Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ADVANCED SUBSIDIARY LEVEL 8223/2

PAPER 2 1 hour 15 minutes

Marks 60 **2022**

Additional Material: Non-programmable calculator

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 diagrams, graphs or rough working.
- You may use a non-programmable calculator.
- Do not use correction fluid.

- Answer **all** questions.
- The number of marks is given in brackets [ ] at the end of each question or part question.
- You will lose marks if you do not show your working or if you do not use appropriate units.

For Examiner's use	
1	
2	
3	
4	
Total	

Marker	
Checker	

This document consists of **14** printed pages and **2** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

For Examiner's Use

1 Fig. 1.1 shows a roundworm, *Caenorhabditis elegans*. The actual size of this roundworm is approximately 1mm in length and 0.08 mm in diameter. It does not have a blood circulatory system, nor does it have a respiratory system.

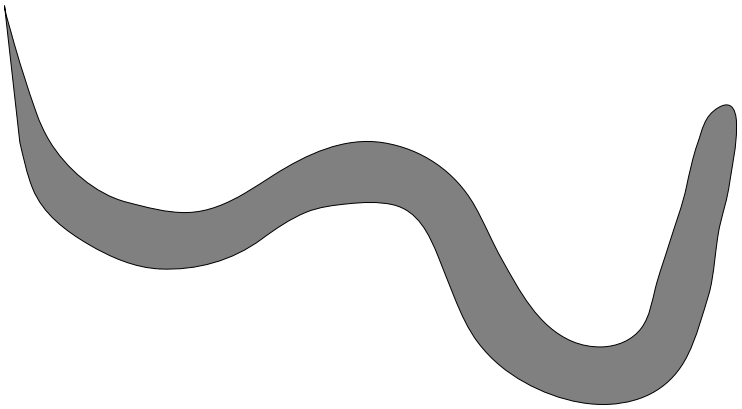

Fig. 1.1

(a) Explain how the body cells of this roundworm are supplied with oxygen.

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..... [2]

(b) Oxygen is transported in blood by a special protein molecule, called haemoglobin.

Describe the structure of this molecule and how it transports oxygen.

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(c) The graph in Fig. 1.2 shows two oxygen dissociation curves.

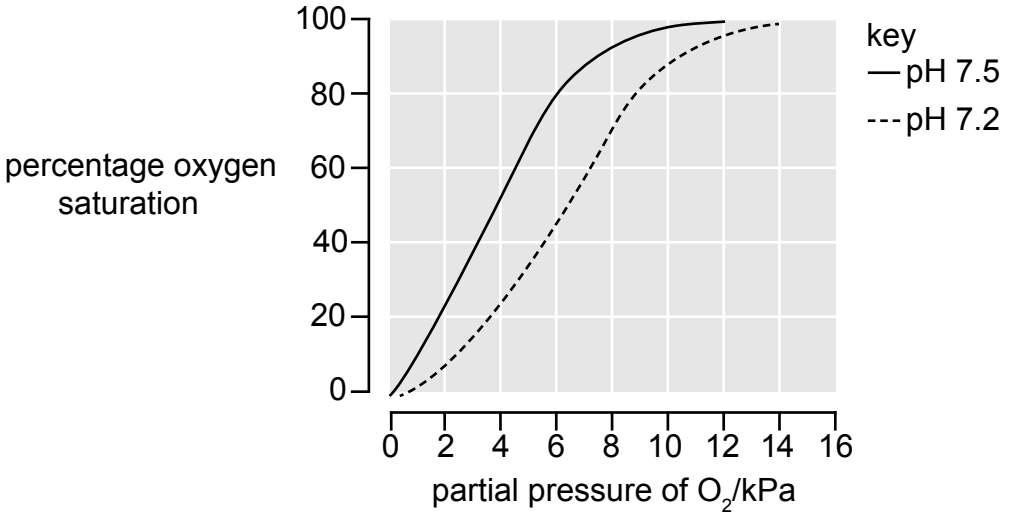

Fig. 1.2

(i) Describe how the changes in pH influence the affinity of haemoglobin for oxygen.

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..... [2]

(ii) Name the effect which is shown in Fig. 1.2.

..... [1]

(iii) Explain how this change in the dissociation curve allows athletes' muscles to respire aerobically for an extended period.

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..... [4]

[12]

For Examiner's Use

2 Malaria is a general health risk in Namibia.

(a) State the binomial name and type of one of the pathogens that causes malaria in Namibia.

Binomial name: .....

