Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY HIGHER LEVEL

8321/1

PAPER 1

1 hour 30 minutes

Marks 70

2019

Additional Materials: Ruler

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Candidates answer on the Question Paper in the spaces provided.
- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any rough work, diagrams or graphs.
- You may use a non-programmable calculator.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use.*
- Answer **all** questions.
- The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Total	

Marker	
Checker	

HIGHER LEVEL

This document consists of **13** printed pages and **3** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

[Turn over

1 Fig. 1.1 shows a typical plant cell.

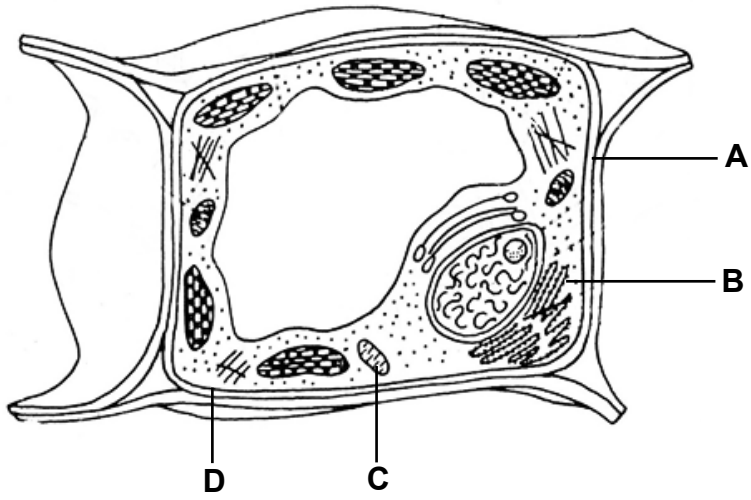

Fig. 1.1

(a) (i) Identify the structures labelled **B** and **C**.

B .....

C ..... [2]

(ii) Name the insoluble substance that structure **A** is made from.

..... [1]

(iii) State the name of the part of the cell which controls its activities.

..... [1]

(iv) List **two** functions of the part labelled **D**.

1.....

.....

2.....

..... [2]

(b) Use a tick (✓) or cross (x) to indicate whether or not the process shown in the table occurs in meiosis, or mitosis, or in both.

Table 1.1

feature	**type of cell division**	
	meiosis	**mitosis**
produces gametes		
produces genetically different daughter cells		
produces diploid daughter cells		
mutations can occur to change the genetic code		

[4]

[10]

For Examiner's Use

2 A grade 12 learner investigated the effect of different pH values on the mass of products formed from their respective substrates by two different enzymes in one hour. The enzymes and substrates were kept at 37°C. Fig. 2.1 shows the results.

