GCSE

Specimen Papers and Mark Schemes

Edexcel GCSE Biology A (1520)

For First Examination Summer 2003

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Contents

Centre Number						Paper Reference **1522/1F**		Surname	Other Names
Candidate Number						Paper Reference **1520/1F**		Signature	

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1522/1F 1520/1F

Edexcel GCSE

Science: Double Award A **[1522]**
Paper 1F

Biology A **[1520]**
Paper 1F

FOUNDATION TIER
Specimen Paper

Time: 1 hour 30 minutes **N0000**

Materials required for the examination
None

Items included with these question papers
None

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your signature, your surname and other names, then tick the box to show the correct paper reference for your examination.

The paper reference is shown below the boxes. If more than one paper reference is shown, you should tick the one for which you have been entered.

Answer ALL questions in the spaces provided in this book.

Show all stages in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

This paper has 12 questions. There are no blank pages.

Advice to Candidates

This symbol shows where the quality of your written answer will also be assessed.

Additional Answer Sheets may be used.

Turn over

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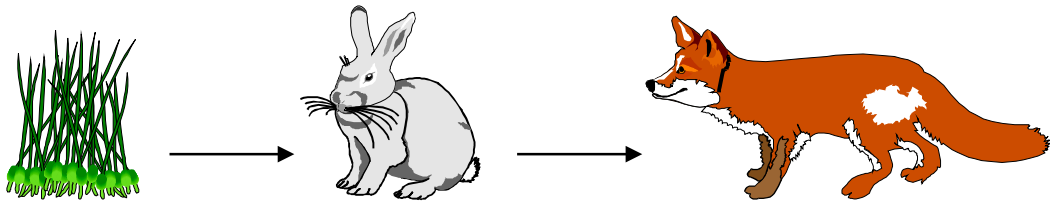
Leave blank

1. The diagram shows a food chain in a field.



(a) In the space below, draw and label a pyramid of biomass for this food chain.

(2)

(b) There are plans to build a factory on the field.

(i) What will happen to the number of rabbits and foxes if the factory is built?

.....

.....

(1)

(ii) Give reasons for your answer.

.....

.....

.....

(2)

(Total 5 marks)

Leave blank

2. Use a word or phrase from the box to complete each sentence.

The first one has been done for you.

increases	**decreases**	**stays the same**

After injecting with a used needle, the chance of getting hepatitis A ……increases……..

After taking an antibiotic, the number of disease-causing microorganisms in the body …….

After taking heroin, the amount of pain felt .....

For regular smokers, the chance of developing lung cancer .....

When a person is healthy, the number of white blood cells .....

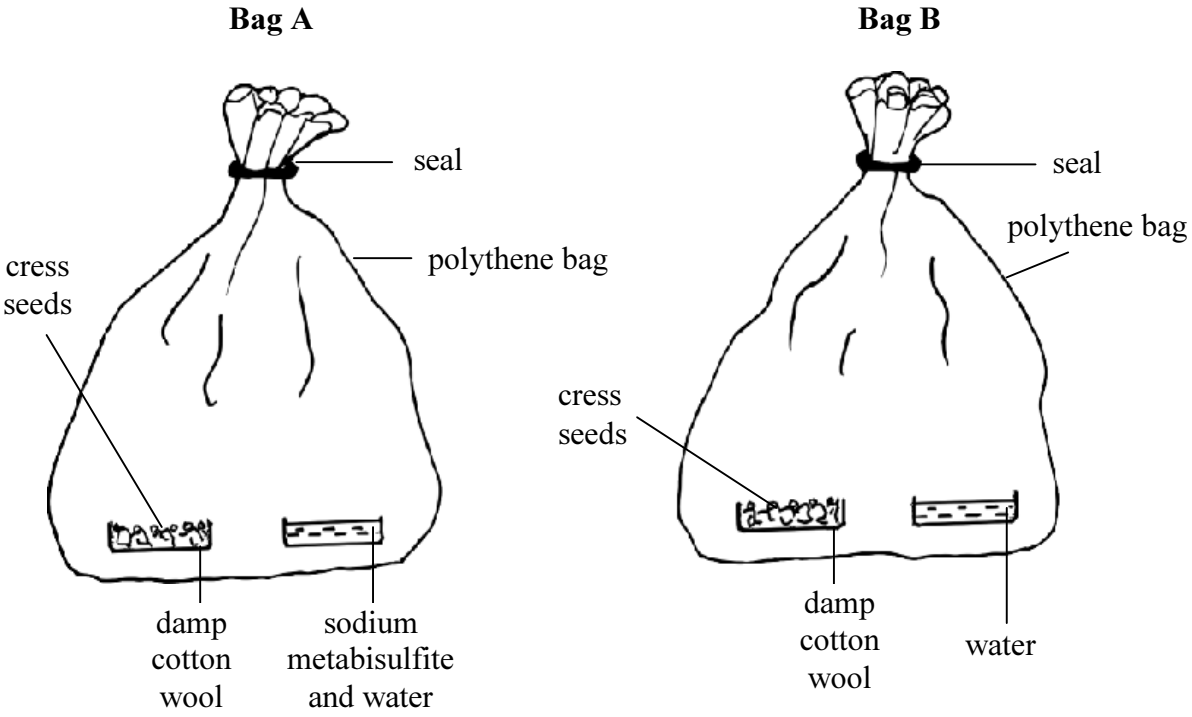
(4)

(Total 4 marks)

TURN OVER FOR QUESTION 3

Leave blank

3. Two bags, **A** and **B**, were used to investigate the effect of sulfur dioxide on the germination of cress seeds. The mixture of sodium metabisulfite and water released sulfur dioxide gas slowly in bag **A**.



(a) Give **one** reason why the bags were sealed.

.....

(1)

(b) What is the purpose of using bag **B**?

.....

(1)

(c) Give **two** conditions that must be kept the same for each bag in this investigation.

1 .....

2 .....

(2)

Leave blank

(d) The sulfur dioxide passed from the dish with the sodium metabisulfite and water to the cress seeds. Tick **one** box to show the correct method.

diffusion ☐

osmosis ☐

evaporation ☐

transpiration ☐

(1)

(e) The table shows the result of the investigation.

	Bag A	**Bag B**
Number of seeds	20	20
Number of seeds germinated	0	15

(i) What percentage of seeds germinated in bag **B**?

.....

(1)

(ii) What effect did sulfur dioxide have on the germination of cress seeds?

.....

(1)

(Total 7 marks)

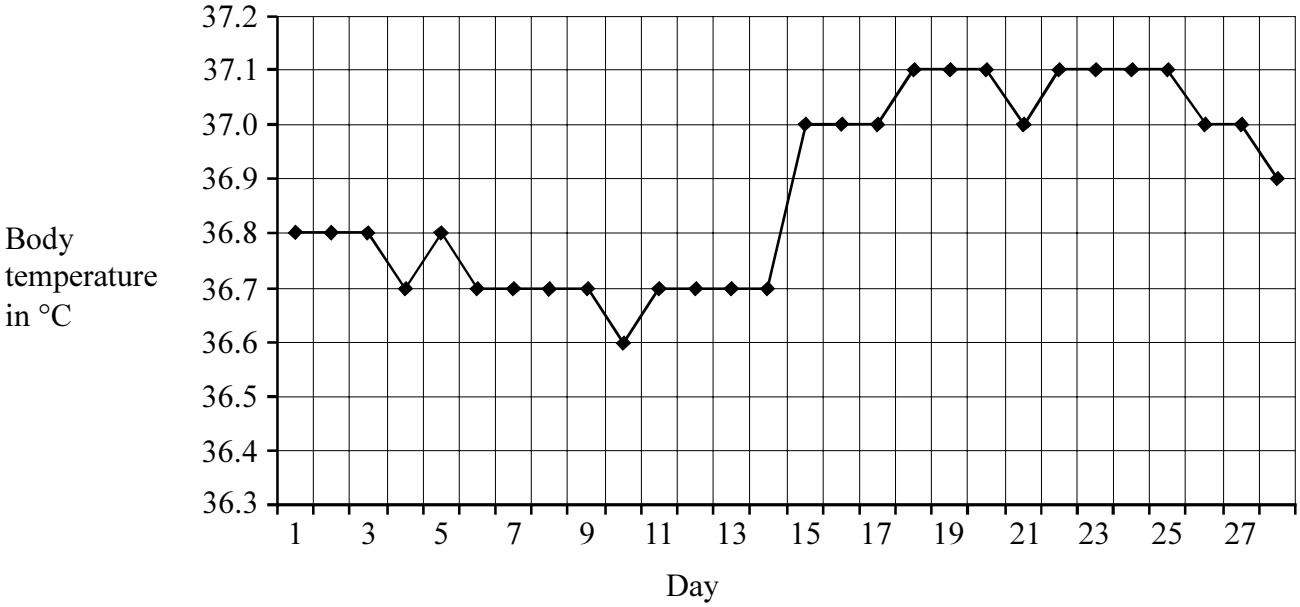
TURN OVER FOR QUESTION 4

Leave blank

4. For a woman to become pregnant, a sperm must fertilise one of her eggs. Just before an egg is released from an ovary, her body temperature rises slightly.

A woman who wanted to become pregnant measured her body temperature each day for 28 days, starting on the first day of her period.

A graph of her body temperature is shown below.



(a) (i) What was the body temperature of the woman on day 19?

..... °C

(1)

(ii) On which day was an egg released from the woman's ovary?

.....

(1)

(iii) What instrument is used to measure her body temperature?

.....

(1)

Leave blank

(b) During the 28 days, the woman's ovary released two different hormones, hormone H and progesterone. The table shows some roles of these hormones.

Hormone H	Progesterone
Repairs uterus lining	Maintains uterus lining
Develops secondary sexual characteristics	Prevents release of eggs

(i) Name hormone H.

.....

(1)

(ii) How does hormone H travel from the ovary to the uterus?

.....

(1)

(iii) Give **two** female secondary sexual characteristics.

1 .....

2 .....

(2)

(iv) Why is it important that progesterone maintains the uterus lining during pregnancy?

.....

.....

(1)

(Total 8 marks)

TURN OVER FOR QUESTION 5

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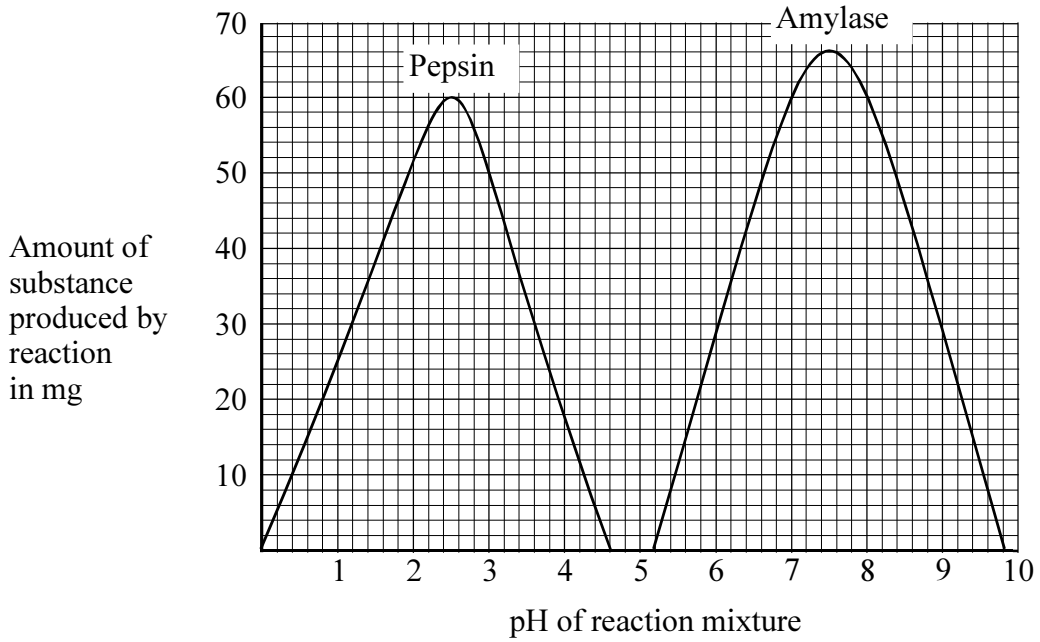
5. Experiments were carried out to investigate the action of two enzymes at different pH values. The enzymes were amylase and pepsin (a protease). All experiments were carried out at 37 °C for 20 minutes. The results are shown on the graph below.



(a) How much substance was produced in the pepsin-controlled reaction at pH3?

.....mg

(1)

(b) At which pH values were 60 mg of substance produced by:

(i) pepsin.....

(1)

(ii) Draw a line on the grid to show what you would expect the result to be with amlyase at 37 °C for 10 minutes.

(2)

(c) Which substance is produced when:

(i) pepsin acts on protein:

.....

(1)

(ii) amylase acts on starch?

.....

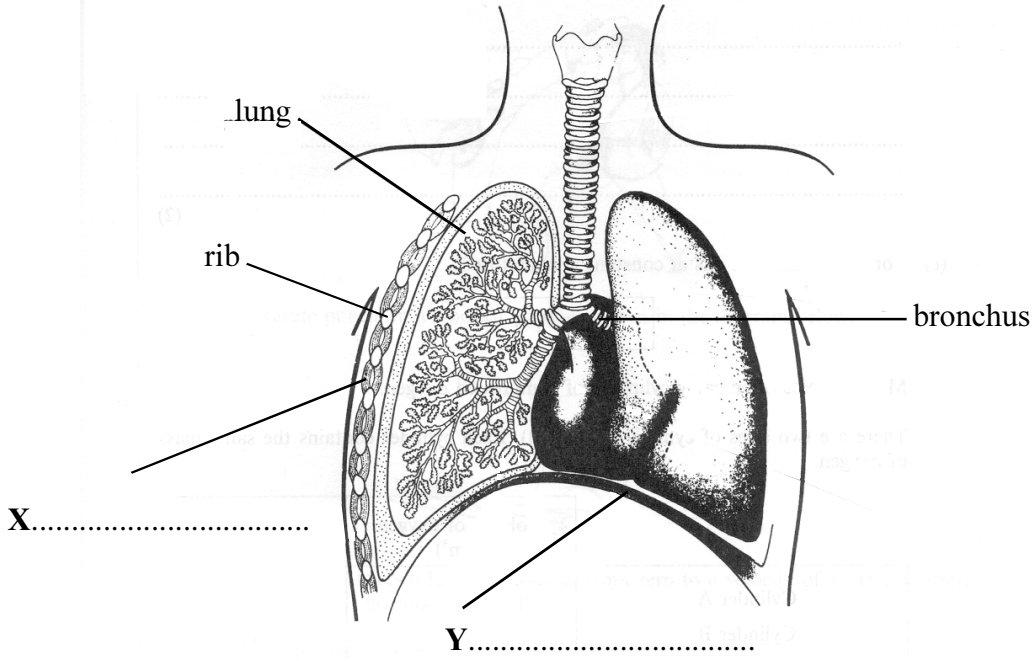
(1)

(Total 6 marks)

TURN OVER FOR QUESTION 6

Leave blank

6. The diagram shows parts of the human thorax.



(a) Label **X** and **Y**.

(2)

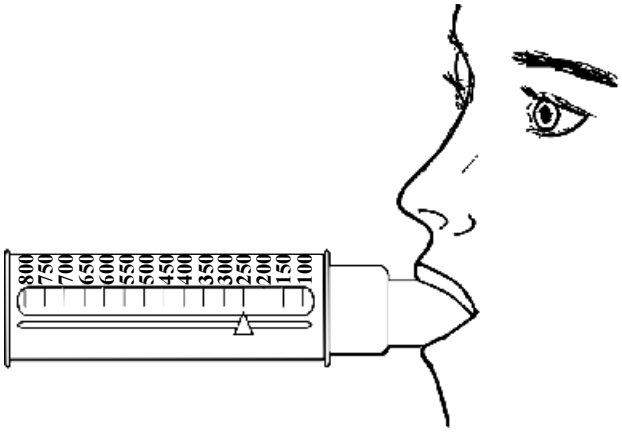
(b) People with asthma sometimes have difficulty in breathing. This happens when the small air tubes of their lungs become narrow. This makes it more difficult to get air into and out of their lungs.

Underline the name for the small air tubes in the lungs.

alveoli **bronchioles** **capillaries** **trachea**

(1)

(c) It is possible to find out how asthma affects breathing by using apparatus called a peak flow meter. The person blows as hard as possible into the meter as shown in the diagram below. If the person has asthma, low readings are obtained.



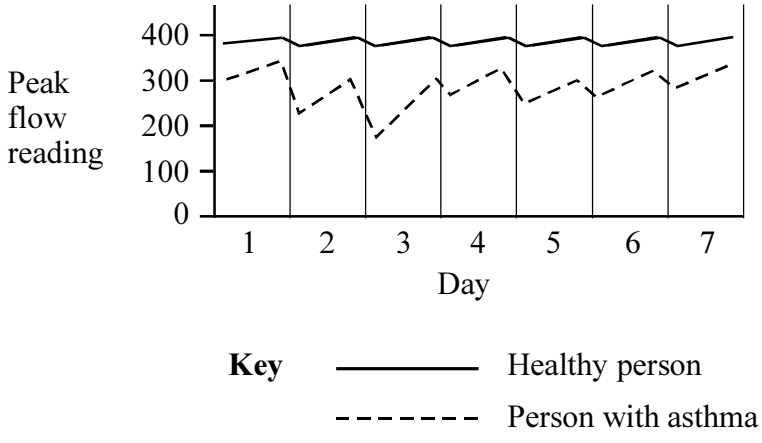
What is the reading on the peak flow meter?