Type of pathogen: ..... [2]

(b) Describe how malaria is transmitted.

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(c) The map in Fig. 2.1 shows the distribution of malaria transmission in Namibia.

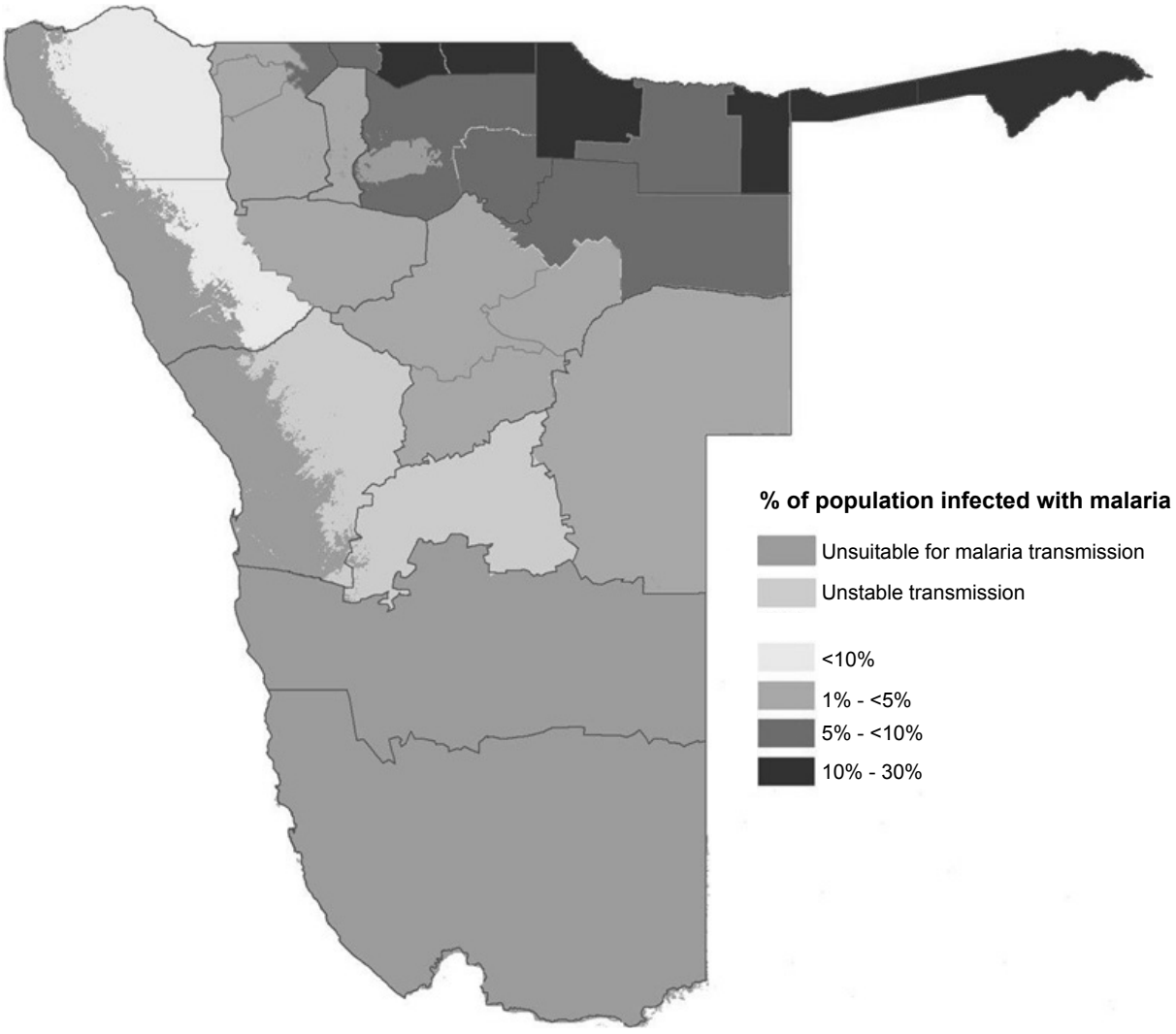

Fig. 2.1

Explain why malaria transmission occurs mainly in the northern regions of Namibia and not in the south or along the coast.

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..... [3]

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(d) Namibia is one of the 21 countries selected by the World Health Organization who have set themselves the goal to eliminate malaria by 2022. The graph in Fig. 2.2 shows the number of reported malaria cases confirmed by slide examination over a period of 10 years.