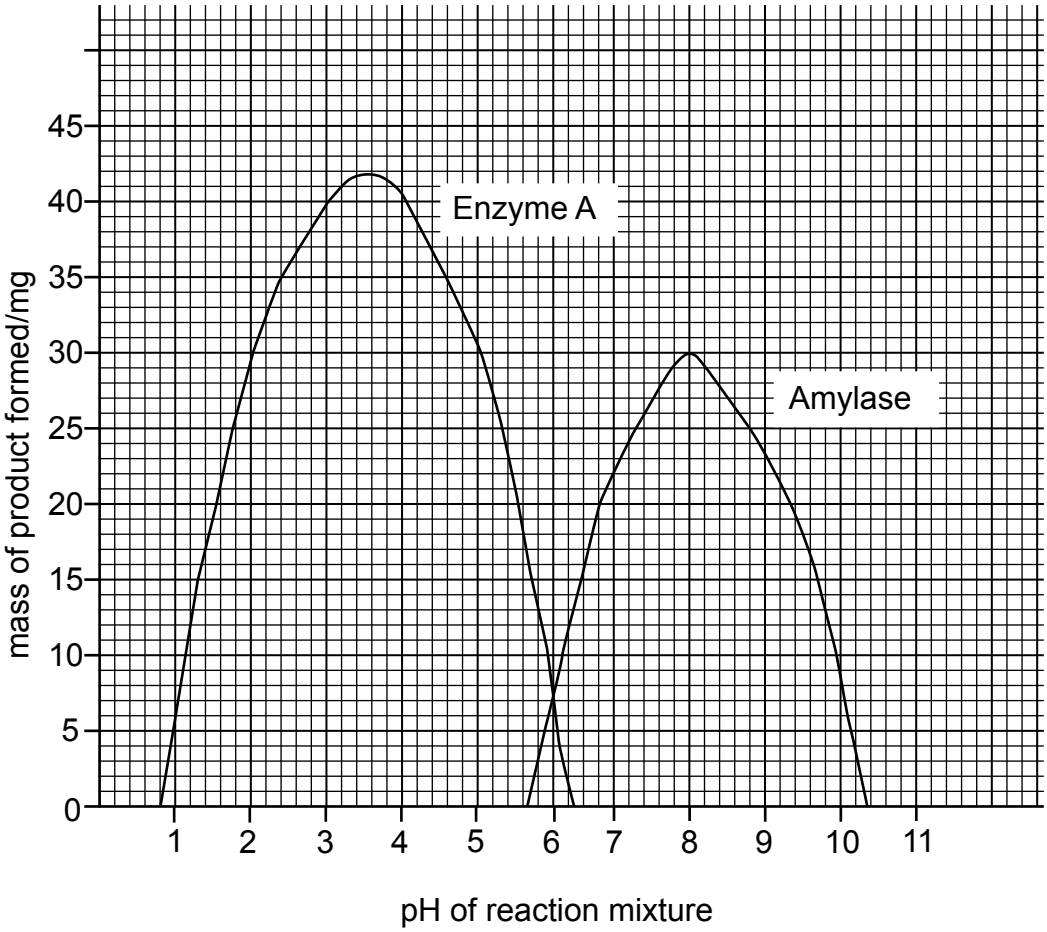

Fig. 2.1

(a) (i) What mass of product was produced by amylase at pH7?

..... [1]

(ii) Suggest which product was formed by the action of amylase on its substrate.

..... [1]

(iii) At which pH values was 30 mg of product formed by enzyme A and by amylase.

enzyme A ..... [1]

amylase ..... [1]

(iv) One of the reactions shown takes place in the human stomach.

Which enzyme, enzyme A or amylase, controls a reaction in the human stomach?

Give a reason for your answer.

enzyme .....

reason .....

..... [2]

(b) The enzyme catalase breaks down hydrogen peroxide into water and oxygen. Fig. 2.2 shows one possible mechanism for this enzyme controlled reaction.

Complete the table below by matching the substances listed to the label **A**, **B**, **C** or **D** in Fig. 2.2.

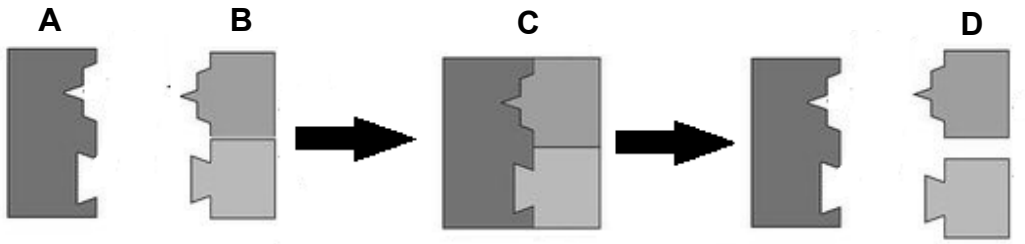

Fig. 2.2

substance	**labels A, B, C or D**
catalase	.....
oxygen and water	.....
hydrogen peroxide	.....
enzyme-substrate complex	.....