.....

(1)

Leave blank

(d) Readings were taken every morning and evening for seven days from a healthy person and from a person with asthma. The results are shown on the peak flow chart below.



(i) Use the chart to find the day on which breathing was most difficult for the person with asthma.

Day .....

(1)

(ii) The healthy person's readings are different from the person's with asthma.
State **two** ways in which they are different.

1 .....

2 .....

(2)

(iii) A person blowing into a peak flow meter obtained a reading of 230.
Does this suggest that this person suffers from asthma?
Give a reason for your answer.

.....

.....

(1)

(e) Drugs used to relieve asthma are called bronchodilators. Suggest what these drugs do.

.....

.....

.....

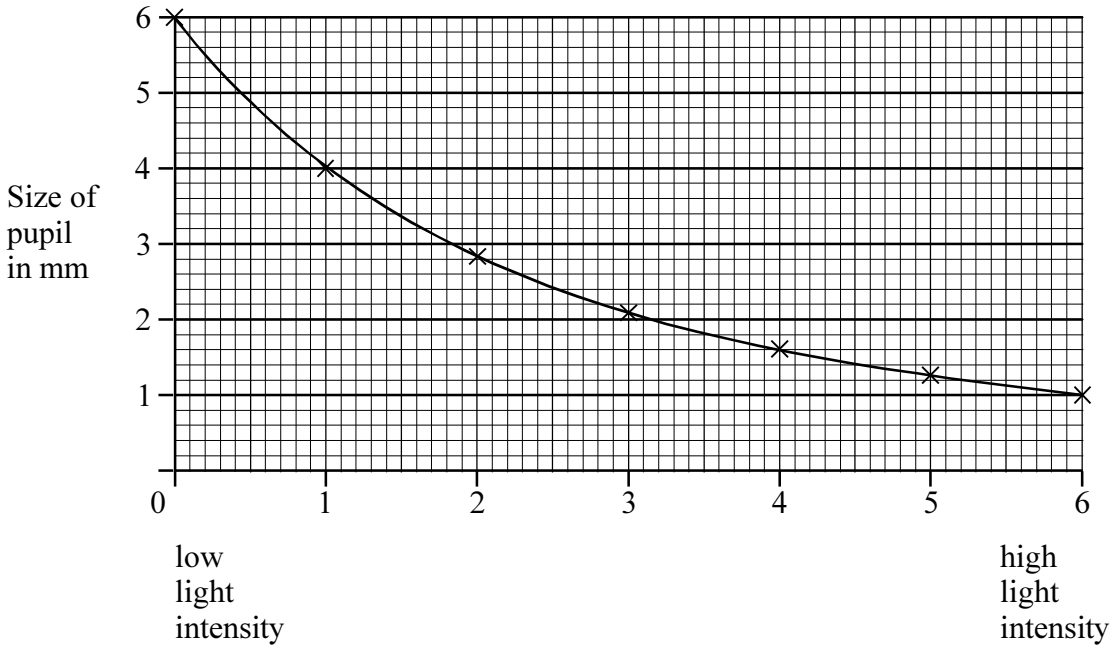
(2)

(Total 10 marks)

TURN OVER FOR QUESTION 7

Leave blank

7. The graph shows the size of the pupil in a student's eye in different light intensities.



(a) Use the graph to answer the questions below.

(i) How many readings were taken to produce the data for the graph?

.....

(1)

(ii) What was the size of the pupil at a light intensity of 6?

Answer……mm

(1)

(iii) How does the size of the pupil vary with the light intensity?

.....

.....

(2)

(b) Use words from the box to complete the passage.

brain	**iris**	**muscle**	**optic**	**retina**

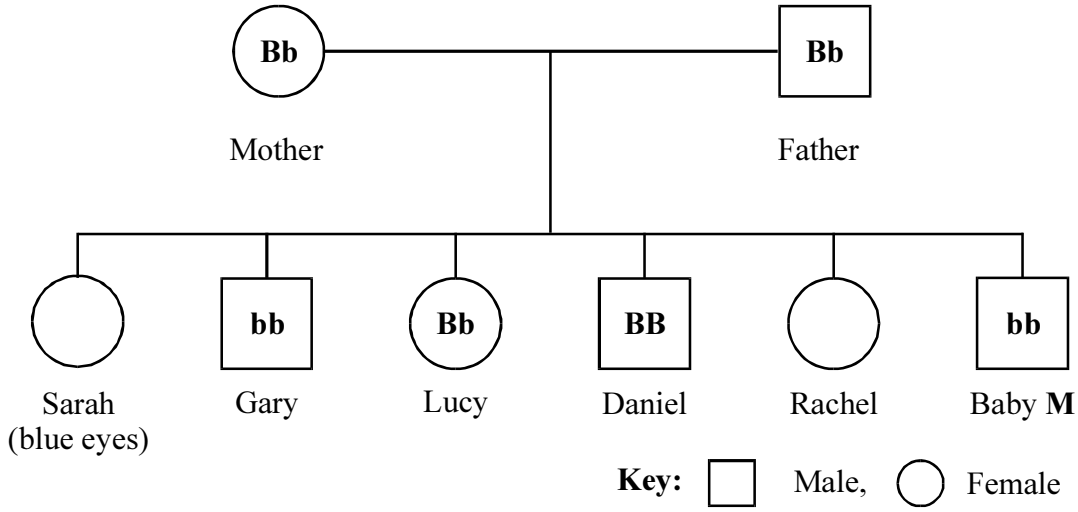
Light is detected by cells in the ……. An electrical impulse is then sent to the ……. along the ……. nerve. Another impulse is then sent to the ……. tissue of the …….

(5)

(Total 9 marks)

Leave blank

8. The diagram below shows the inheritance of eye colour in a family The allele for brown eyes is dominant (**B**) and the allele for blue eyes is recessive (**b**).



(a) Which of the following statements is true?

A Lucy and Daniel both have blue eyes
B Lucy and Daniel have different coloured eyes
C Lucy and Daniel have the same coloured eyes
D All the males in the family have brown eyes

Write the correct answer (**A**, **B**, **C** or **D**) in the box. ☐

(1)

(b) (i) What is the sex and eye colour of baby **M**?

.....

(2)

(ii) How was the sex of baby **M** determined at fertilisation?

.....

.....

(2)

(c) In the family shown, Rachel has an identical twin. Rachel has brown eyes.

(i) Who is Rachel's identical twin? .....

(1)

(ii) Explain how you decided on your answer.

.....

.....

.....

(2)

(Total 8 marks)

Leave blank

9. The passage below is about Charles Darwin.

Who Inspired Darwin?

Thomas Malthus lived in the early 19th century. He wrote 'An Essay on the Principle of Population.' In this essay he pointed out that human beings produce far more offspring than ever survive. However, the adult population tends to remain stable from generation to generation.

Darwin realised that this idea applies to other animals. For example, one fish, which lays thousands of eggs in a year, would over-populate an area with its offspring if they all survived.

The work of Malthus helped Darwin to develop his own ideas of how a species changes. He produced his theory of natural selection. Darwin realised that there must be a reason why some offspring survived but others did not. He suggested that small variations between individuals of a species might give certain individuals a better chance of survival. For example, those organisms with characteristics that made them better at escaping from predators or finding food would have a better chance of

(a) (i) What is meant by the phrase "the adult population tends to remain stable from generation to generation"?

.....

.....

.....

.....

(2)

(ii) Suggest why fish lay thousands of eggs rather than just a few.

.....

.....

.....

.....

(2)

(iii) What can cause "small variations between individuals of a species"?

.....

.....

(1)

Leave blank

(iv) What is meant by the phrase **natural selection**?

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(b) Here are four statements about evolution. Tick the box beside the statement that is false.

The theory of evolution was developed by Darwin	☐
DNA is the genetic material that transfers information from generation to generation	☐
Acquired characteristics **cannot** be passed on from parent to offspring	☐
Nature plays an important part in artificial selection	☐

(1)

(c) Suggest **two** ways that scientists can let other groups of scientists know about their ideas.

1 .....

2 .....

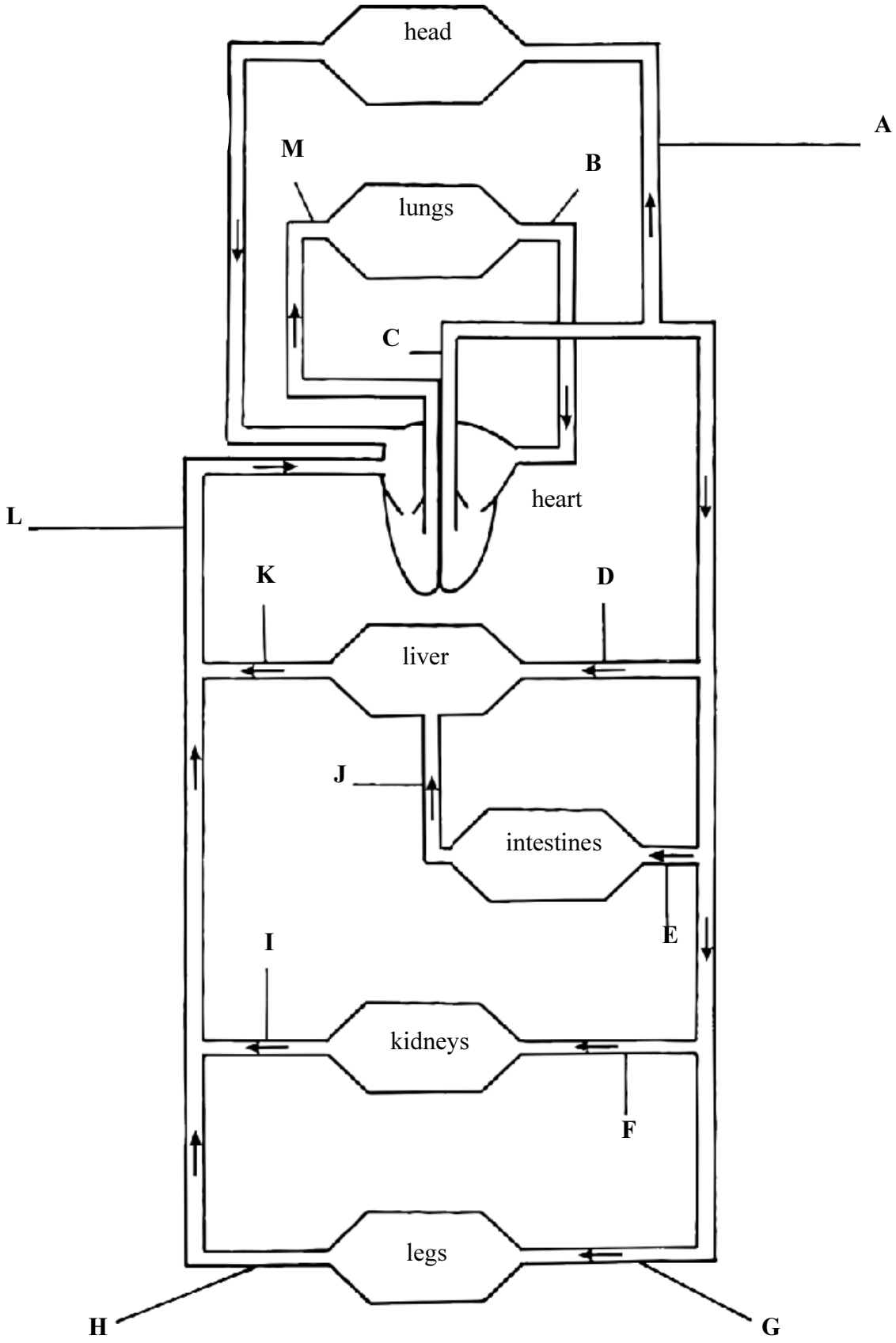
(2)

(Total 12 marks)

TURN OVER FOR QUESTION 10

Leave blank

10. The diagram shows a plan of the circulatory system. The blood vessels are labelled with letters.



Use the letters on the diagram to complete the sentences in the table.

Leave blank

The first one has been done for you.

Sentence	Letter
The blood vessel named the aorta is	**C**
The blood vessel containing blood pumped from the right ventricle is	
The blood vessel carrying blood with **least** carbon dioxide is	
The blood vessel carrying blood with **most** amino acids after a meal is	
The blood vessel containing blood at **lowest** pressure is	
The **first** blood vessel to transport inhaled solvents is	

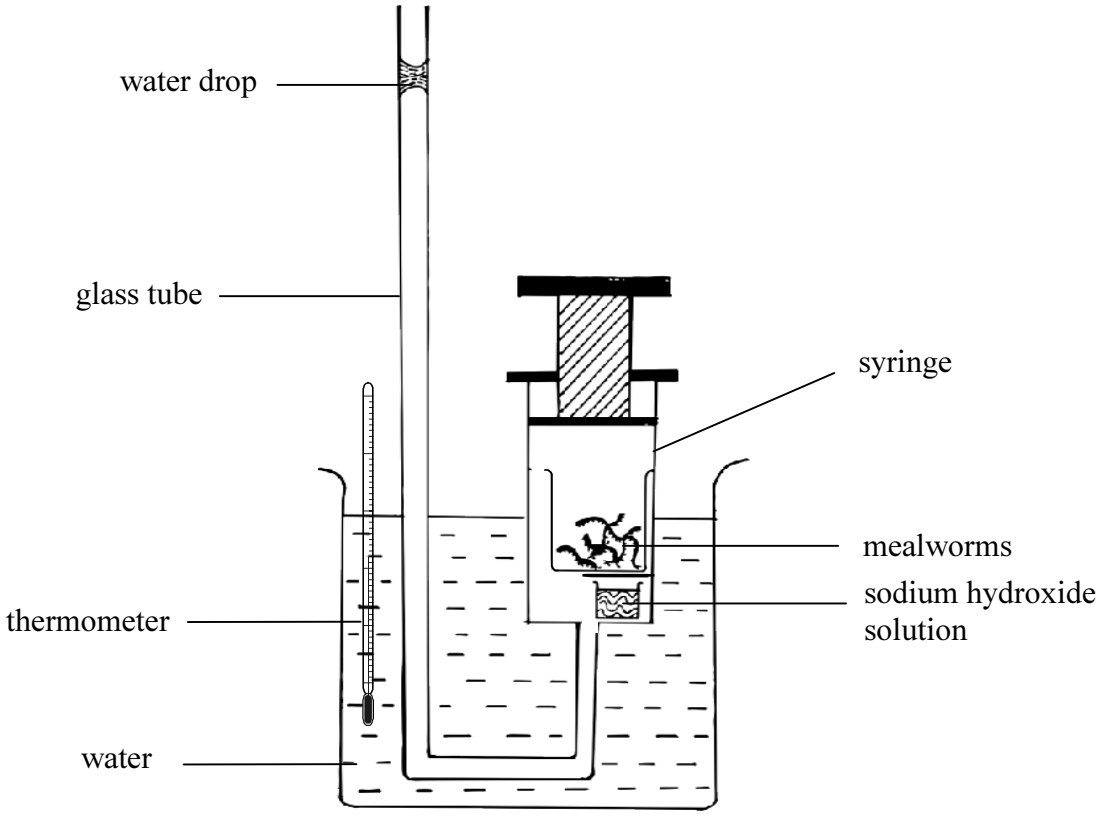
(5)

(Total 5 marks)

TURN OVER FOR QUESTION 11

Leave blank

11. This apparatus was used to measure the effect of temperature on the respiration rate of mealworms.



(a) (i) Name the gas absorbed by sodium hydroxide solution.

.....

(1)

(ii) Show on the diagram the direction of movement of the water drop.

(1)

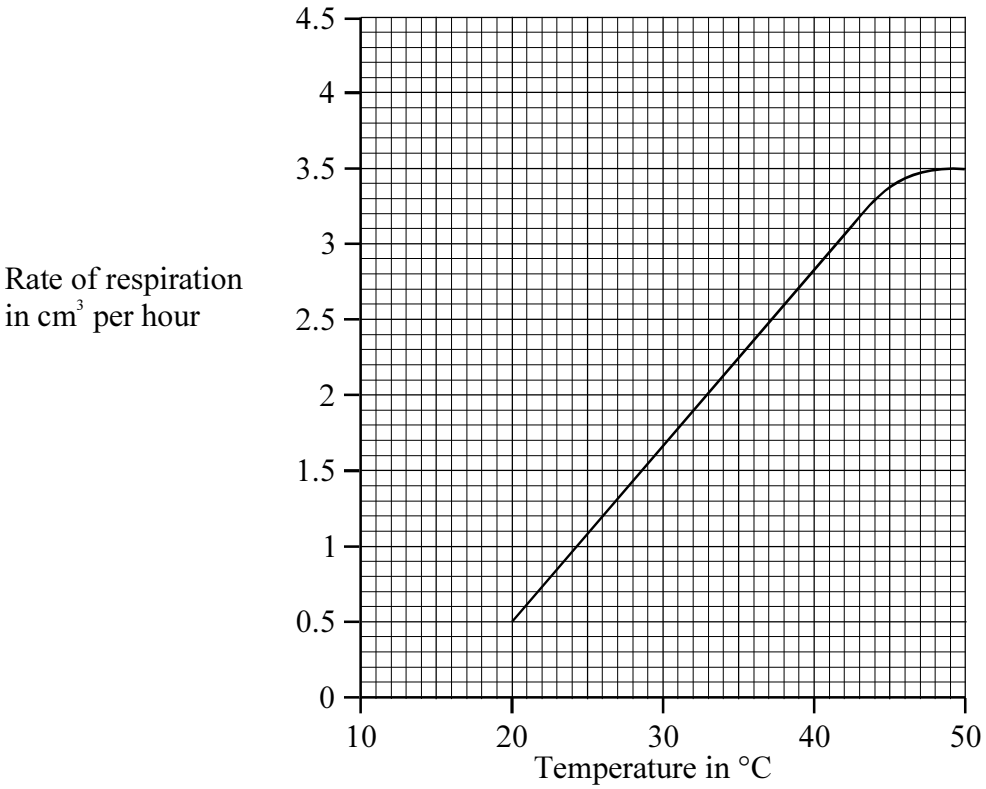
(iii) Give **one** difference between the apparatus shown and a suitable control apparatus.