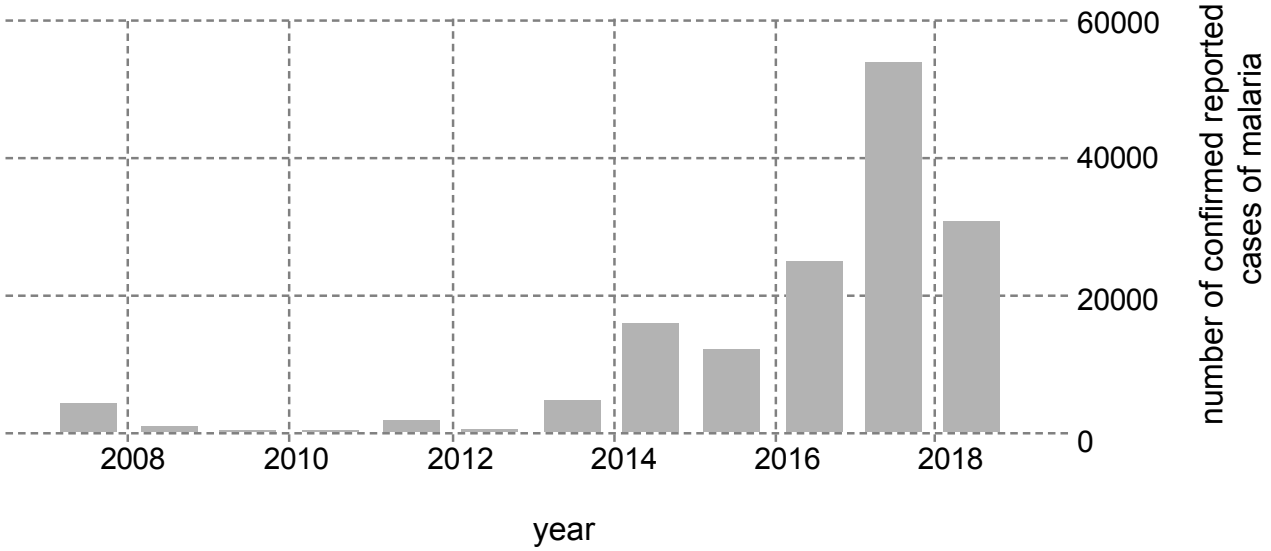

Fig. 2.2

(i) Between 2008 and 2012 the number of reported cases of malaria was low. Explain the measures which brought about such low numbers of cases.

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(ii) Since 2014 the number of cases of malaria has increased.
Suggest why social gatherings at night may have been a contributing factor to this increase.

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..... [2]

(e) Explain why antibiotics such as penicillin prevent bacterial infections but are not effective against the malaria parasite.

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[16]

3 Fig. 3.1 shows the cell cycle.

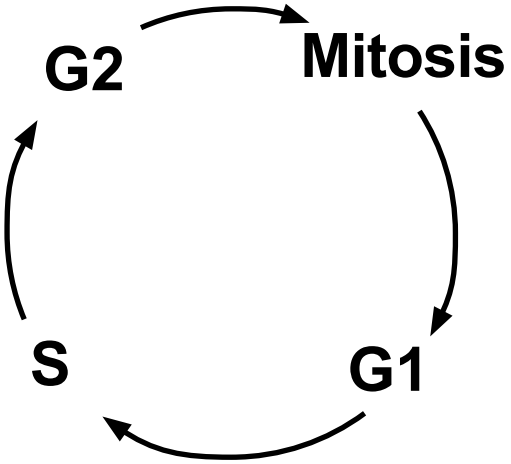

Fig. 3.1

Fig. 3.2 shows the appearance of an animal cell's chromosomes during one stage of mitosis.