[4]

[10]

3 **(a)** Enzymes in the mouth, stomach and small intestine help to digest food.

(i) Explain what enzymes do during digestion.

.....

.....

.....

..... [2]

(ii) Describe the role of the stomach in digestion.

.....

.....

.....

..... [2]

(iii) Explain what must happen to the digested food before it can be used by cells in the body.

.....

.....

.....

..... [2]

(b) Carbohydrates are an essential part of a balanced diet for athletes. A marathon runner in preparation for a competition was advised to follow a diet consisting mainly of starch before the race.

(i) Fig. 3.1 shows the effect of different diets on the stored mass of carbohydrate in the muscle.

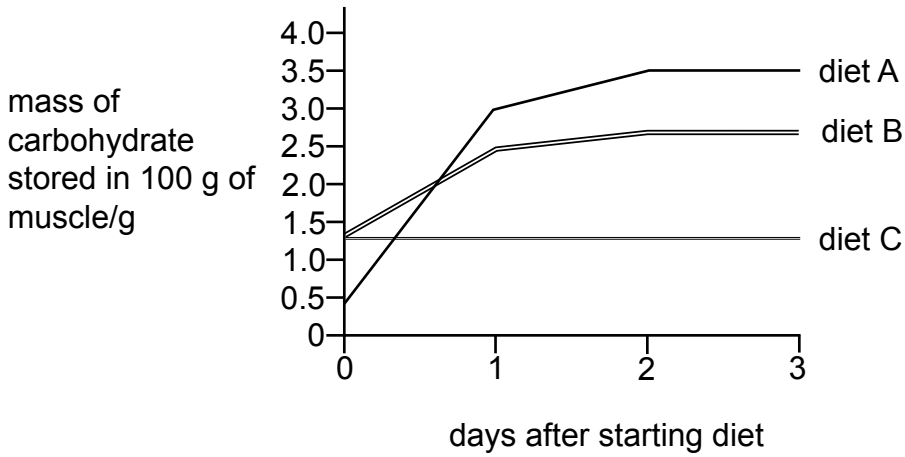

Fig. 3.1

Diet A shows the effect of a high-carbohydrate diet, which was started after several days of following a diet without carbohydrates.

Diet B shows the effect of a high-carbohydrate diet, which was started after a normal mixed diet.

Diet C shows the effect of a normal mixed diet.

Explain how the stored carbohydrate would benefit the athlete during the marathon.

.....

.....

.....

.....

.....

..... [3]

(ii) As part of their preparation for a competition, a marathon runner was advised to follow one of the three diets.

Which diet should they follow and explain the reason for your choice.

diet .....

explanation .....

.....

..... [2]

[11]

For Examiner's Use

4 Fig. 4.1 is a flow diagram showing the process of blood clotting following a cut to the skin. Use Fig. 4.1 to answer the questions below.