.....

(1)

Leave blank

(b) The rate of respiration was measured at intervals from 20 °C to 50 °C. The graph shows the results of the investigation.



(i) Explain the results shown on the graph.

.....

.....

.....

.....

(2)

(ii) What was the rate of respiration at 37 °C?

.....

(1)

(iii) Suggest what would happen if temperatures above 50 °C were used.
Give a reason for your answer.

.....

.....

.....

.....

(2)

(Total 8 marks)

Leave blank

12. Algae are microscopic plants often found in water. They produce food by photosynthesis.

Researchers plan to grow large numbers of algae to help solve the world's energy crisis.

(a) Write a letter suggesting what the researchers could do in order to grow large numbers of the algae.

Dear Researchers,

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5)

(b) The algae can be used to make petrol. This would reduce the need to obtain fuel by destroying the world's forests.

Suggest **three** advantages of reducing the destruction of the world's forests.

1 .....

.....

2 .....

.....

3 .....

.....

(3)

(Total 8 marks)

TOTAL MARK 90

END

Centre Number						Paper Reference		Surname	Other Names
						1520/2F			
Candidate Number								Signature	

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1520/2F

Edexcel GCSE

Biology A [1520]

Paper 2F

FOUNDATION TIER

Specimen Paper

Time: 1 hour **N0000**

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

Materials required for the examination
None

Items included with these question papers
None

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your signature, your surname and other names.

The paper reference is shown in the top left hand corner.

Answer ALL questions in the spaces provided in this book.

Show all stages in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

This paper has 9 questions. There are no blank pages.

Advice to Candidates

This symbol shows where the quality of your written answer will also be assessed.

Additional Answer Sheets may be used.

Turn over

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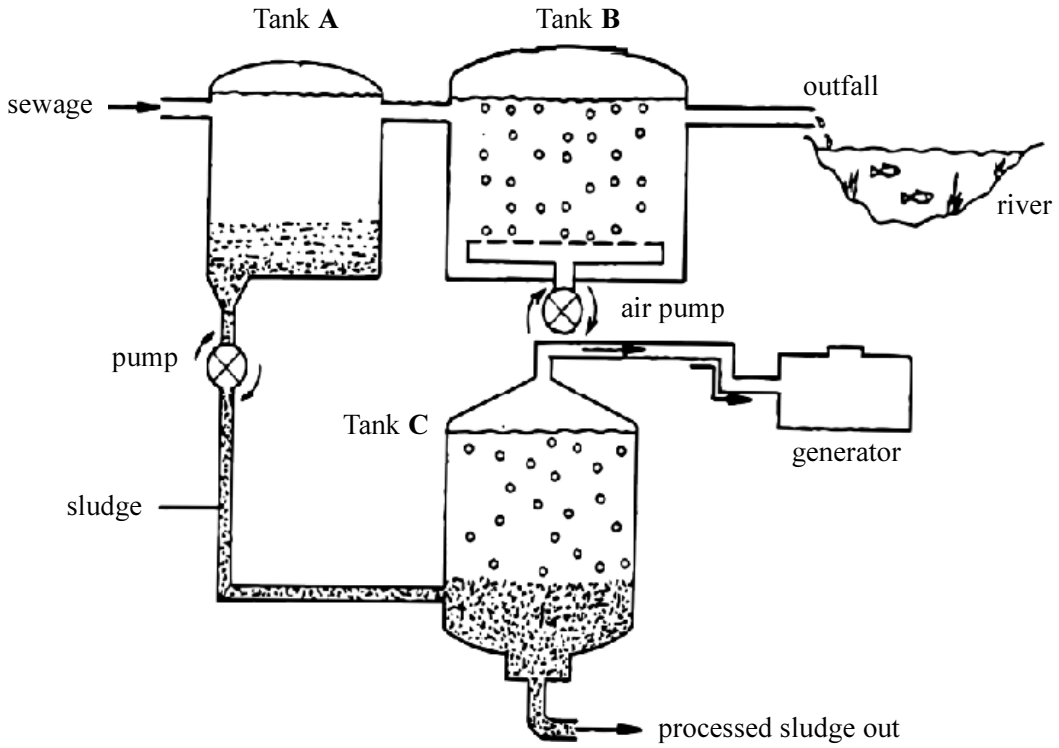
Leave blank

1. The diagram shows part of the equipment used in the **activated** sludge treatment of sewage.



The table describes stages of sewage treatment which take place in the tanks.
Complete the table by writing the letter of **one** tank in each box.

Description of stage	**Tank**
bacteria produce methane	
gravity separates sewage into sludge and liquid effluent	
bacteria respire aerobically	
bacteria break down the sludge	

(4)

(Total 4 marks)

Leave blank

2. The table gives information about some diseases. Complete the table.

Disease	Type of organism causing the disease	How the organism is spread	Symptoms of the disease
Cholera	bacterium	……...	diarrhoea and dehydration
……	protozoan	by mosquito	shivering and fever
Influenza	……	by droplets in air	……

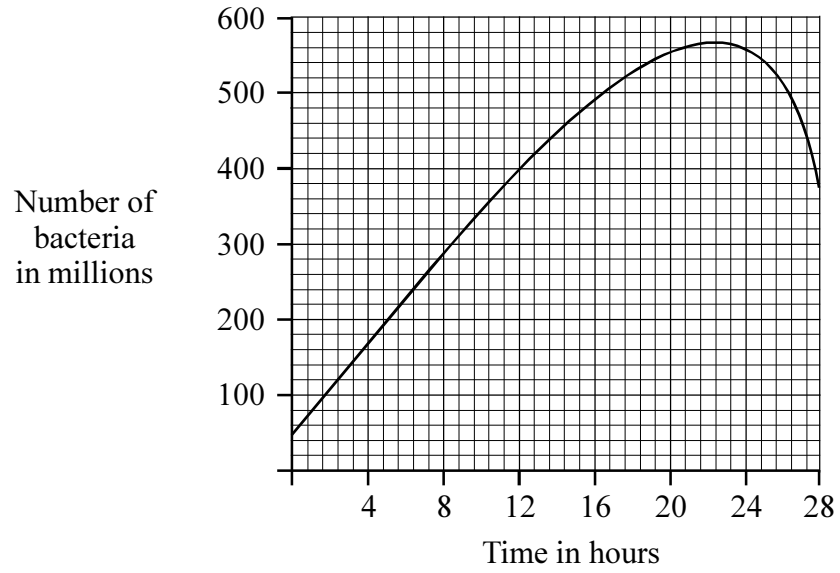
(4)

(Total 4 marks)

TURN OVER FOR QUESTION 3

Leave blank

3. The graph shows the numbers of bacteria over 30 hours, in a flask of liquid.



(a) What evidence is there that the liquid contained food?

.....

.....

(1)

(b) At which times did the flask contain 400 million bacteria?

..... and .....

(2)

(c) Give **one** reason why the numbers of bacteria decreased after 24 hours.

.....

.....

(1)

(Total 4 marks)

Leave blank

4. Semen collected from a bull is diluted before storing to be used in artificial insemination.

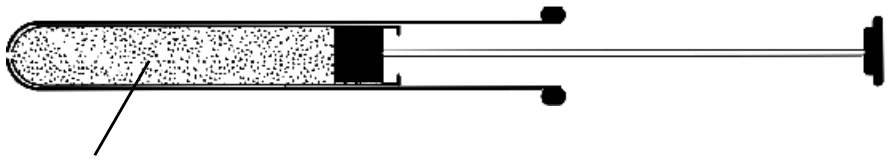
(a) What is the advantage of diluting the semen?

.....

.....

(1)

(b) The diagram shows a catheter, used in artificial insemination.
A straw containing semen is removed from storage, then inserted into the catheter just before insemination.



Where would the straw containing semen be stored?

.....

(1)

(c) Why is it necessary to warm the semen to body temperature before using it for the insemination?

.....

.....

.....

(2)

(d) How does the semen from the catheter get into the cow?

.....

.....

(1)

(e) Why is it important that the semen is released at the cervix?

.....

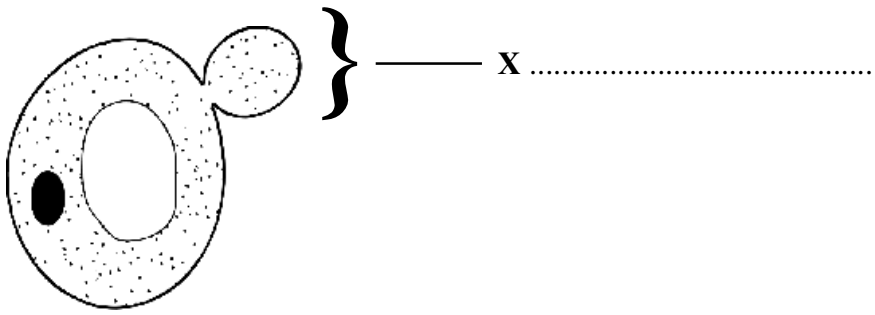
.....

(1)

(Total 6 marks)

Leave blank

5. The diagram shows the fungus yeast, as seen through a microscope.



(a) Label part **X**.

(1)

(b) Use the diagram to help you describe the reproduction of yeast cells.

.....

.....

.....

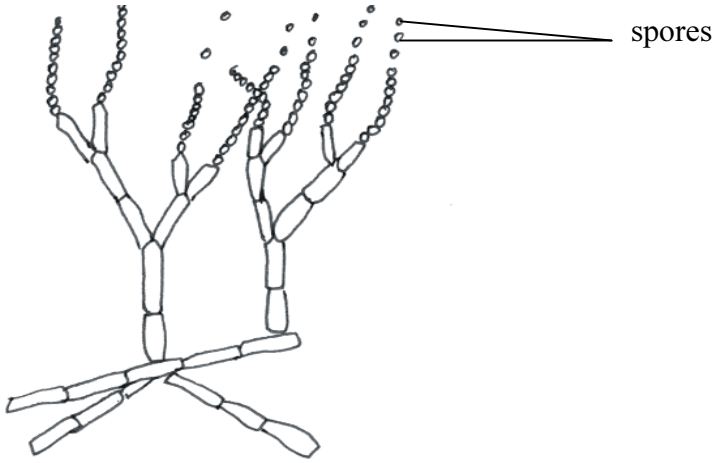
.....

.....

(3)

Leave blank

(c) The diagram shows the fungus *Penicillium*, as seen through a microscope, growing on agar jelly.



Give **one** way in which *Penicillium* is different from yeast.

.....

.....

(1)

(d) The spores produced by *Penicillium* have very low mass.

(i) What is the function of the spores?

.....

.....

(1)

(ii) What is the advantage of each spore having a low mass?

.....

.....

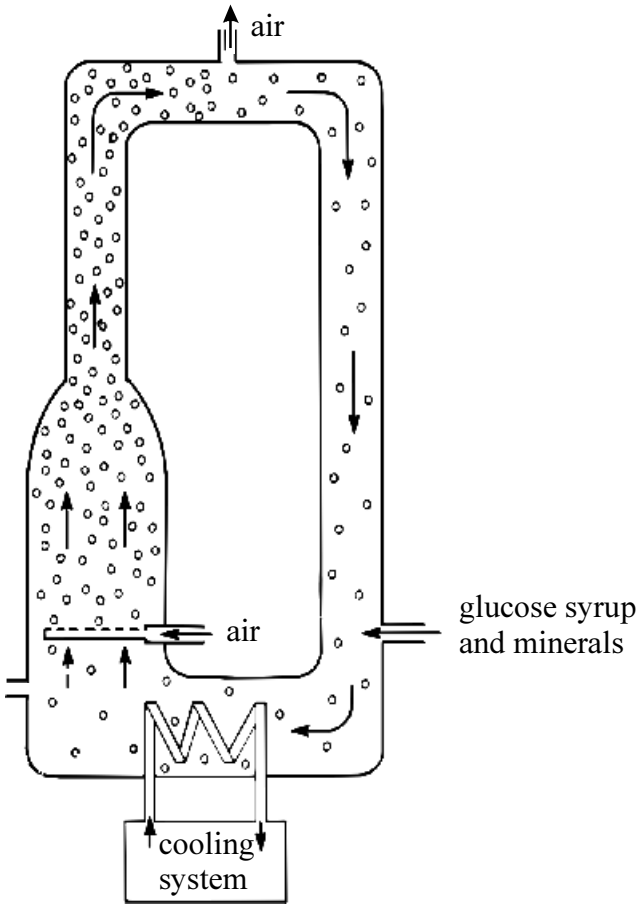
(1)

(Total 7 marks)

TURN OVER FOR QUESTION 6

Leave blank

6. The diagram shows an "air lift" fermenter, which is used to produce mycoprotein.



(a) Give **two** functions of the air bubbles which are pumped into the fermenter.

1 .....

2 .....

(2)

(b) Before adding the fungus *Fusarium*, the fermenter is sterilised. Explain why:

(i) the fermenter must be sterilised;

.....

(1)

(ii) disinfectant is not used to sterilise the fermenter;

.....

(1)

(iii) steam is used to sterilise the fermenter.

.....

(1)

(c) Why is glucose syrup added to the fermenter?

Leave blank

.....

.....

(1)

(d) Why is it important:

(i) to keep a constant pH in the fermenter;

.....

.....

(1)

(ii) to have a cooling system in the fermenter;

.....

.....

(1)

(iii) to heat the fungus to a temperature of 65°C at the end of the process?

.....

.....

.....

.....

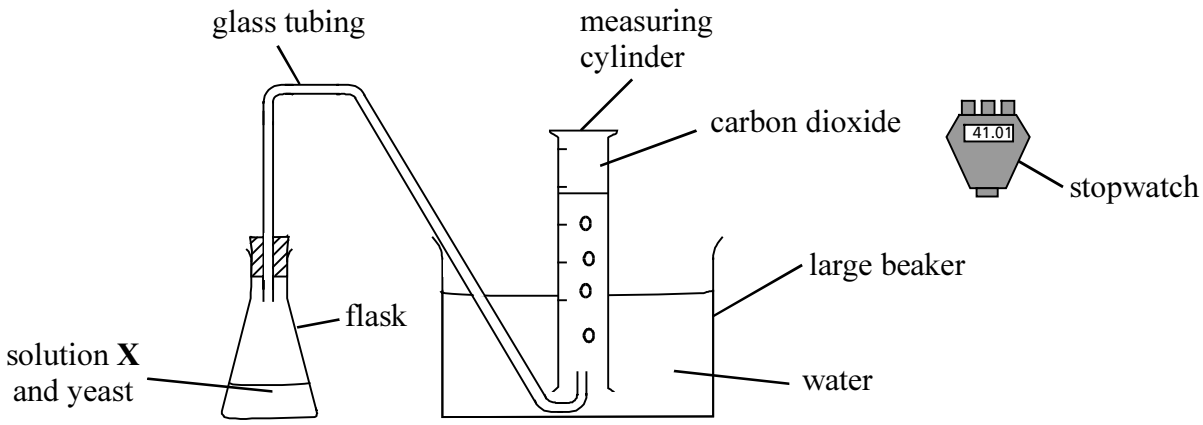
(2)

(Total 10 marks)

TURN OVER FOR QUESTION 7

Leave blank

7. Eric investigated the fermentation of solution **X** by yeast.
He used the apparatus shown below.



(a) Name a substance in solution **X** from which ethanol is produced.

.....

(1)

(b) Explain how the rate of fermentation in the apparatus could be measured.

.....

.....

.....

.....

(2)

Leave blank

(c) Eric investigated fermentation at different temperatures over a 24-hour period. The results are shown on the table.

Temperature (°C)	**Volume of carbon dioxide collected in 24 hrs (cm^3)**			**Average volume of carbon dioxide collected in 24 hrs(cm^3)**
10	25	28	28	27
20	58	65	66	63
30	99	108	102	……..

(i) Calculate the average volume of carbon dioxide produced over 24 hours at 30°C. Show your working.

Answer ……..……cm^3

(2)

(ii) What is the advantage of calculating an average volume of carbon dioxide for each temperature?

.....

(1)

(iii) What do Eric's results show about the relationship between temperature and the rate of fermentation?

.....

.....

(1)

(iv) What would be the effect of a temperature of 0 °C on the rate of fermentation? Give a reason for your answer.

.....

.....

(2)

(v) What would be the effect of a temperature of 80 °C on the rate of fermentation? Give a reason for your answer.

.....

