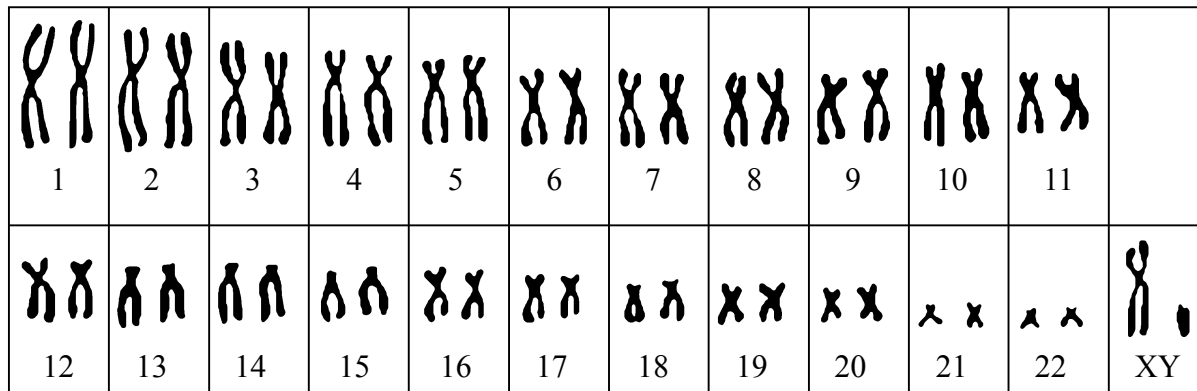
(4)

Q5

(Total 9 marks)



6. The diagram below shows all the chromosomes visible in a human cell during mitosis. The chromosomes have replicated their DNA. In the diagram they have been arranged in pairs and each pair has been given a number.



(a) (i) What is the diploid number of this cell?

..... (1)

(ii) What is the sex of the person that this cell was taken from? Give a reason for your answer.

.....

 (2)



Leave
blank

(b) Different genes are found on different chromosomes. The gene for turning cholesterol (fat) into testosterone is found on chromosome 10.

(i) Name the place in the human body where testosterone is made.

.....
(1)

(ii) Give **one** role of testosterone in the body.

.....
(1)

(iii) Suggest how converting cholesterol into testosterone might help to reduce heart disease.

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

(c) The gene for cystic fibrosis is found on chromosome 7. Cystic fibrosis is an inherited condition. People with cystic fibrosis produce abnormally sticky mucus in the small tubes of the lung.

Suggest how cystic fibrosis might affect gas exchange.

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

(Total 9 marks)

Q6



BLANK PAGE



Leave
blank

7. Complete the table below to place the levels of organisation in the correct order, where 1 is the lowest and 5 is the highest. Two have been done for you.

Give an example of each of the five levels. One has been done for you.

Level of organisation	Order	Example
Cell	2	
Organ	4	
Organelle		
System		
Tissue		Mesophyll

Q7

(Total 5 marks)

13



Turn over

8. Malaria is one of the leading causes of sickness and death in the developing world. According to the World Health Organization (WHO), the disease infects up to 500 million people every year resulting in about 2.7 million deaths.

(a) Calculate the percentage of infected people who are killed by malaria. Show your working.

Answer %
(2)

(b) Malaria is caused by a pathogen that is spread from person to person by an insect vector (mosquito).

(i) What is meant by the term **pathogen**?

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

(ii) How do mosquitoes spread the pathogen from person to person?

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



Leave blank

(c) Mosquito nets sprayed with insecticide and put over beds at night can be used to help control the spread of malaria. The WHO estimates these nets could reduce the 2.7 million deaths by 20%.

(i) How many lives could be saved by the use of these nets?

.....
(1)

(ii) The table below shows some methods used to control the spread of malaria. Complete the table by describing how each method helps to control the spread of malaria. The first one has been done for you.

Method	Description
Draining ponds	Kills mosquito larvae
Biological control	
Tablets containing drugs	
Vaccines	
Chemical repellents	

(4)

Q8

(Total 10 marks)



9. The table below shows the mass of certain food components in 100 g of liquid milk and in 100 g of dry powdered milk.

Food component	Mass of food component in g per 100 g	
	Liquid milk	Dry powdered milk
Water	87.4	4.1
Carbohydrate	2.0	36.9
Fat	1.7	28.7
Protein	1.8	21.6

(a) (i) How much carbohydrate would be in 50 g of liquid milk?

.....
(1)

(ii) How much more fat is contained in 100 g of powdered milk than in 100 g liquid milk?

.....
(1)

(iii) Which of the food components listed in the table contains all the elements carbon, hydrogen, oxygen, nitrogen and sulphur?

.....
(1)

(iv) The food components in the table are all needed in a balanced diet. Name **two** other food components, not listed in the table, that are needed in a balanced diet.

1

2

(2)

(b) Describe a simple test you could carry out to test a food sample for fat (lipid).

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

(2)



(c) Mothers feed their babies on milk. Describe what happens to the fat in milk in the gut of a baby.

.....

.....

.....

.....

.....

.....

(3)

(Total 10 marks)

Leave
blank

Q9



BLANK PAGE



Leave
blank

10. The table below contains incomplete biological statements. Complete each statement by writing the correct number in each box. The first statement has been done for you.

Statement	Number
The number of blood vessels taking blood into the chambers of the heart is	2
The number of chromosomes in a human sperm cell is	
The number of chromosomes in a red blood cell is	
The number of hormones released by the ovary is	
The number of different types of cell in a typical leaf that contain chloroplasts is	
The number of enzymes released by the pancreas that digest fat is	

(Total 5 marks)

Q10



11. Plants carry out photosynthesis, which enables them to manufacture the food they need for growth.

(a) Explain how each of the following changes in the environment might affect the rate of photosynthesis.

(i) An increase in temperature from 10 °C to 20 °C

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

(3)

(ii) An increase in light intensity

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

(2)



Leave
blank

(b) Explain how the uptake of mineral salts by the process of active transport is also important in the growth of plants.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(3)

Q11

(Total 8 marks)



12. Humans regulate the amount of water contained in the body. This means that the volume of water entering the body must equal the volume of water leaving the body.

(a) (i) Water enters the body through food and drink. Give **one** other source of water for cells in the body.

.....
(1)

(ii) Water leaves the body in the urine and in the faeces. Give **one** other way that water is lost from the body.

.....
(1)

(b) The body is also able to regulate its temperature.

(i) Describe how the skin contributes to temperature regulation when the body is exposed to an increased external temperature.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
(4)

(ii) Explain how increased external temperature can affect the water balance in the body.

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



(c) Suggest **two** advantages of being able to regulate body temperature.

1

.....

2

.....

(2)

(Total 10 marks)

Leave
blank

Q12

--	--



Leave blank

13. A symptom of many human infections is fever. Fever raises the body temperature and can help the body defend itself from infection. Human pathogens thrive best at 36.8 °C. Raising the temperature a few degrees can help to defend against pathogens by activating the immune system to make more white blood cells. However, very high fevers, with temperatures above 40 °C, can cause brain damage.

(a) Explain how white blood cells help defend against infection.

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

(4)

(b) Suggest **two** ways that someone with a very high fever can be treated to lower their body temperature in order to avoid brain damage.

1

2

(2)

Q13

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

END