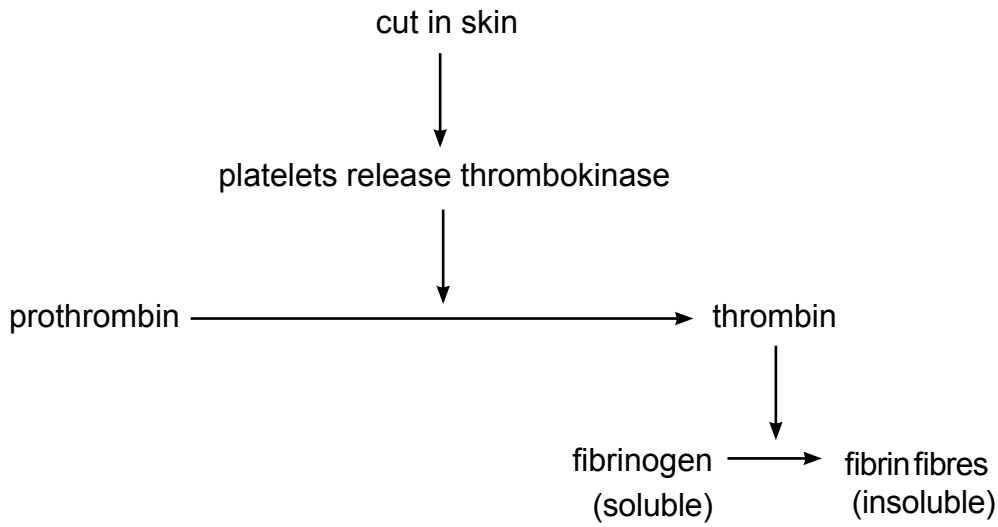

Fig. 4.1

(a) (i) State what must be damaged in the skin to stimulate thrombokinase production.

..... [1]

(ii) What causes the change of prothrombin to thrombin?

..... [1]

(iii) Explain the effect that thrombin has on fibrinogen.

.....

.....

.....

..... [2]

(b) Fig. 4.2 is a drawing of a blood vessel showing ways in which micro-organisms getting into the blood are dealt with.

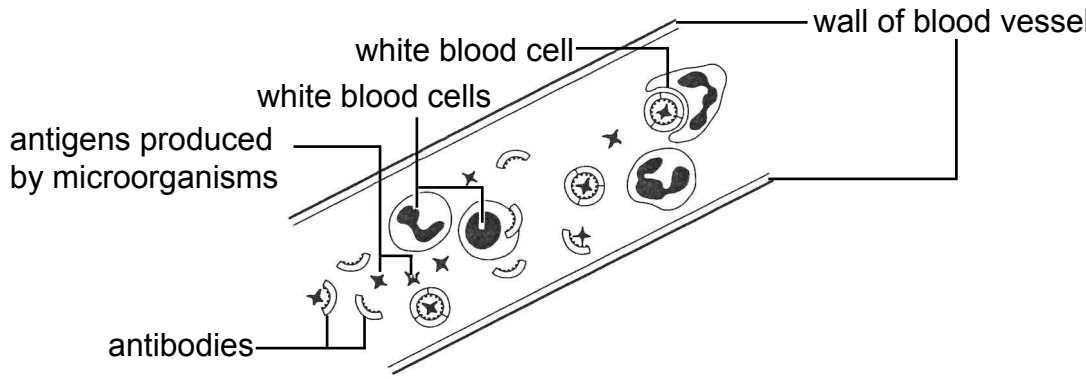

Fig 4.2

With reference to Fig. 4.2, explain how microorganisms are destroyed in the blood.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[9]

For Examiner's Use

5 Fig. 5.1 shows the mechanism by which endothermic animals maintain a constant body temperature despite fluctuations in the external temperature.