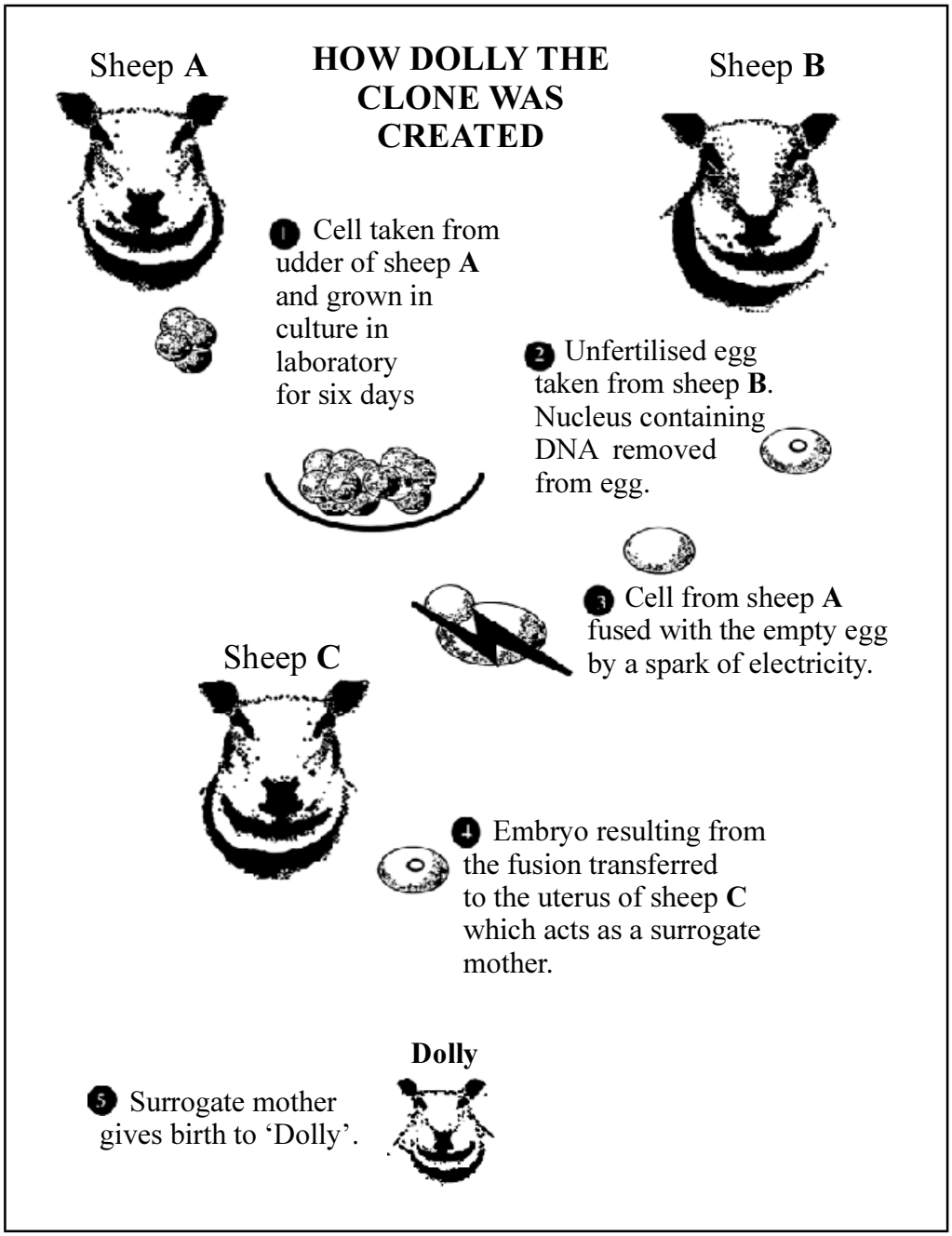
.....

(2)

(Total 11 marks)

Leave blank

8. The diagram shows how scientists produced Dolly the sheep.



(a) (i) Dolly was produced with the help of an unfertilised egg.
Where did the scientists get the DNA to put into this egg?

.....

(1)

(ii) Suggest why it was important to remove the DNA from the unfertilised egg.

.....

.....

(2)

(iii) Dolly is genetically identical to another sheep in the diagram. Which one?

.....

(1)

(b) Give **one** way in which this method is different from the normal method of sheep reproduction.

.....

.....

(1)

(c) The production of Dolly was a significant advance in scientific work. The work may result in animal clones being produced in large numbers.

Suggest why it is important that people are informed of new scientific advances.

.....

.....

.....

(2)

(d) Suggest **one** advantage of producing animal clones.

.....

.....

(1)

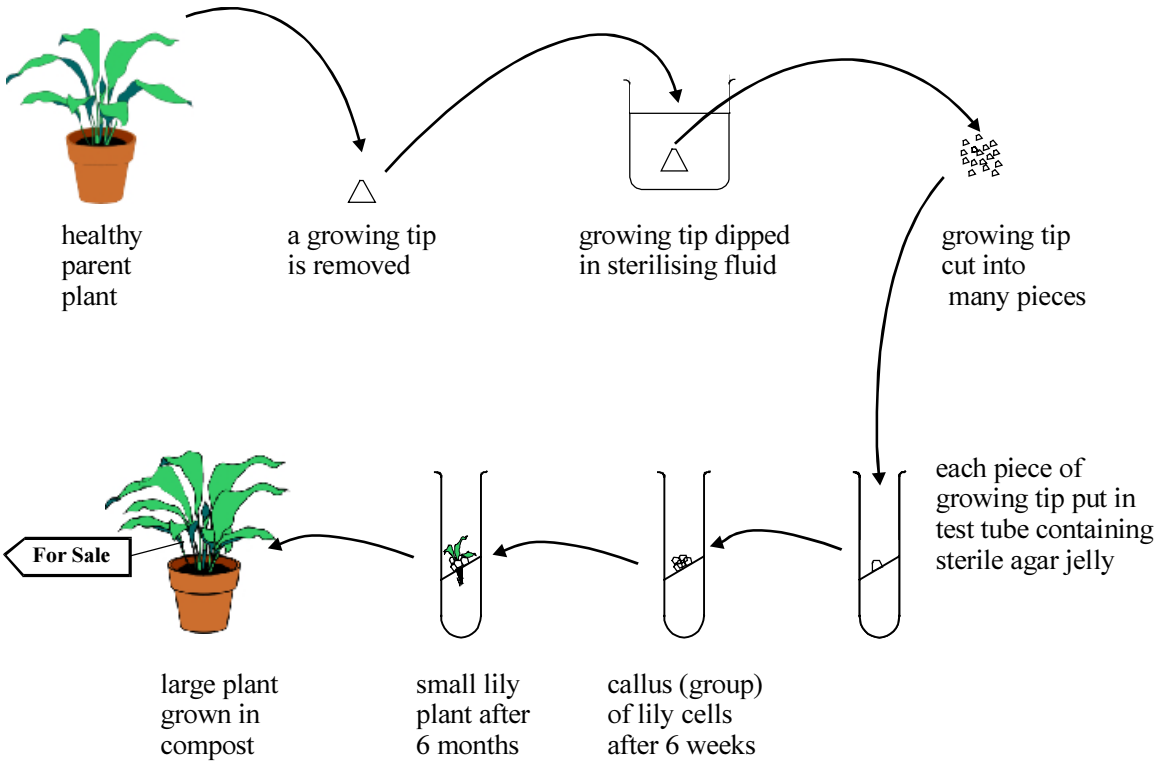
(Total 8 marks)

Leave blank

TURN OVER FOR QUESTION 9

Leave blank

9. Lily plants can be produced by dividing parent plants into a few smaller plants.
The diagram shows stages in the process of tissue culture which is used to produce very large numbers of lily plants.



Use the diagram to help you explain the stages in the process of producing large numbers of lily plants.

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.....

.....

(Total 6 marks)

TOTAL MARK 60

END

Centre Number						Paper Reference **1522/4H**		Surname	Other Names
Candidate Number						Paper Reference **1520/3H**		Signature	

For Examiner's use only

For Team Leader's use only

1522/4H 1520/3H

Edexcel GCSE

Science: Double Award A **[1522]**
Paper 4H

Biology A **[1520]**
Paper 3H

HIGHER TIER
Specimen Paper

Time: 1 hour 30 minutes **N0000**

Materials required for the examination
None

Items included with these question papers
None

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your signature, your surname and other names, then tick the box to show the correct paper reference for your examination.

The paper reference is shown below the boxes. If more than one paper reference is shown, you should tick the one for which you have been entered.

Answer ALL questions in the spaces provided in this book.

Show all stages in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

This paper has 13 questions. There is one blank page.

Advice to Candidates

This symbol shows where the quality of your written answer will also be assessed.

Additional Answer Sheets may be used.

Question Number	Leave Blank
1	
2	
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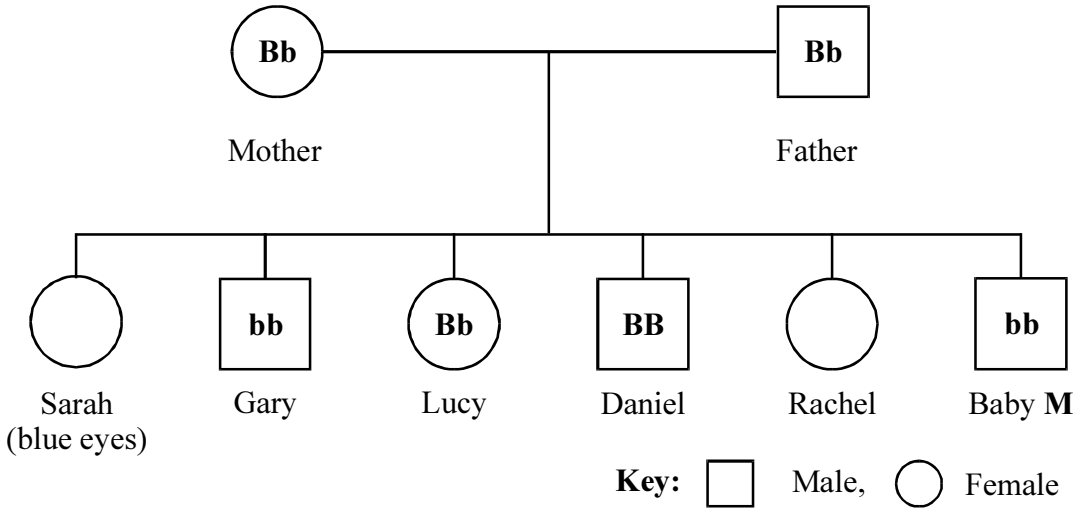
10	
11	
12	
13	
Total	

Turn over

Edexcel
Success through qualifications

Leave blank

1. The diagram below shows the inheritance of eye colour in a family The allele for brown eyes is dominant (**B**) and the allele for blue eyes is recessive (**b**).



(a) Which of the following statements is true?

A Lucy and Daniel both have blue eyes

B Lucy and Daniel have different coloured eyes

C Lucy and Daniel have the same coloured eyes

D All the males in the family have brown eyes

Write the correct answer (**A**, **B**, **C** or **D**) in the box.

(1)

(b) (i) What is the sex and eye colour of baby **M**?

.....

(2)

(ii) How was the sex of baby **M** determined at fertilisation?

.....

.....

.....

(2)

(c) Daniel's genotype is BB.

What is Sarah's genotype?

.....

(1)

(d) In the family shown, Rachel has an identical twin. Rachel has brown eyes.

Leave blank

(i) Who is Rachel's identical twin? .....

(1)

(ii) Explain how you decided on your answer.

.....

.....

.....

(2)

(Total 9 marks)

TURN OVER FOR QUESTION 2

Leave blank

2. The passage below is about Charles Darwin.

Who Inspired Darwin?

Thomas Malthus lived in the early 19th century. He wrote 'An Essay on the Principle of Population.' In this essay he pointed out that human beings produce far more offspring than ever survive. However, the adult population tends to remain stable from generation to generation.

Darwin realised that this idea applies to other animals. For example, one fish, which lays thousands of eggs in a year, would over-populate an area with its offspring if they all survived.

The work of Malthus helped Darwin to develop his own ideas of how a species changes. He produced his theory of natural selection. Darwin realised that there must be a reason why some offspring survived but others did not. He suggested that small variations between individuals of a species might give certain individuals a better chance of survival. For example, those organisms with characteristics that made them better at escaping from predators or finding food would have a better chance of

(a) (i) What is meant by the phrase "the adult population tends to remain stable from generation to generation"?

.....

.....

.....

.....

(2)

(ii) Suggest why fish lay thousands of eggs rather than just a few.

.....

.....

.....

.....

(2)

(iii) What can cause "small variations between individuals of a species"?

.....

.....

(1)

Leave blank

(iv) What is meant by the phrase **natural selection**?

.....

.....

.....

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.....

.....

(4)

(b) Here are four statements about evolution. Tick the box beside the statement that is false.

The theory of evolution was developed by Darwin ☐

DNA is the genetic material that transfers information from generation to generation ☐

Acquired characteristics **cannot** be passed on from parent to offspring ☐

Nature plays an important part in artificial selection ☐

(1)

(c) Suggest **two** ways that scientists can let other groups of scientists know about their ideas.

1 .....

2 .....

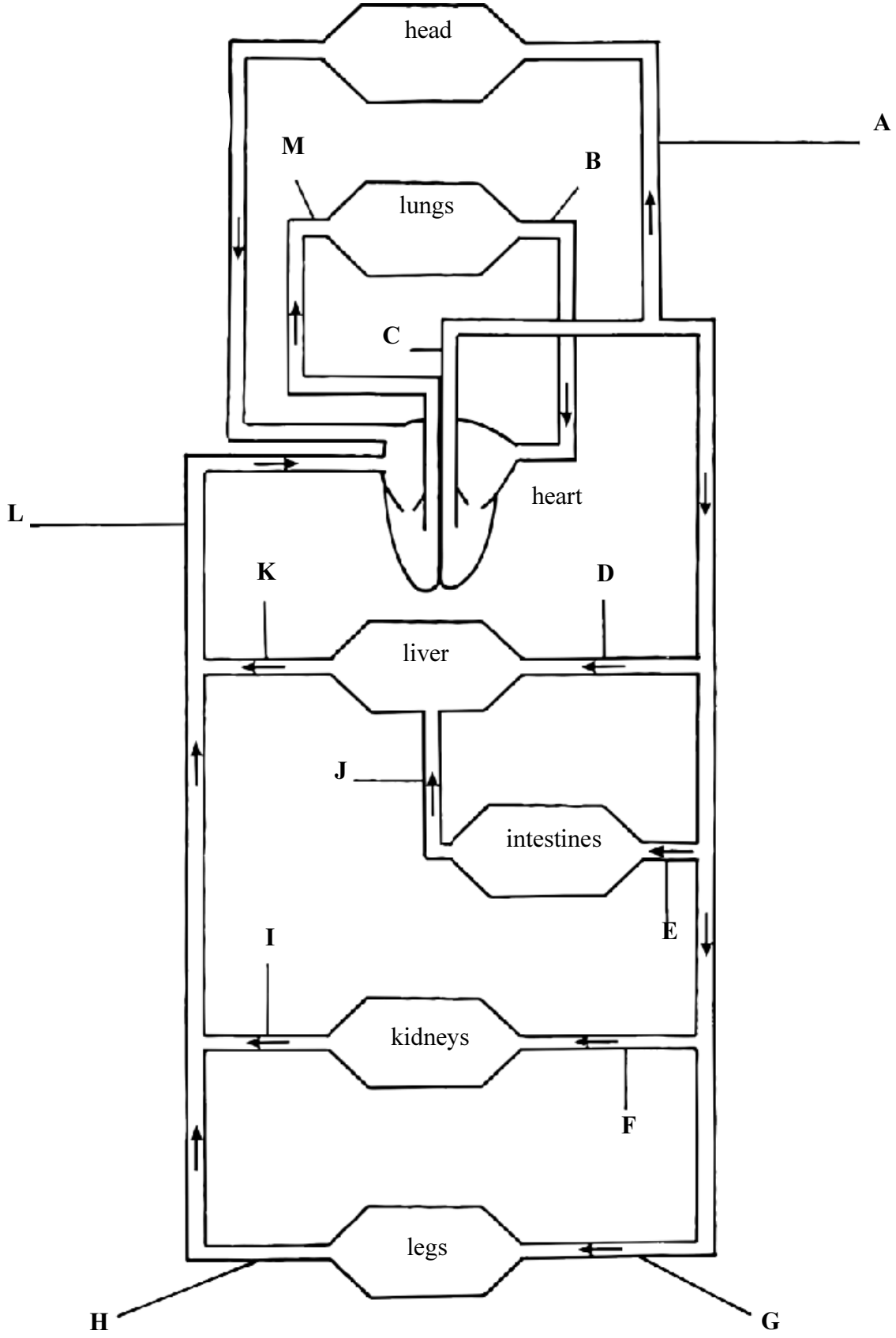
(2)

(Total 12 marks)

TURN OVER FOR QUESTION 3

Leave blank

3. The diagram shows a plan of the circulatory system. The blood vessels are labelled with letters.



Use the letters on the diagram to complete the sentences in the table.

Leave blank

The first one has been done for you.