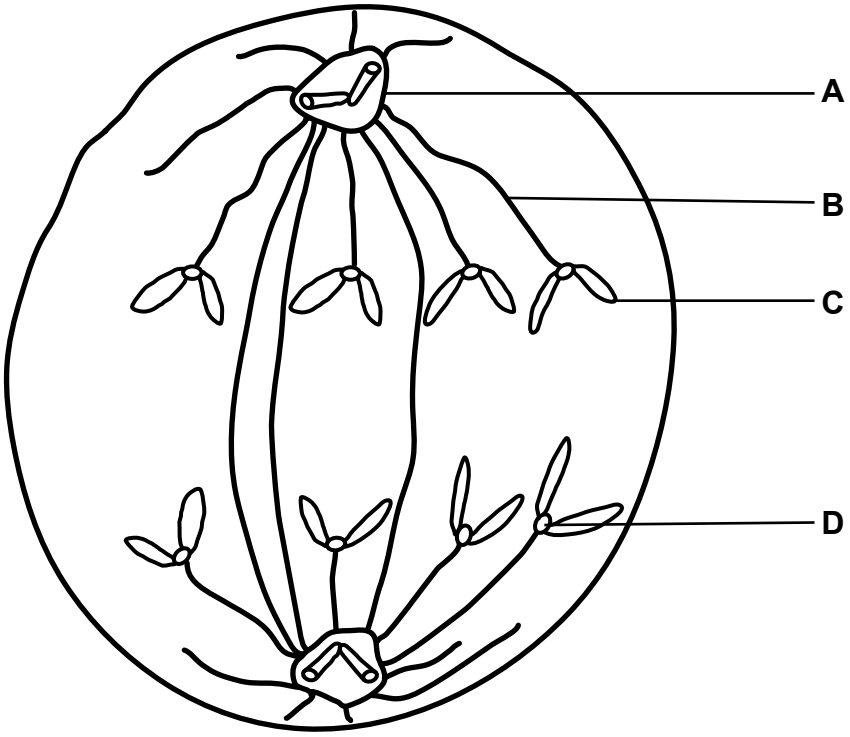

Fig 3.2

For Examiner's Use

(a) (i) State the letter in Fig. 3.1 which represents the phase of the cell cycle in Fig. 3.2.

..... [1]

(ii) Name the stage of mitosis shown in Fig. 3.2. State a reason for your answer.

stage .....

reason .....

..... [2]

(iii) Identify the structures labelled **A** and **B** in Fig. 3.2.

A .....

B ..... [2]

(iv) Describe the functions of the structures labelled **C** and **D** on Fig. 3.2.

C .....

.....

D .....

..... [2]

(b) Fig. 3.3 shows a photomicrograph of an onion root tip, where the cell division is occurring.

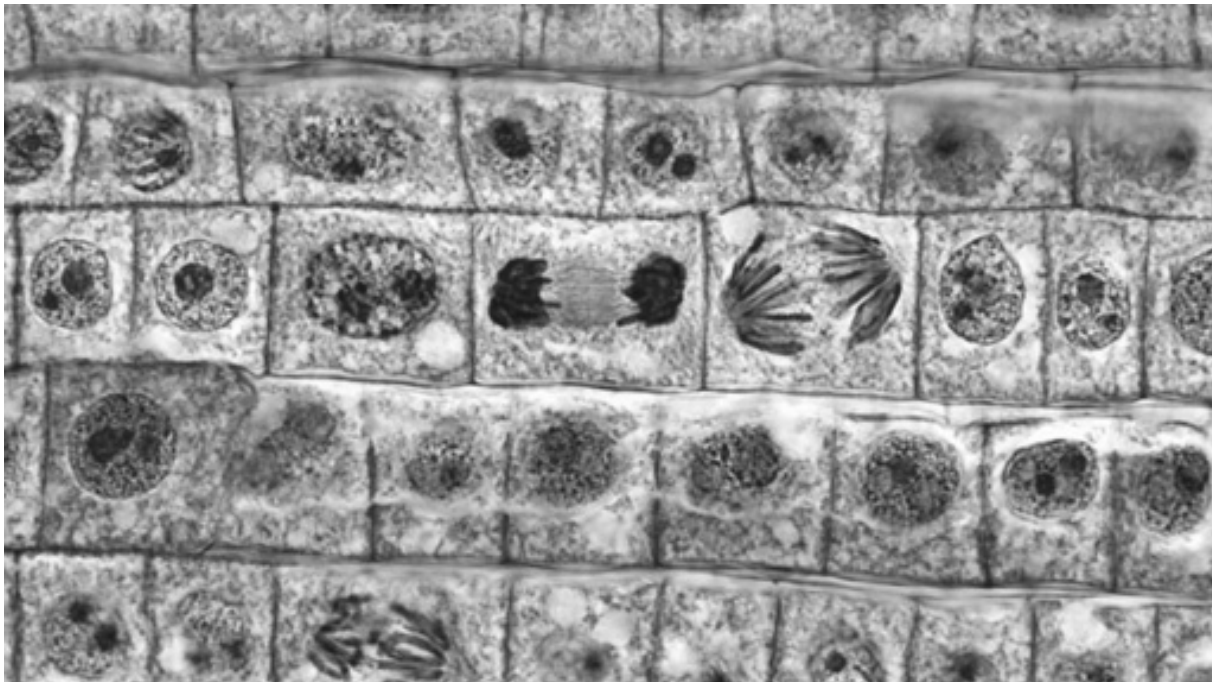

Fig. 3.3

On Fig. 3.3 use the letter M to label one cell which shows the same phase and stage of the cell cycle as the cell in Fig. 3.2. [1]

(c) Describe the behaviour of the chromosomes in an animal cell during the stages following the one shown in Fig. 3.2 until the new nuclear membrane is formed.