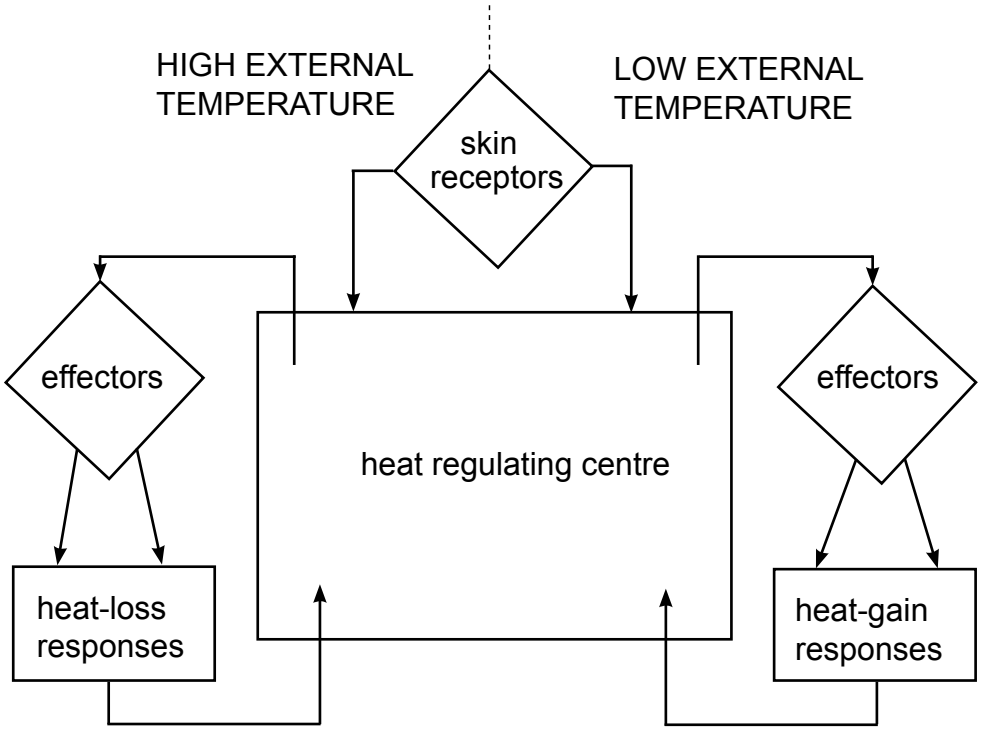

Fig. 5.1

(a) (i) What is the term used for this type of regulatory mechanism?

..... [1]

(ii) Name the part of the brain which is responsible for temperature control.

..... [1]

(b) Describe and explain **two** mechanisms in the body for increasing body temperature and **two** mechanisms for decreasing body temperature.

Increasing body temperature

1 .....

.....

2 .....

.....

Decreasing body temperature

1 .....

.....

2 .....

..... [4]

(c) Summarise the principle of negative feedback.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(d) Explain how the features of the following animals are important in temperature control.

(i) Bat-eared foxes living in Namibia have larger ears than foxes living in the cold climate of the Arctic.

.....

..... [1]

(ii) A species of Namibian grasshopper is dark coloured at low temperatures but becomes a lighter colour at higher temperatures.

.....

..... [1]

(iii) Meerkats live underground in burrows.

.....

..... [1]

[13]

For Examiner's Use

6 Fig. 6.1 shows the base sequence along a strand of DNA which forms part of a gene.

A – C – C – G – T – A – C – T – G – G – A – C – A

Fig. 6.1

(a) (i) Define *a gene*.

.....

..... [1]

(ii) Describe the structure of DNA.

.....

..... [1]

(iii) Write down the sequence of bases that will make up the complementary strand of mRNA.

..... [3]

(b) A mutation occurs to the original DNA strand. The first base A is removed and replaced by a G.

(i) State **two** possible causes of this mutation.

1.....

2..... [2]

(ii) Explain how this change in the base sequence will affect the protein produced.

.....

.....

.....

..... [2]

[9]

For Examiner's Use

7 In an experiment using sugar cane plants, three groups of young plants were treated as below for a period of 12 weeks.

Group A - no extra nitrogen was supplied.

Group B - 100 mg nitrogen was supplied per week.

Group C - 100 mg nitrogen was supplied per week for the first 6 weeks, whereafter no extra nitrogen was supplied for the remaining 6 weeks.

Nitrogen was supplied as ammonium sulfate.

The number of leaves per plant was counted and the mean number of leaves for each group was calculated.

Fig. 7.1 shows the results.