Sentence	Letter
The blood vessel named the aorta is	**C**
The blood vessel containing blood pumped from the right ventricle is	
The blood vessel carrying blood with **least** carbon dioxide is	
The blood vessel carrying blood with **most** amino acids after a meal is	
The blood vessel containing blood at **lowest** pressure is	
The **first** blood vessel to transport inhaled solvents is	

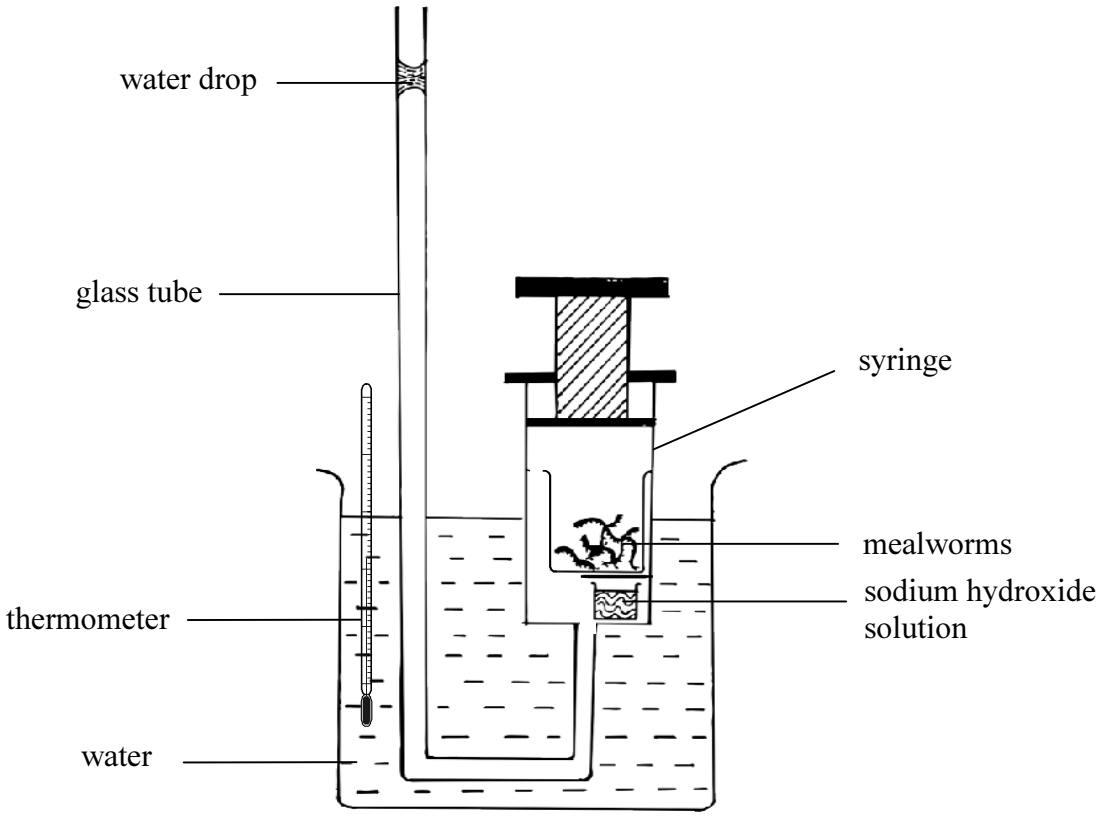
(5)

(Total 5 marks)

TURN OVER FOR QUESTION 4

Leave blank

4. This apparatus was used to measure the effect of temperature on the respiration rate of mealworms.



(a) (i) Name the gas absorbed by sodium hydroxide solution.

.....

(1)

(ii) Show on the diagram the direction of movement of the water drop.

(1)

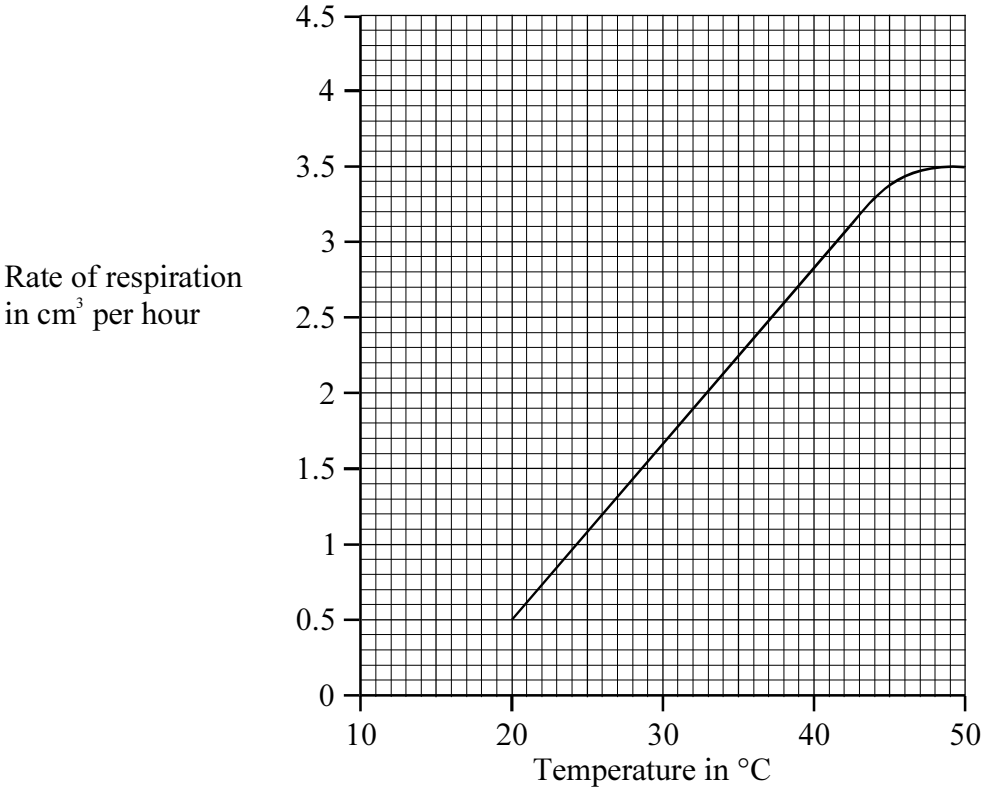
(iii) Give **one** difference between the apparatus shown and a suitable control apparatus.

.....

(1)

Leave blank

(b) The rate of respiration was measured at intervals from 20 °C to 50 °C. The graph shows the results of the investigation.



(i) Explain the results shown on the graph.

.....

.....

.....

.....

(2)

(ii) Suggest what would happen if temperatures above 50 °C were used.

Give a reason for your answer.

.....

.....

.....

.....

(2)

(Total 7 marks)

TURN OVER FOR QUESTION 5

Leave blank

5. Algae are microscopic plants often found in water. They produce food by photosynthesis.

Researchers plan to grow large numbers of algae to help solve the world's energy crisis.

(a) Write a letter suggesting what the researchers could do in order to grow large numbers of the algae.

Dear Researchers,

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5)

(b) The algae can be used to make petrol. This would reduce the need to obtain fuel by destroying the world's forests.

Suggest **three** advantages of reducing the destruction of the world's forests.

1 .....

.....

2 .....

.....

3 .....

.....

(3)

(Total 8 marks)

Leave blank

6. Read the passage and answer the questions that follow.

Young people who go clubbing lose a lot of water as sweat while they dance. This makes them very thirsty, so they drink a lot of water. Some of them also take tablets called *Ecstasy.* *Ecstasy* stimulates release of the hormone ADH. Young people who dance a lot and take *Ecstasy* have very dilute blood plasma. When blood passes through the brain, the brain cells swell and press against the inside of the skull. The pressure on the brain cells causes damage, which can be fatal.

(a) Explain why it is important that young people sweat when dancing.

.....

.....

.....

(2)

(b) (i) Name the organ that releases ADH.

.....

(1)

(ii) Which organ does ADH target?

.....

(1)

(iii) How does ADH travel from where it is released to the organ it targets?

.....

(1)

(c) Explain why young people who dance a lot and take *Ecstasy* have very dilute blood plasma.

.....

.....

.....

(2)

(d) Explain why brain cells swell when the blood plasma is very dilute.

.....

.....

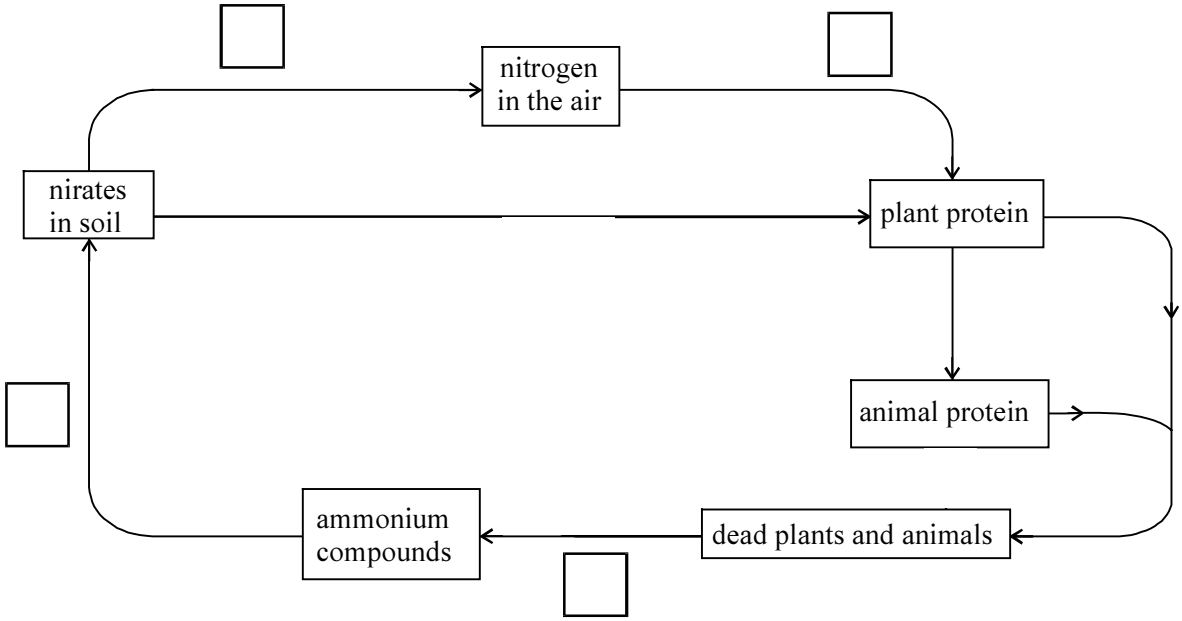
.....

(2)

(Total 9 marks)

7. The diagram shows the nitrogen cycle.

Leave blank



Four types of bacteria take part in the nitrogen cycle.

A – decomposing
B – denitrifying
C – nitrogen fixing
D – nitrifying

(a) Write **one** letter in each empty box on the nitrogen cycle to show where these bacteria are involved.

(4)

(b) Complete the following passage.

When plants are eaten by animals, the large insoluble molecules of plant protein are ……. into small soluble molecules called ……. This process is catalyzed by ……. released from the ……. The small soluble molecules are ……. into the blood and used to make animal protein.

(5)

(Total 9 marks)

Leave blank

8. DNA is a double helix with each strand linked by a series of paired bases. There are four bases in DNA.

(a) The table shows the percentage of each base found in a sample of DNA taken from a rat.

Complete the table to give the names of the two missing bases.

Percentage of base	Name of base
28.6	Adenine
21.4	Guanine
28.6	
21.4	

(2)

(b) A DNA molecule contains 1000 base **pairs**. 30% of the bases are guanine.

How many adenine bases are contained in this DNA molecule? Show your working.

Answer .....

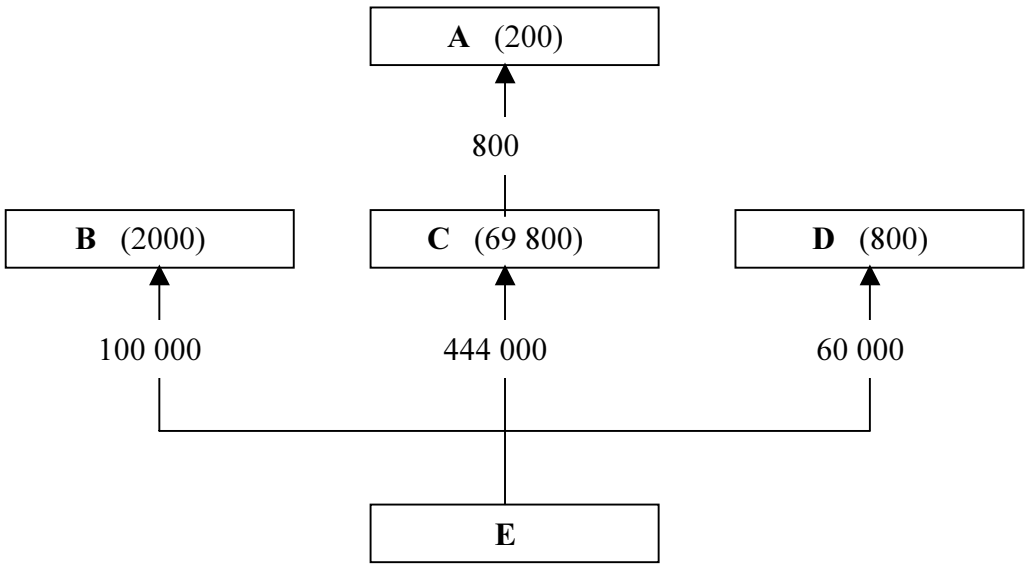
(3)

(Total 5 marks)

TURN OVER FOR QUESTION 9

Leave blank

9. The diagram shows a food web with organisms of types **A**, **B**, **C**, **D**, and **E**.
Numbers on arrows show the energy available to these organisms in kJ per m^2 per year.
Numbers in brackets show the energy that becomes part of the biomass of the organisms in kJ per m^2 per year.



The energy efficiency of an organism is a measure of how much of the energy available to the organism becomes part of its biomass.

The equation below shows how to calculate energy efficiency.

$$\text{Energy efficiency} = \frac{\text{energy that become part of biomass}}{\text{energy available}} \times 100\%$$

(a) Calculate the energy efficiency of organism **B**.

Put your answer in the table below.

Organism	Energy efficiency (%)
A	25.0
B	
C	15.7
D	1.3

(1)

Leave blank

(b) Suggest **two** reasons why organism **D** has a low energy efficiency.

1 .....

.....

2 .....

.....

(2)

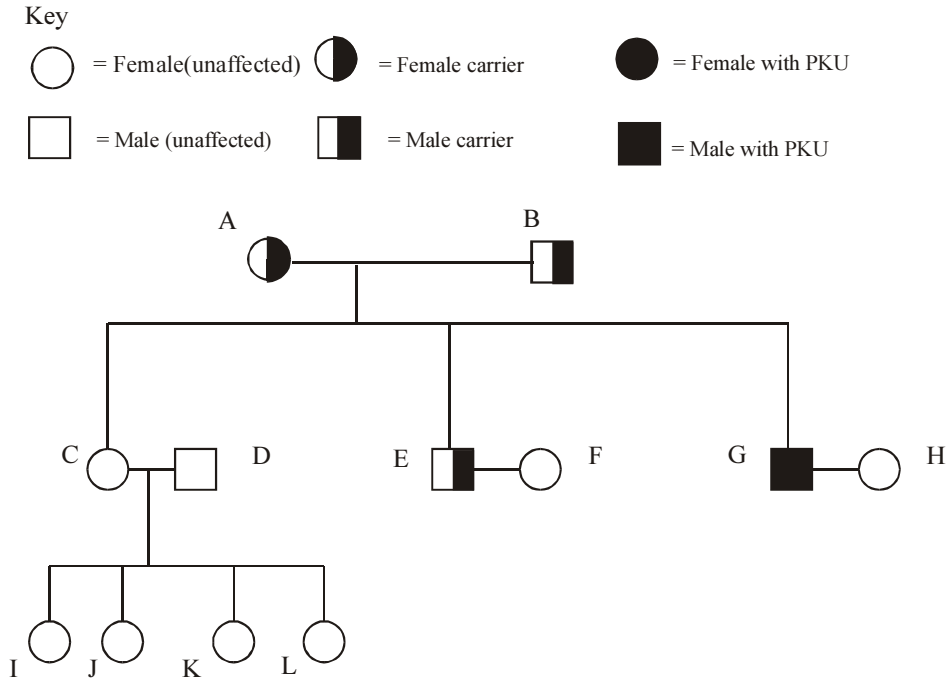
(Total 3 marks)

TURN OVER FOR QUESTION 10

Leave blank

10. PKU (phenylketonuria) is an inherited disease. The allele (n) for the disease is recessive to the normal allele (N).

The diagram shows how PKU was inherited in a family.



(a) Give the genotype of each individual in the table below.

Individual	Genotype
B	
J	

(2)

(b) How many of the children of **A** and **B** are homozygous?

.....

(1)

(c) If **G** and **H** have a child, what is the probability that it will have PKU?

.....

(1)

(d) **C** and **D** have four children, all of whom are female. What is the probability that their next child will be female?