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..... [2]

(d) The main event during the S-phase of the cell cycle is DNA replication.

(i) Name the **two** enzymes involved in DNA replication and state the function of each.

Name .....

Function .....

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Name .....

Function .....

..... [4]

For Examiner's Use

(ii) Explain what is meant by the term 's*emi-conservative replication*' of DNA.

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..... [2]

[16]

For Examiner's Use

4 Lipids are a group of organic compounds with many diverse functions.

Fig. 4.1 shows a triglyceride and Fig. 4.2 shows a lipid molecule.

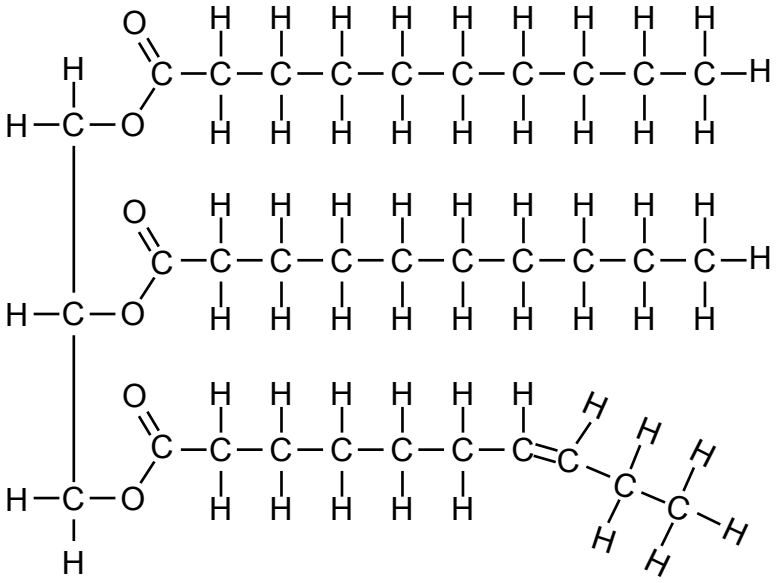

Fig. 4.1

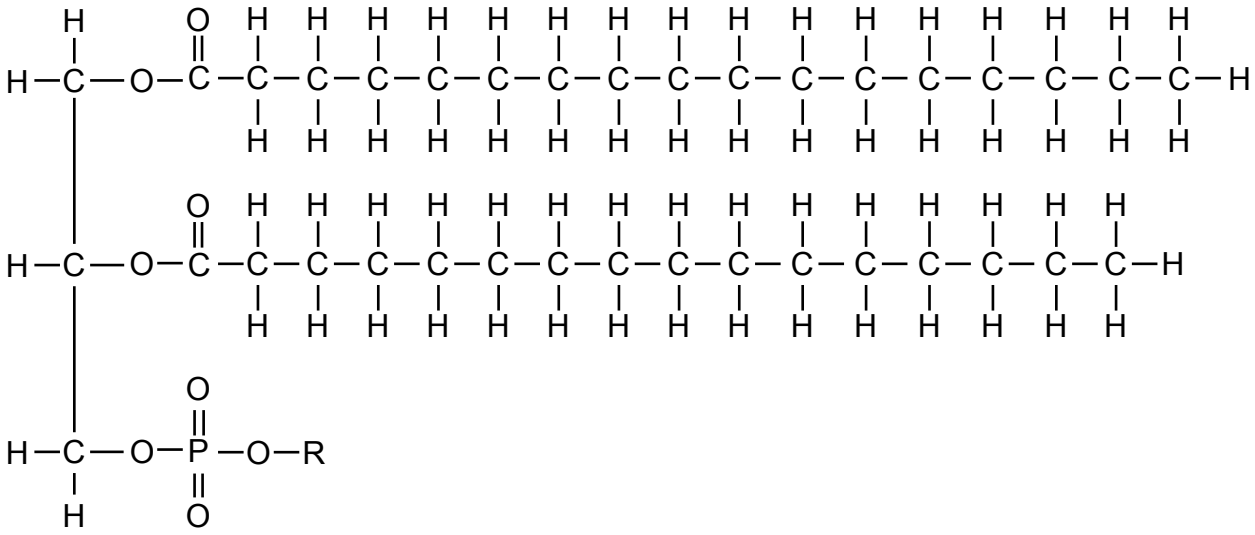

Fig. 4.2

(a) (i) State **one** structural difference between the tryglyceride shown in Fig. 4.1 and the lipid molecule shown in Fig. 4.2.