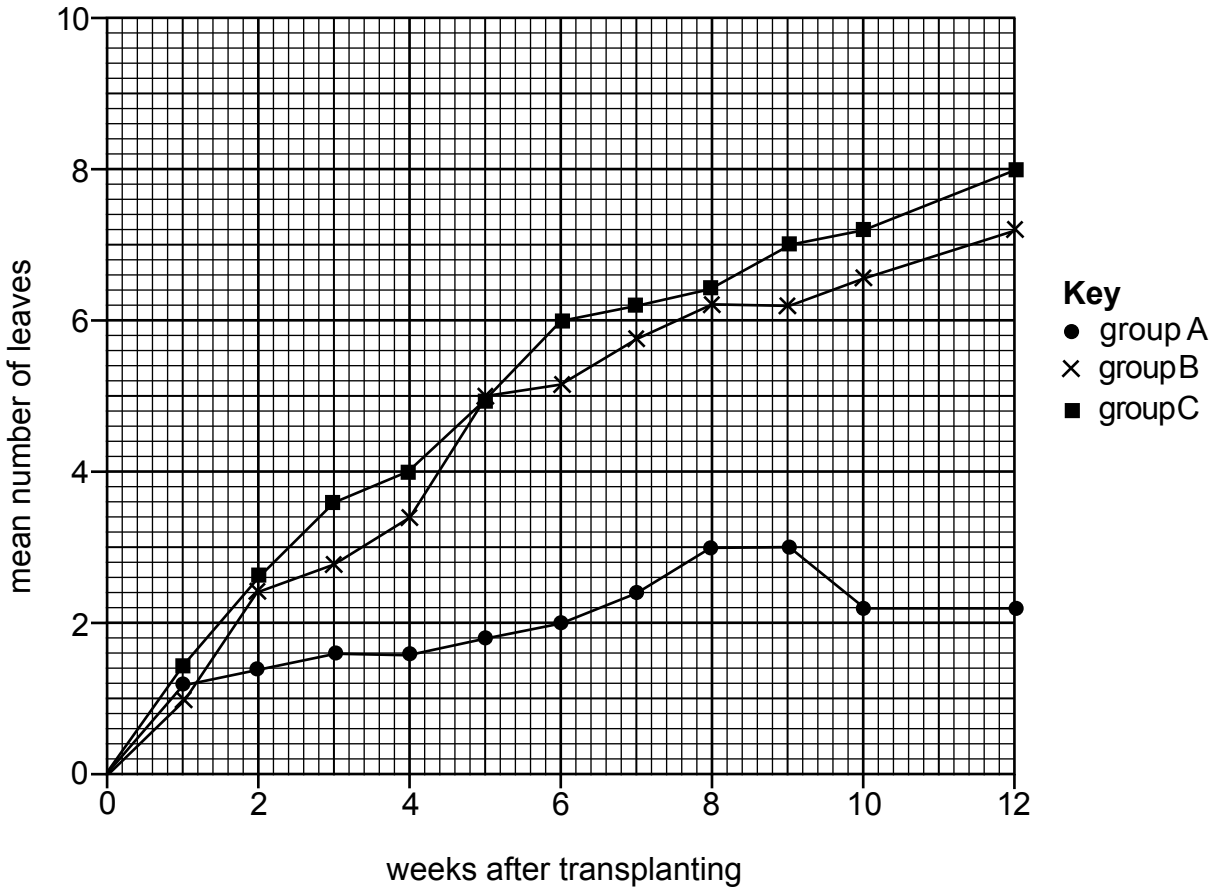

Fig. 7.1

(a) Describe the growth of the leaves in the plants in group **A**.

.....

.....

.....

..... [2]

(b) At the end of the experiment a student concluded that nitrogen fixation alone is not enough to support the growth in the number of leaves.

Which piece of evidence in Fig. 7.1 supports this conclusion?

.....

..... [1]

(c) Suggest an explanation for the difference in the growth between the plants in groups **A** and **B**.

.....

.....

.....

..... [2]

(d) Compare the mean number of the leaves in the plants in groups **B** and **C**.

.....

.....

.....

..... [2]

(e) Use the information about the fertiliser treatment to suggest how the leaves from the plants in group **B** might differ in appearance from those in group **C**.

.....

..... [1]

[8]

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