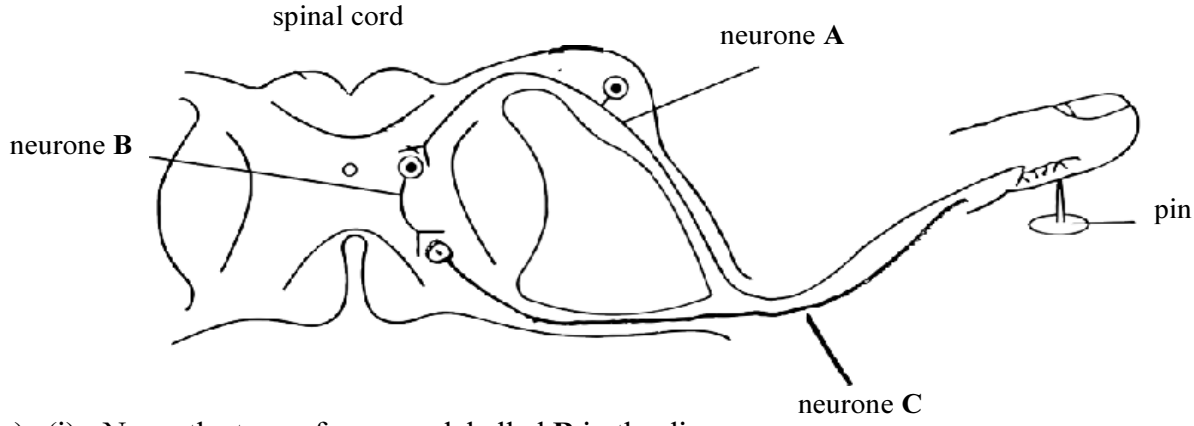
.....

(1)

(Total 5 marks)

Leave blank

11. The diagram shows part of a finger and a reflex arc.



(a) (i) Name the type of neurone labelled **B** in the diagram.

.....

(1)

(ii) Describe how nerve impulses are passed from neurone **A** to neurone **B**.

.....

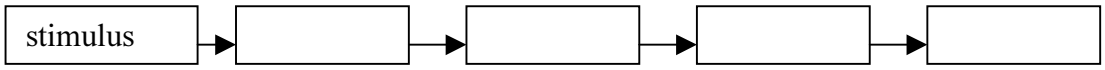
.....

(2)

(b) The words below are used to describe the pathway which involves nerve impulses during a reflex action.

effector	**neurones**	**receptor**	**response**	**stimulus**

Complete the pathway using these words.



(3)

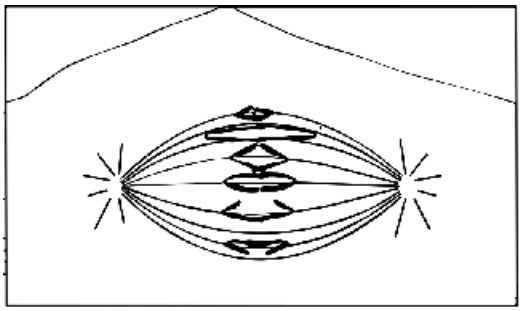
(Total 6 marks)

TURN OVER FOR QUESTION 12

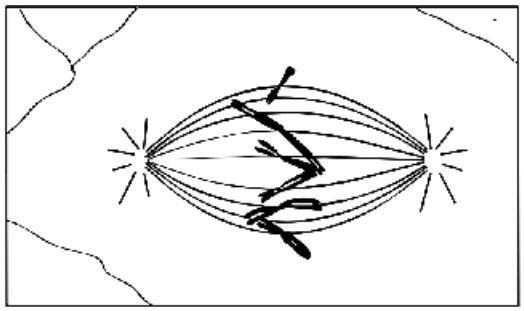
Leave blank

12. The diagrams **A**, **B**, **C**, **D**, **E** and **F** show an animal cell at different stages of mitosis.

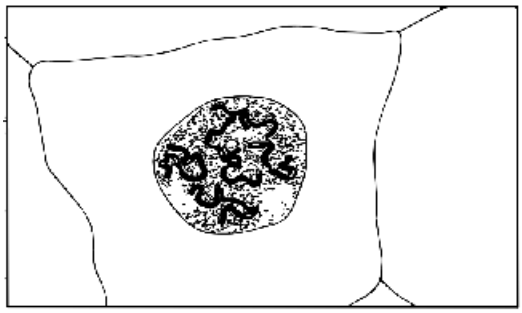
A



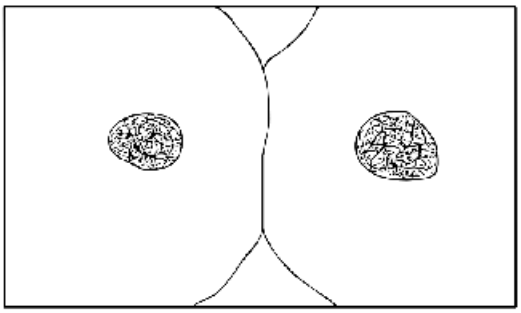
B



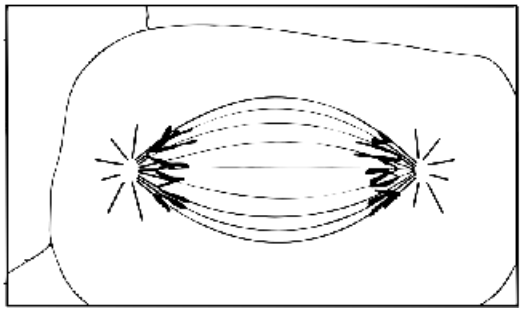
C



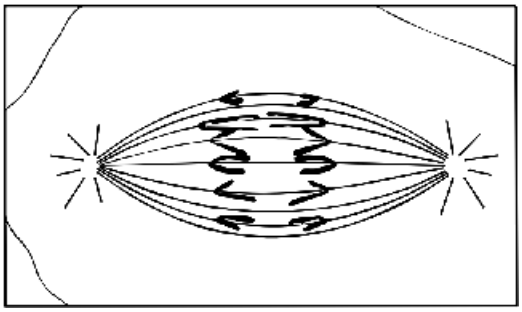
D



E



F



Leave blank

(a) Use the letter by each diagram to arrange these stages in the correct order. Write your answers in the table. The first and last stages have been done for you. Write **one** letter only in each box.

Stage in mitosis	**Label letter**
First stage	C
Second stage	
Third stage	
Fourth stage	
Fifth stage	
Sixth stage	D

(3)

(b) What is the diploid chromosome number of this cell?

.....

(1)

(c) Give **two** ways in which meiosis differs from mitosis.

1 .....

.....

2 .....

.....

(2)

(Total 6 marks)

TURN OVER FOR QUESTION 13

Leave blank

13. How does air pollution affect the environment?

.....

.....

.....

.....

.....

.....

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.....

.....

.....

.....

(6)

(Total 6 marks)

TOTAL MARK 90

END

Centre Number						Paper Reference		Surname	Other Names
						1520/4H			
Candidate Number								Signature	

1520/4H

Edexcel GCSE

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Biology A **[1520]**

Paper 4H

HIGHER TIER

Specimen Paper

Time: 1 hour **N0000**

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Materials required for the examination
None

Items included with these question papers
None

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your signature, your surname and other names.

The paper reference is shown in the top left hand corner.

Answer ALL questions in the spaces provided in this book.

Show all stages in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

This paper has 8 questions. There are no blank pages.

Advice to Candidates

This symbol shows where the quality of your written answer will also be assessed.

Additional Answer Sheets may be used.

Turn over

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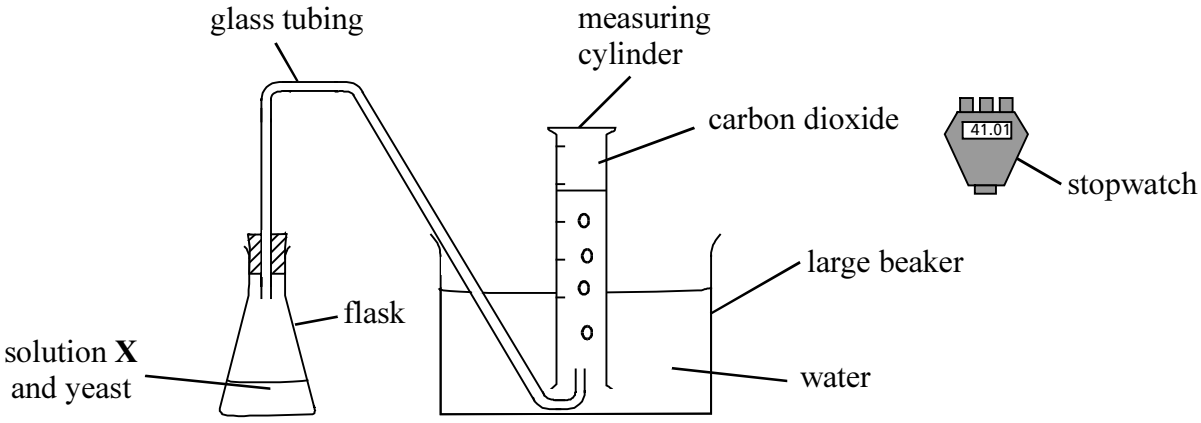
Leave blank

1. Eric investigated the fermentation of solution **X** by yeast.
He used the apparatus shown below.



(c) Name a substance in solution **X** from which ethanol is produced.

.....

(1)

(d) Explain how the rate of fermentation in the apparatus could be measured.

.....

.....

.....

.....

(2)

Leave blank

(c) Eric investigated fermentation at different temperatures over a 24-hour period. The results are shown on the table.

Temperature (°C)	**Volume of carbon dioxide collected in 24 hrs (cm^3)**			**Average volume of carbon dioxide collected in 24 hrs(cm^3)**
10	25	28	28	27
20	58	65	66	63
30	99	108	102	……..

(i) Calculate the average volume of carbon dioxide produced over 24 hours at 30°C. Show your working.

Answer ……..……cm^3

(2)

(ii) What is the advantage of calculating an average volume of carbon dioxide for each temperature?

.....

(1)

(iii) What do Eric's results show about the relationship between temperature and the rate of fermentation?

.....

.....

(1)

(iv) What would be the effect of a temperature of 0 °C on the rate of fermentation? Give a reason for your answer.

.....

.....

(2)

(v) What would be the effect of a temperature of 80 °C on the rate of fermentation? Give a reason for your answer.

.....

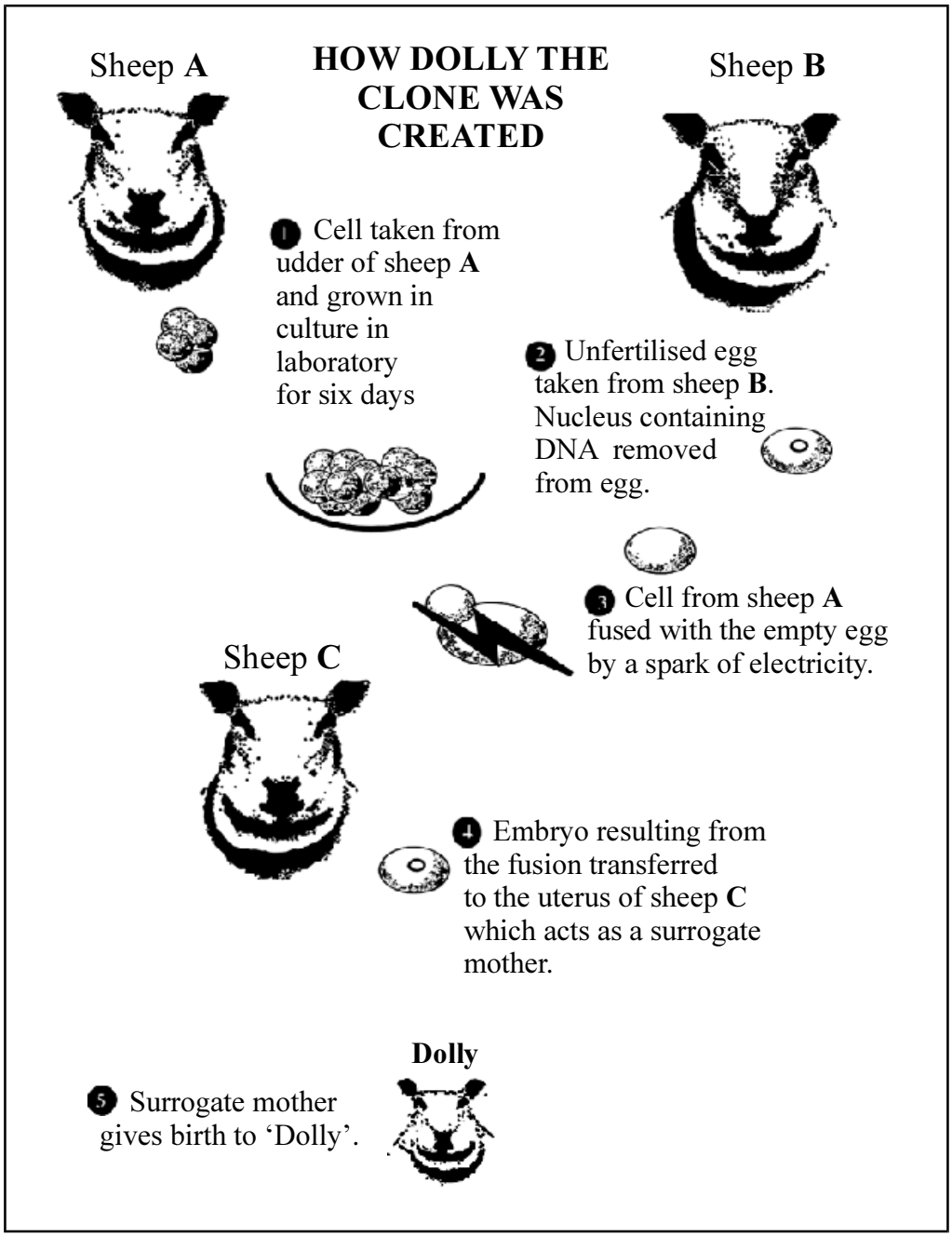
.....

(2)

(Total 11 marks)

Leave blank

2. The diagram shows how scientists produced Dolly the sheep.



(a) (i) Dolly was produced with the help of an unfertilised egg.
Where did the scientists get the DNA to put into this egg?

.....

(1)

(ii) Suggest why it was important to remove the DNA from the unfertilised egg.

.....

.....

(2)

(iii) Dolly is genetically identical to another sheep in the diagram. Which one?

.....

(1)

(b) Give **one** way in which this method is different from the normal method of sheep reproduction.

.....

.....

(1)

(c) The production of Dolly was a significant advance in scientific work. The work may result in animal clones being produced in large numbers.

Suggest why it is important that people are informed of new scientific advances.

.....

.....

.....

(2)

(d) Suggest **one** advantage of producing animal clones.

.....

.....

(1)

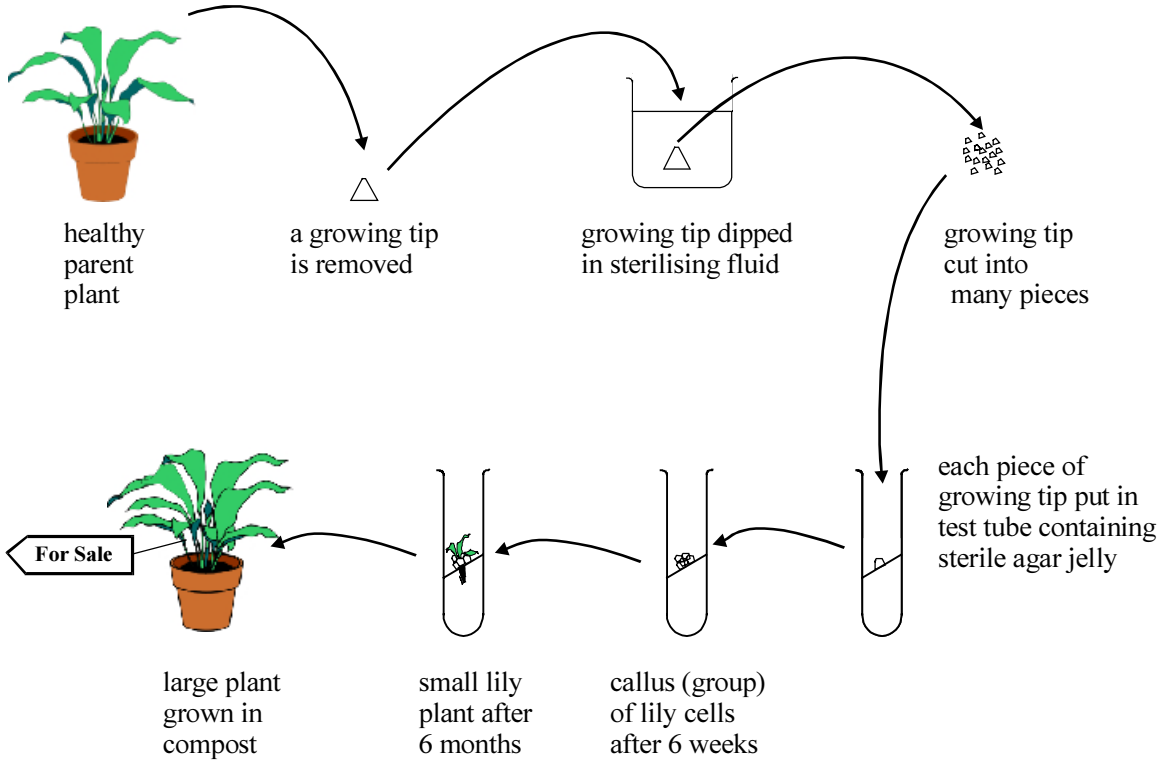
(Total 8 marks)

Leave blank

TURN OVER FOR QUESTION 3

Leave blank

3. Lily plants can be produced by dividing parent plants into a few smaller plants.
The diagram shows stages in the process of tissue culture which is used to produce very large numbers of lily plants.