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..... [1]

For Examiner's Use

(ii) The molecule shown in Fig. 4.2 is a component of cell membranes.

Describe the polarity of the molecule and how this determines its arrangement in the cell membrane. You may make annotations on the diagram in Fig. 4.2 and prepare your own diagram in the space provided to help you answer the question.

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Space for an annotated diagram

[8]

(b) Digestion of triglycerides takes place by means of hydrolysis reactions catalysed by the enzyme lipase. The progress of the reaction can be followed by measuring the change in the pH of the solution.

A solution of the triglyceride tristearin was placed in a water-bath at 25°C. The solution was given time to reach 25 °C before the enzyme lipase was added to it. The pH of the solution was measured every minute for 20 minutes. The results are shown in the graph in Fig. 4.3.

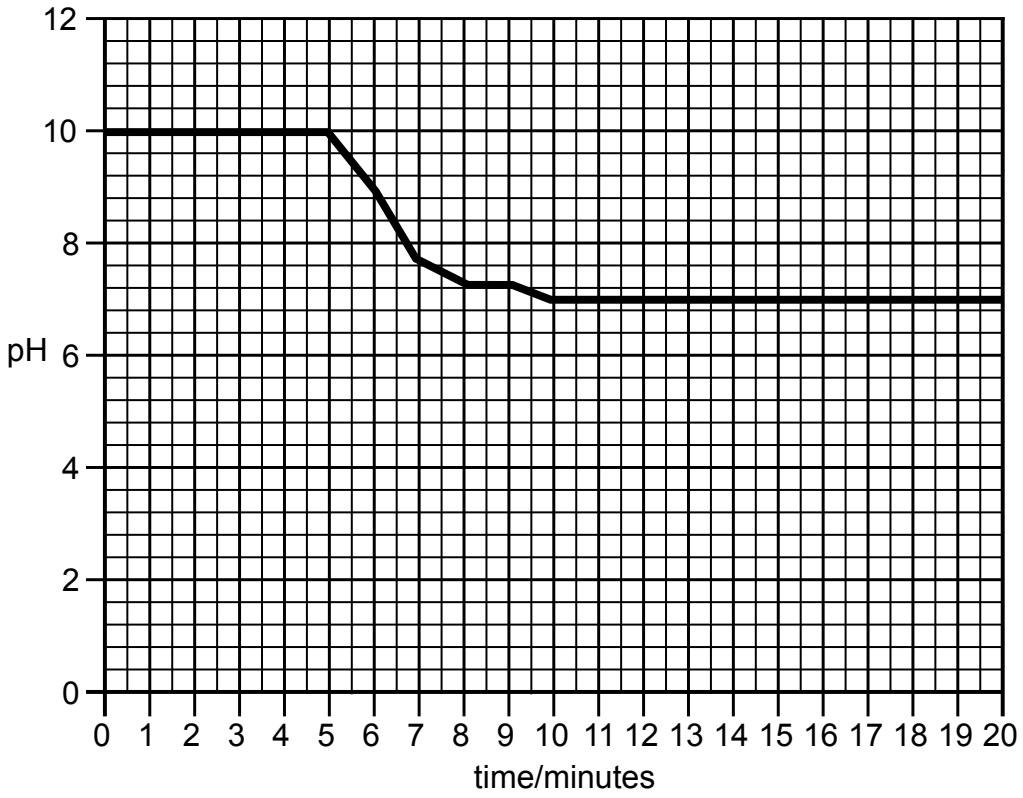

Fig. 4.3

(i) Use the data provided in Fig. 4.3 to state the time when

lipase was added .....

the reaction ended ..... [2]

(ii) Explain why the pH decreased during this reaction.

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..... [2]

(iii) Another solution of tristearin, with the same concentration was placed in another water-bath at 35°C. All other factors in the experiment were kept the same and lipase was added at the same time.

On Fig. 4.3 draw a second graph to indicate the course of the reaction at 35°C. [3]

[16]

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