Use the diagram to help you explain the stages in the process of producing large numbers of lily plants.

.....

.....

.....

.....

.....

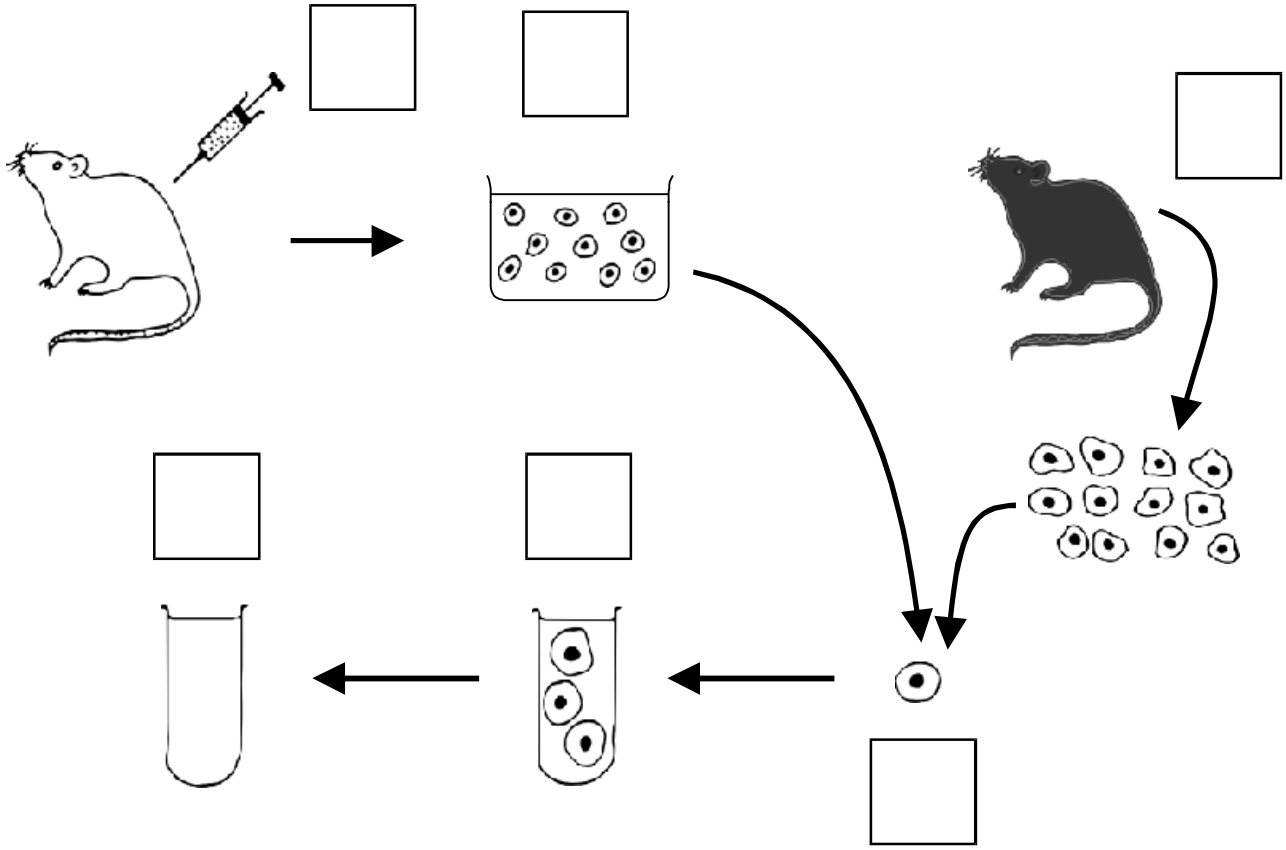
.....

.....

(Total 6 marks)

Leave blank

4. The flow diagram shows a process resulting in the production of monoclonal antibodies.



The statements in the table describe each stage but they are in the wrong order.
Write **one** letter in each empty box in the diagram to show the correct order.

Description of stage	Letter
Hybridoma cells multiply in nutrient and produce specific antibodies.	A
A mouse is injected with red cells from another mouse. Time is allowed for its spleen cells to produce antibodies.	B
Hybridoma cells are removed, leaving antibodies in the nutrient.	C
A cancer cell and a spleen cell fuse to form a large hybridoma cell.	D
Cancer cells are taken from another mouse.	E
Spleen cells from the mouse grow in the nutrient.	F

(5)

(Total 5 marks)

Leave blank

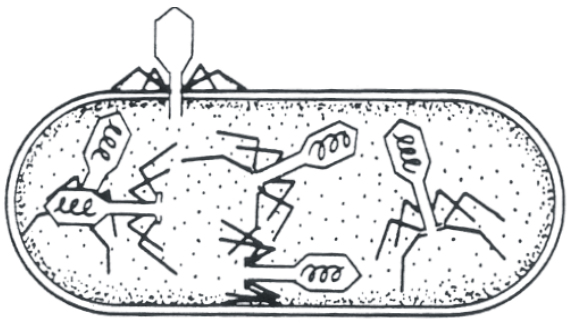
5. The diagram in box 2 shows the middle stage of a virus attack on a bacterium.

Start of attack

Box 1

Middle stage

Box 2



End of attack

Box 3

(a) What happens during the middle stage?

.....

.....

.....

.....

(2)

(b) In box 1 and box 3 draw labelled diagrams to show what happens at the start and the end of the viral attack.

(6)

(Total 8 marks)

6. Read the newspaper article about soya bean plants.

Leave blank

GM SOYA BEANS

Traditional soya bean plants are killed by selective weedkillers. Genetic engineers have transferred a gene into a soya bean plant to create a genetically modified variety. This new variety of soya bean plant is resistant to selective weedkiller. Farmers in the USA grow this variety and use selective weedkiller to improve crop yield.

Some people are concerned that there are dangers in growing genetically modified soya beans.

(a) What is meant by the term **genetically modified**?

.....

.....

.....

(2)

(b) The new variety of soya bean plant is resistant to selective weedkiller.
Explain how this can increase crop yield when the new variety is grown.

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(c) Suggest **two** ways in which growing the new variety of soya bean plants may be harmful.

1 .....

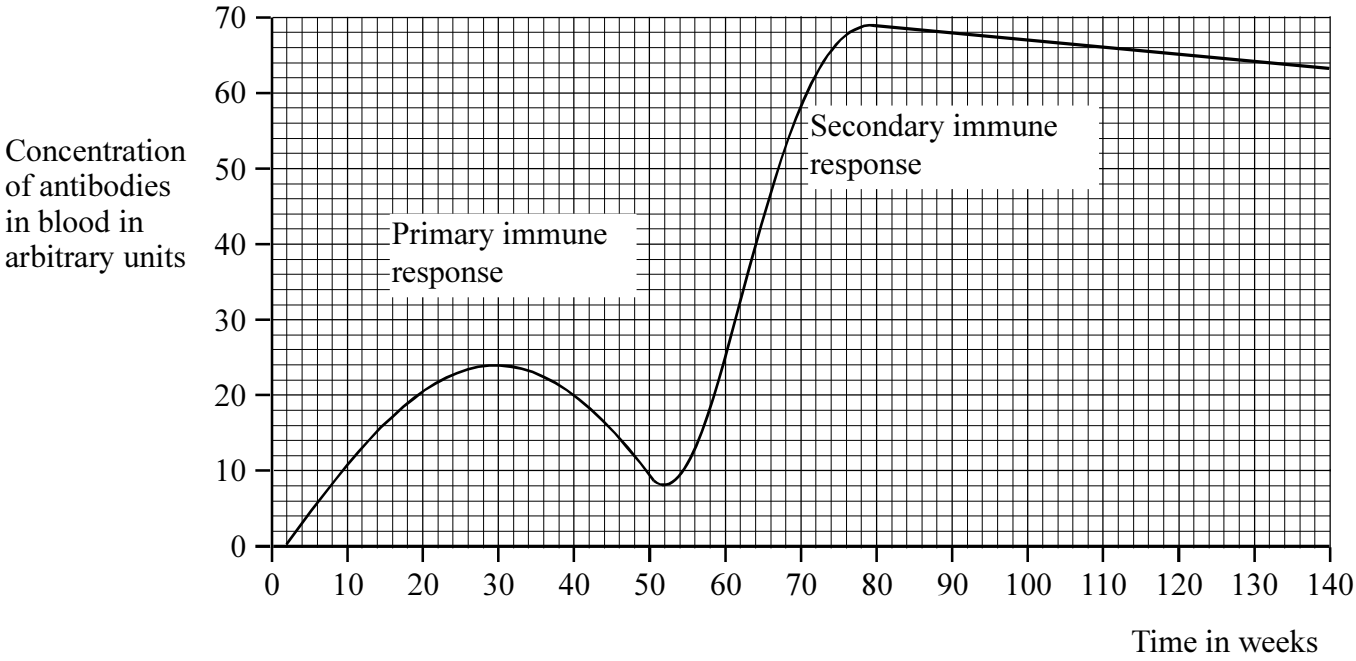
2 .....

(2)

(Total 8 marks)

Leave blank

7. A person was given two vaccinations of an inactivated virus. The graph shows the person's primary and secondary immune responses.



(a) Draw an arrow on the graph to show when the second vaccination was given.

(1)

(b) Describe how proteins on the outside of inactivated viruses result in the production of antibodies.

.....

.....

.....

.....

.....

.....

(3)

(b) Give **three** ways in which the primary immune response is different from the secondary immune response.

Leave blank

1 .....

.....

2 .....

.....

3. .....

.....

(3)

(c) Why is it important to use an inactivated virus?

.....

(1)

(Total 8 marks)

TURN OVER FOR QUESTION 8

Leave blank

8. The sentences describe the process of protein synthesis.
Use words from the list to complete the sentences.

amino acids
bases
cytoplasm
DNA
nucleus
polypeptides
ribosomes
sugars
tRNA

(a) The process of protein synthesis begins in the …… .

(b) Strands of …… begin to unwind.

(c) …… in groups of three along the DNA form triplets.

(d) mRNA forms along the DNA strand and moves to the …… .

(e) Triplets along mRNA code for …… .

(f) Amino acids join to form …… .

(6)

(Total 6 marks)

TOTAL MARK 60

END

Syllabus 1520

Biology A

Specimen Paper 1F

MARK SCHEME

First Examination Summer 2003

Edexcel
Success through qualifications

USING THE MARK SCHEME

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8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

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4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

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QUALITY OF WRITTEN COMMUNICATION

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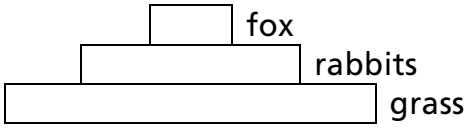
1. (a)



1 mark for shape
1 mark for labels

2

(b) (i) numbers decrease/eq; 1

(ii) no food/grass for rabbits/eq;
no food/rabbits for foxes; 2

Total 5 marks

2. decreases;
decreases;
increases;
stays the same; 4

Total 4 marks

3. (a) keep (sulfur dioxide) gas in/keep water vapour in/eq; 1

(b) control/see what effect water had/comparison; 1

(c) Any two from:
- temperature;
- dampness of cotton wool/humidity;
- size of bag;
- transparency/thickness of bag;
- number of seeds;

2

(d) diffusion ✓ ; 1

(e) (i) 75; 1

(ii) no germination happened/eq; 1

Total 7 marks

4. (a) (i) 37.1; 1

(ii) 14/15; 1

(iii) thermometer; 1

(b) (i) oestrogen; 1

(ii) (in the) blood; 1

(iii) Any two from:
- enlarged breasts;
- body shape eg hips widen;
- lack of facial hair;
- high voice; 2

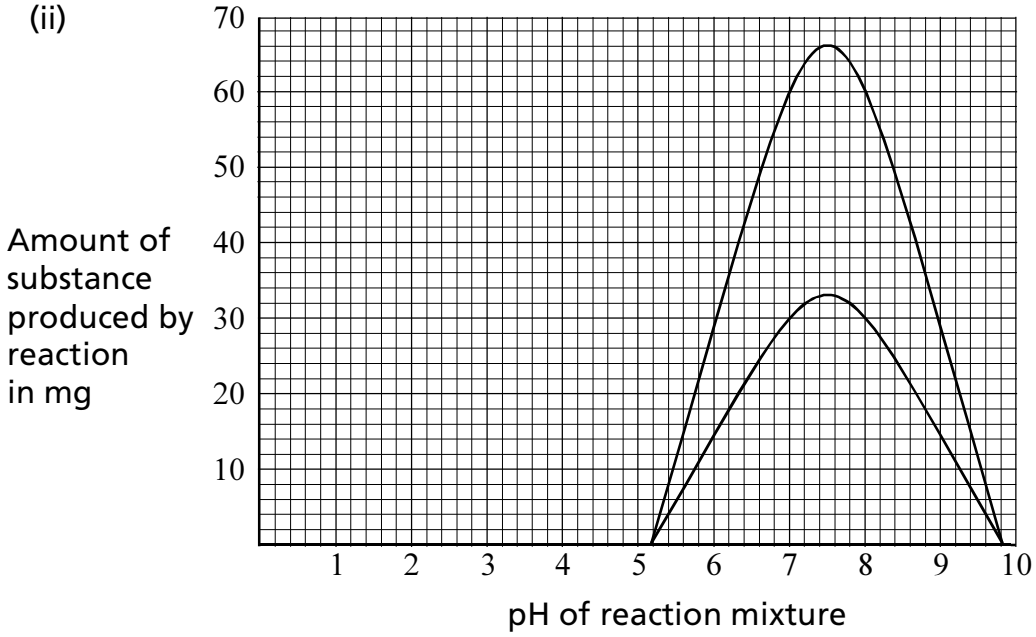
(iv) for embryo to implant/placenta to establish/
to allow fetus to develop/obtain enough nutrients; 1

Total 8 marks

5. (a) 50 (mg); 1

(b) (i) 2.5; 1

(ii)



same max and min pH values;
peak height about half original; 2

(c) (i) amino acid/polypeptide; 1

(ii) glucose; 1

Total 6 marks

6. (a) X – intercostal/muscle;
Y – diaphragm; 2

(b) bronchioles; 1

(c) 250; 1

(d) (i) 3; 1

(ii) higher;
less daily variation/eq; 2

(iii) (yes) normal never drops to 230/230 is a low reading/eq; 1

(e) A suggestion to include:
- widen/eq;
- bronchioles/bronchi/small tubes; 2

Total 10 marks

7. (a) (i) seven; 1

(ii) 1; 1

(iii) pupil size decreases;
as light intensity increases; 2

(b) retina;
brain;
optic;
muscle;
iris; 5

Total 9 marks

8. (a) C/Lucy and Daniel have same coloured eyes; 1

(b) (i) male;
blue; 2

(ii) X from ovum/mother;
Y from sperm/father; 2

(c) (i) Lucy; 1

(ii) Rachel's twin must:
- be a girl/Lucy or Sarah;
- have brown eyes/can't have blue eyes; 2

Total 8 marks

9. (a) (i) numbers remain constant/eq;
over a long period of time; 2

(ii) A suggestion to include two from:
- predation;
- some survive;
- to continue the species/eq; 2

(iii) mutation/environmental factor/eq; 1

(iv) A description to include three from:
- environmental pressure/eq;
- competition;
- individuals with beneficial characteristics;
- survive;
- reproduce;
- pass on characteristic to offspring;

plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; 4

(b) nature plays an important part in artificial section; 1

(c) lecture;
publish (in journal); 2

Total 12 marks

10. M;
B;
J;
L;
B; 5

Total 5 marks

11. (a) (i) carbon dioxide; 1

(ii) direction of arrow downwards; 1

(iii) **Either** control has no mealworms;
or has water/no sodium hydroxide solution; 1

(b) (i) An explanation to include two from:
- increase in activity/enzyme reaction/ metabolism/eq;
- more oxygen used as temperature rises;
- levels off at higher temperature; 2

(ii) 2.5; 1

(iii) A suggestion to include two from:
- correct reference to the (fall of) rate of respiration;
- denature enzymes;
- mealworms killed/die;
- no results obtainable/rate falls/eq; 2

Total 8 marks

12. (a) A letter to include four from:
- in water;
- light;
- reference to suitable temperature;
- minerals/named mineral;
- add carbon dioxide;
- keep herbivores out;
- remove dead algae;

plus one communication mark for using a suitable structure and style of writing; 5

(b) Three suggestions from:
- less greenhouse effect/global warning;
- more photosynthesis;
- absorbs carbon dioxide;
- habitats remain;
- less disruption to food chains/webs;
- less risk of species extinction;
- less risk of soil erosion/floods; 3

Total 8 marks

TOTAL MARK 90

Syllabus 1520

Biology A

Specimen Paper 2F

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First Examination Summer 2003

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Success through qualifications

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AMPLIFICATION

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1. C;
A;
B;
C; 4

Total 4 marks

2. in water;
malaria;
virus;
running nose/pains/headaches/eq; 4

Total 4 marks

3. (a) bacteria grew in numbers/eq; 1

(b) 12 hours;
27 – 28 hours; 2

(c) food ran out/build up of toxic waste/eq; 1

Total 4 marks

4. (a) can be used to inseminate more cows/eq; 1

(b) in a freezer/using liquid nitrogen/eq; 1

(c) An explanation to include:
1. thaws out the frozen semen/eq;
2. so the sperms can swim/eq; 2

(d) press the plunger (and cut the seal)/eq; 1

(e) so that the semen enters the uterus/
can reach the fallopian tubes/can reach an egg/eq; 1
[Ignore so that semen goes to the right place/
semen does not go to the wrong place]

Total 6 marks

5. (a) X – bud; 1

(b) A description to include two from:
- buds/**X** grow on the cell/eq;
- they drop away/become independent/eq;
- is asexual/replicates the yeast/eq;

plus 1 communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; 3

(c) *Penicillium* is branched/has hyphae/is part of a mycelium/ yeast is unicellular/
Penicillium reproduces by spores/
yeast has vacuoles/eq; 1

(d) (i) continue the species/spread to new areas/eq; 1

(ii) can travel further/move in the air/eq; 1

Total 7 marks

6. (a) Any two from:
- give air/oxygen for microbes/eq;
- aerobic respiration;
- mix/agitate mixture/ make sure that microbe in contact with nutrients/eq; 2

(b) (i) kill off unwanted microbes/eq; 1

(ii) remains of disinfectant contaminate fermenter/ Fusarium/ fungus may be killed; 1

(iii) steam cools to harmless water/eq; 1

(c) food/energy/eq; 1

(d) (i) aid growth/wrong pH inhibits growth/eq; 1

(ii) to keep mixture at the right/optimum temperature/eq; 1

(iii) kill any live fungus at end of process/eq;
otherwise fungus would continue to grow/eq; 2

Total 10 marks

7. (a) sugar/glucose/eq; 1

(b) An explanation to include:
- measure the amount of carbon dioxide/eq;
- per unit time/using the stopwatch/eq; 2

(c) (i) 99 + 108 + 102 = 309;
$\frac{309}{3}$ = 103; ecf 2

(ii) more likely to represent the true value/eq; 1

(iii) as temperature rises then so does the rate of fermentation/
rate of fermentation is proportional to temperature/eq; 1

(iv) decrease in rate/zero rate/eq;
enzymes below optimum/inactive/
reference to collision theory/eq; 2

(v) very little/no fermentation/eq;
enzyme denatured/destroyed/eq; 2

Total 11 marks

8. (a) (i) sheep **A**/udder cell/eq; 1

(ii) A suggestion to include two from:
- cell would die with two nuclei/eq;
- otherwise it would have the genes of sheep **B**/eq;
- so that the correct DNA would be accepted/eq; 2

(iii) Sheep **A**; 1

(b) does not need sperm/
uses instruments/surrogate mother/eq; 1

(c) A suggestion to include two from:
- there may be dangers/eq;
- may be unethical/eq;
- educates opinion/eq; 2

(d) can be used to produce useful chemicals/products/
large groups of animals with desired characteristics/eq; 1

Total 8 marks

9. An explanation to include five from:

- parent plant must be disease free/eq;
- growing tip has actively dividing cells/ cells dividing by mitosis;
- sterilised to kill microbe/fungi/pathogens/eq;
- cut into pieces to make many plants/eq;
- grown on jelly which contains nutrients/ jelly sloped to drain/eq;
- away water/jelly sloped to avoid rotting/eq;
- cells grown into a ball of cells/callus/eq;
- leaves and roots form/eq;
- plant grown on to become large enough for sale at the garden centre/eq;

plus 1 communication mark for using a suitable structure and style of writing; 6

Total 6 marks

TOTAL MARK 60

Syllabus 1520

Biology A

Specimen Paper 3H

MARK SCHEME

First Examination Summer 2003

Edexcel
Success through qualifications

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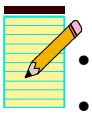

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1. (a) C/Lucy and Daniel have same coloured eyes; 1

(b) (i) male;
blue; 2

(ii) X from ovum/mother;
Y from sperm/father; 2

(c) bb; 1

(d) (i) Lucy; 1

(ii) Rachel's twin must:
- be a girl/Lucy or Sarah;
- have brown eyes/can't have blue eyes; 2

Total 9 marks

2. (a) (i) numbers remain constant/eq;
over a long period of time; 2

(ii) A suggestion to include two from:
- predation;
- some survive;
- to continue the species/eq; 2

(iii) mutation/environmental factor/eq; 1

(iv) A description to include three from:
- environmental pressure/eq;
- competition;
- individuals with beneficial characteristics;
- survive;
- reproduce;
- pass on characteristic to offspring;

plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; 4

(b) nature plays an important part in artificial section; 1

(c) lecture;
publish (in journal); 2

Total 12 marks

3. M;
B;
J;
L;
B; 5

Total 5 marks

4. (a) (i) carbon dioxide; 1

(ii) direction of arrow downwards; 1

(iii) **Either** control has no mealworms;
or has water/no sodium hydroxide solution; 1

(b) (i) An explanation to include two from:
- increase in activity/enzyme reaction/ metabolism/eq;
- more oxygen used as temperature rises;
- levels off at high temperature; 2

(ii) A suggestion to include two from:
- correct reference to the (fall of) rate of respiration;
- denature enzymes;
- mealworms killed/die;
- no results obtainable/rate falls/eq; 2

Total 7 marks

5. (a) A letter to include four from:
- in water;
- light;
- reference to suitable temperature;
- minerals/named mineral;
- add carbon dioxide;
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- remove dead algae;

plus one communication mark for using a suitable structure and style of writing; 5

(b) A suggestion to include three from:
- less greenhouse effect/global warning;
- more photosynthesis;
- absorbs carbon dioxide;
- habitats remain;
- less disruption to food chains/webs;
- less risk of species extinction;
- less risk of soil erosion/floods; 3

Total 8 marks

6. (a) An explanation to include two from:
- dancing generates heat;
- heat transferred out of body/cooling essential/eq;
- prevent enzyme denaturation/death; 2

(b) (i) brain; 1

(ii) kidney; 1

(iii) in the blood/plasma/bloodstream; 1

(c) An explanation to include two from:
- sweat contains salt;
- drinking water does not replace salt;
- water reabsorbed in kidney;
- because of ADH; 2

(d) An explanation to include two from:
- water absorbed;
- by osmosis;
- brain cells contain less water than plasma/eq; 2

Total 9 marks

7. (a) correct letters in boxes;;;; 4

(b) digested;
amino acids;
enzymes;
stomach/pancreas/small intestines;
absorbed; 5

Total 9 marks

8. (a) thymine; 2
cytosine;

(b) 2000 bases;
600 are G/600 are C/1200 are G or C;
800 are A and T/400 are A; 3

Total 5 marks

9. (a) (i) 2.0; 1

(ii) Two suggestions from:
- warm blooded/body temperature constant/eq;
- energy transferred as heat loss;
- respiration rate high;
- active/moves a lot;
- cannot digest food available; 2

Total 3 marks

10. (a) Nn;
NN; 2

(b) two; 1

(c) zero/eq; 1

(d) half/eq; 1

Total 5 marks

11. (a) (i) relay/intermediate; 1

(ii) A description to include two from:
1. synapse;
2. neurotransmitter;
3. diffusion; 2

(b) receptor → neurones → effector → response 3

All correct - 3 marks
3 correct - 2 marks
2 correct - 1 mark
1 correct - 0 marks

Total 6 marks

12. (a) B
A
F
E 3

All correct - 3 marks
3 correct - 2 marks
2 correct - 1 mark
1 correct - 0 marks

(b) 6; 1

(c) Two from:
- reduces/halves chromosome number/ produces haploid cells/eq;
- produces gametes/sex cells/sperms and eggs;
- results in cells which are genetically different;
- occurs in gonads/testes/ovary only;
- produces 4 cells; 2

Total 6 marks

13. An explanation to include five from:
- sulphur dioxide/carbon dioxide/nitrogen oxide;
- from factories/car exhaust/burning fossil fuel;
- acid rain;
- kills plants/deforestation;
- kills fish;
- carbon monoxide;
- less oxygen in blood;
- can kill;
- greenhouse effect/global warming;
- eg carbon dioxide/water vapour;
- flooding;
- loss of habitats;
- species extinction;
- disruption of food chains/webs;
- depletion of ozone layer;
- CFCs;
- danger from ultraviolet/UV radiation;

plus one communication mark for using a suitable structure and style of writing; 6

Total 6 marks

TOTAL MARK 90

Syllabus 1520

Biology A

Specimen Paper 4H

MARK SCHEME

First Examination Summer 2003

Edexcel
Success through qualifications

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- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

1. (a) sugar/glucose/eq; 1

(b) An explanation to include:
- measure the amount of carbon dioxide/eq;
- per unit time/using the stopwatch/eq; 2

(c) (i) 99 + 108 + 102 = 309;
$\frac{309}{3}$ = 103; ecf 2

(ii) more likely to represent the true value/eq; 1

(iii) as temperature rises then so does the rate of fermentation/
rate of fermentation is proportional to temperature/eq; 1

(iv) decrease in rate/zero rate/eq;
enzymes below optimum/inactive/
reference to collision theory/eq; 2

(v) very little/no fermentation/eq;
enzyme denatured/destroyed/eq; 2

Total 11 marks

2. (a) (i) sheep **A**/udder cell/eq; 1

(ii) A suggestion to include two from:
- cell would die with two nuclei/eq;
- otherwise it would have the genes of sheep **B**/eq;
- so that the correct DNA would be accepted/eq; 2

(iii) Sheep **A**; 1

(b) does not need sperm/
uses instruments/surrogate mother/eq; 1

(c) A suggestion to include two from:
- there may be dangers/eq;
- may be unethical/eq;
- educates opinion/eq; 2

(d) can be used to produce useful chemicals/products/
large groups of animals with desired characteristics/eq; 1

Total 8 marks

3. An explanation to include five from:

- parent plant must be disease free/eq;
- growing tip has actively dividing cells/ cells dividing by mitosis;
- sterilised to kill microbe/fungi/pathogens/eq;
- cut into pieces to make many plants/eq;
- grown on jelly which contains nutrients/ jelly sloped to drain/eq;
- away water/jelly sloped to avoid rotting/eq;
- cells grown into a ball of cells/callus/eq;
- leaves and roots form/eq;
- plant grown on to become large enough for sale at the garden centre/eq;

plus 1 communication mark for using a suitable structure and style of writing; 6

Total 6 marks

4. B
F
E
D
A
C

All correct - 5 marks
4 correct - 4 marks
3 correct - 3 marks
2 correct - 2 marks
1 correct - 1 mark 5

Total 5 marks

5. (a) Any two from:

- viral DNA;
- uses bacterial resources/controls protein manufacture;
- to produce more viruses; 2

(b) Box 1
Any four from:

- draw a virus detached from the bacterium/eq;
- show DNA in the bacterium/eq;
- show DNA in the virus/eq;
- label the virus/eq;

label the bacterium/eq; 4

Box 3

- rupture of the wall and membrane/eq;
- escape of at least one virus/empty bacterium/eq; 2

Total 8 marks

6. (a) gene is transferred/eq;
to different species/soya (bean) plant/eq; 2

(b) An explanation to include three from:
- plant is not killed when weedkiller used/eq;
- less competition from weeds/eq;
- more light for crop/eq;
- more water for crop/eq;
- more minerals for crop/eq;
- so more photosynthesis/eq;

plus 1 communication mark for presenting relevant information in a form that suits its purpose; 4

(c) A suggestion to include:
- could pass on weedkiller to consumer/could be toxic/eq;
- could pass on resistance to weeds/eq; 2

Total 8 marks

7. (a) 50 – 55 weeks (accept within range); 1

(b) A description to include three from:
- some proteins are antigens/eq;
- B lymphocytes;
- creation of plasma cells;
- which secrete the antibodies/eq; 3

(c) primary has less antibodies/
secondary produces more antibodies/eq;
secondary response antibodies decrease
more slowly or last longer/eq;
primary response slower/secondary response faster/eq; 3

(d) otherwise it could cause disease/eq; 1

Total 8 marks

8.	(a)	nucleus;	1
	(b)	DNA;	1
	(c)	bases;	1
	(d)	ribosomes;	1
	(e)	amino acids;	1
	(f)	polypeptides;	1

Total 6 marks

TOTAL MARK 60

SPECIFICATION GRID *Specimen Paper*

GCSE Biology A

Syll. No. 1520 Paper No. 1F Foundation Tier

Maximum mark for Paper 90 Page 1 of 1 **Date 7 November 2000**

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of Demand		SocEET aspects	Short ans./ Object.	Equⁿ & Calcⁿ.	Extended Prose		
		AO1		AO2	AO3		Low	Stand.						
		K & U										= 2	> 2	Comm.
		51 – 62												
		Recall	Other	Applicⁿ	Inv.Sc.		G-E	D-C						
		17-21	34-41	28-39	0-5	90	45-54	36-45	✔	≤60	seeCQC	~18	~5	~3
1	4.03/05		3	2		5	5		✔	3		2		
2	1.11/40/41	2	2			4	4		✔	4				
3	4.02	1		4	2	7	7		✔	6	1			
4	1.25/27/28	4	2	2		8	8		✔	8				
5	1.08/09	2		4		6	6		✔	6				
6	1.16	2	3	5		10	10		✔	8		2		
7	1.20/21/23	2	3	4		9	9			7		2		
8	3.14	2	2	4		8		8		4		4		
9	3.04/12	3	7	2		12		12	✔	4		4	3	1
10	1.07/15		5			5		5	✔	5				
11	1.09/18	1	4	2	1	8		8	✔	4		4		
12	2.06/4.04	2	3	2	1	8		8		3			4	1
	Total	21	34	31	4	90	49	41		62	1	18	7	2

SPECIFICATION GRID *Specimen Paper*

GCSE Biology A

Syll. No. 1520 Paper No. 2F Foundation Tier

Maximum mark for Paper 60 Page 1 of 1 **Date 7 November 2000**

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equⁿ & Calcⁿ.	Extended Prose		
		AO1		AO2	AO3		Low	Stand.						
		K & U										= 2	> 2	Comm.
		34 – 41												
		Recall	Other	Applicⁿ	Inv.Sc.		G-E	D-C						
		11-14	22-27	19-26	0-3	60	30-36	24-30	✔	≤40	seeCQC	~12	~3	~2
1	5.21			4		4	4		✔	4				
2	5.14	4				4	4		✔	4				
3	5.02/06/11		1	3		4	4		✔	4				
4	6.15	1	5			6	6		✔	4		2		
5	5.08/09	2	4	1		7	7		✔	4		2		1
6	6.02/03/05	2		8		10	10		✔	8		2		
7	5.10/11	1	10			11		11	✔	7	2	2		
8	6.14		3	3	2	8		8	✔	4		4		
9	6.13	1	3	2		6		6	✔				5	1
	Total	11	26	21	2	60	35	25		39	2	12	5	2

SPECIFICATION GRID Specimen Paper

GCSE Biology A

Syll. No. 1520 Paper No. 3H Higher Tier

Maximum mark for Paper 90 Page 1 of 1 **Date 7 November 2000**

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equⁿ & Calcⁿ.	Extended Prose		
		AO1		AO2	AO3		Stand.	High				= 2	> 2	Comm.
		K & U												
		51 – 62												
		Recall	Other	Applicⁿ	Inv.Sc.		D-C	B-A*						
		17-21	34-41	28-39	0-5	90	36-45	45-54	✔	≤ 60	seeCQC	~14	~9	~3
1	3.14	2	3	4		9	9			5		4		
2	3.04/12	3	7	2		12	12		✔	4		4	3	1
3	1.07/15		5			5	5		✔	5				
4	1.09/18	1	4	1	1	7	7			3		4		
5	2.06/4.04	2	3	2	1	8	8		✔	3			4	1
6	1.02/31/37	2	5	2		9		9	✔	3		6		
7	1.07/08/4.10	2	3	4		9		9		9				
8	3.03	2		3		5		5	✔	2	3			
9	4.06		2	1		3		3	✔	2	1			
10	3.16/17			5		5		5		5				
11	1.22	1	2	3		6		6		4		2		
12	3.07/08	2		4		6		6		6				
13	4.02	3	3			6		6					5	1
	Total	20	37	31	2	90	41	49		51	4	20	12	3

SPECIFICATION GRID Specimen Paper

GCSE Biology A

Syll. No. 1520 Paper No. 4H Higher Tier

Maximum mark for Paper 60 Page 1 of 1 **Date 7 November 2000**

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equⁿ & Calcⁿ.	Extended Prose		
		AO1		AO2	AO3		Stand.	Stand.				= 2	> 2	Comm.
		K & U												
		34 – 41												
		Recall	Other	Applicⁿ	Inv.Sc.		C-D	B-A*						
		11-14	22-27	19-26	0-3	60	24-30	30-36	✔	≤ 40	seeCQC	~9	~6	~2
1.	5.10/11	1	10			11	11		✔	7	2	2		
2.	6.14		3	3	2	8	8		✔	4		4		
3.	6.13	1	3	2		6	6		✔				5	1
4.	5.29	2		3		5	5		✔	5				
5.	5.04	2	1	5		8		8	✔	6		2		
6.	6.11	3	3	2		8		8	✔	2		2	3	1
7.	5.28	2	2	4		8		8	✔	5			3	
8.	6.08/10	2	4			6		6	✔	6				
	Total	13	26	19	2	60	30	30		35	2	10	11	2

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