

Centre Number	Candidate Number	Candidate Name
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NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY HIGHER LEVEL

8321/2

PAPER 2

2 hours 15 minutes

Marks 100

2017

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*.

Section A

- Answer **all** questions.
- You are advised to spend no longer than 1 hour on Section A.

Section B

- Answer **two** questions.
- Write your answers on the answer sheets provided at the end of the booklet.
- The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
Question	
Question	
Total	
Marker	
Checker	

This document consists of **18** printed pages and **2** blank pages.



Republic of Namibia
MINISTRY OF EDUCATION, ARTS AND CULTURE

SECTION A

Answer **all** questions from this section in the spaces provided.

1 Fig. 1.1 shows a photomicrograph of a synapse.

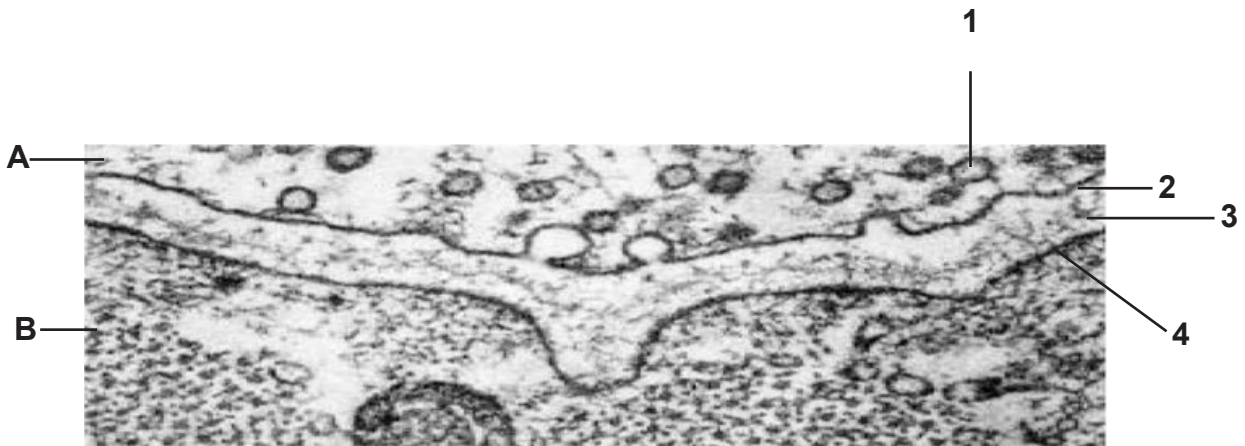


Fig. 1.1

(a) Label structures 1 – 4.

- 1
- 2
- 3
- 4

[4]

(b) Draw a clear arrow on Fig. 1.1 to show the direction of the nerve impulse.

[1]

(c) (i) Name **one** structure found only in **A**.

.....

[1]

(ii) Name **one** structure found only in **B**.

.....

[1]

(d) Explain how the structure labelled 1 enables a nerve impulse to travel from **A** to **B**.

.....

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.....

.....

[3]

[10]

2 Fig. 2.1 shows a diagram of the reactions taking place during a form of autotrophic nutrition which occurs in the chloroplast.

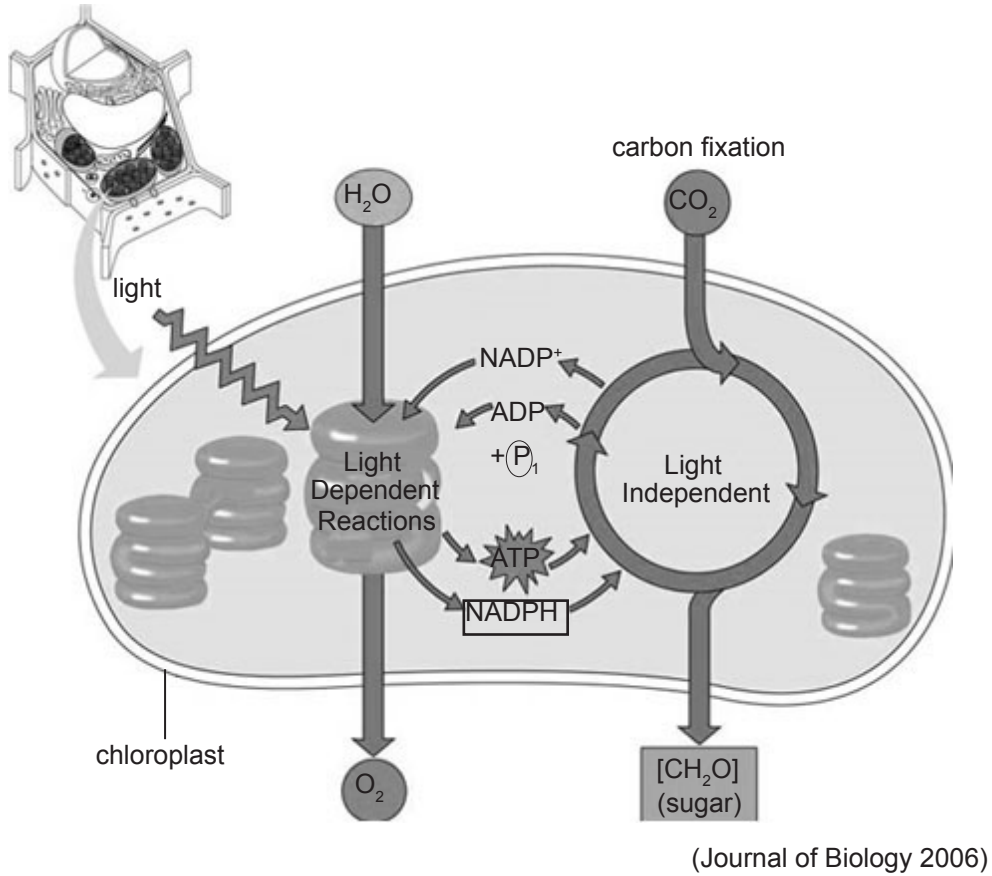


Fig. 2.1

(a) Name the chemical process which is depicted in Fig. 2.1.

..... [1]

(b) Name the exact part of the chloroplast where each of the steps shown takes place.

Light dependent reaction

Light independent reaction..... [1]

(c) Carbon dioxide is one of the raw materials used during the process shown in Fig. 2.1.

(i) Outline the reactions taking place during the light independent reaction.

.....

[3]

(ii) Explain how a change in the carbon dioxide concentration of the air will affect the rate of the process mentioned in 2 (a).

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

[2]

(iii) Water is the other raw material needed for this reaction in the chloroplast. Explain the role of water in this process.

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

[3]

[10]

- 3 Camels are animals found in the deserts of the world. Deserts have extreme temperatures; very hot during the day and very cold at night.



Fig. 3.1

Fig. 3.1 shows an Arabian camel.

- (a) (i) Name **two** methods by which heat can be lost by the camel.

1

2

[1]

- (ii) Select **three** of the adaptations indicated on Fig. 3.1, and explain how each adaptation helps the camel to maintain a constant body temperature.

Adaptation 1

.....

.....

Adaptation 2

.....

.....

Adaptation 3

.....

.....

[3]

- (b) Camels and humans have water in their blood plasma as well as in the cells of their bodies.

Fig. 3.2 shows the effect of dehydration on the water levels of camels and humans. Under normal conditions plasma water makes up 8% of total body water in both mammals.

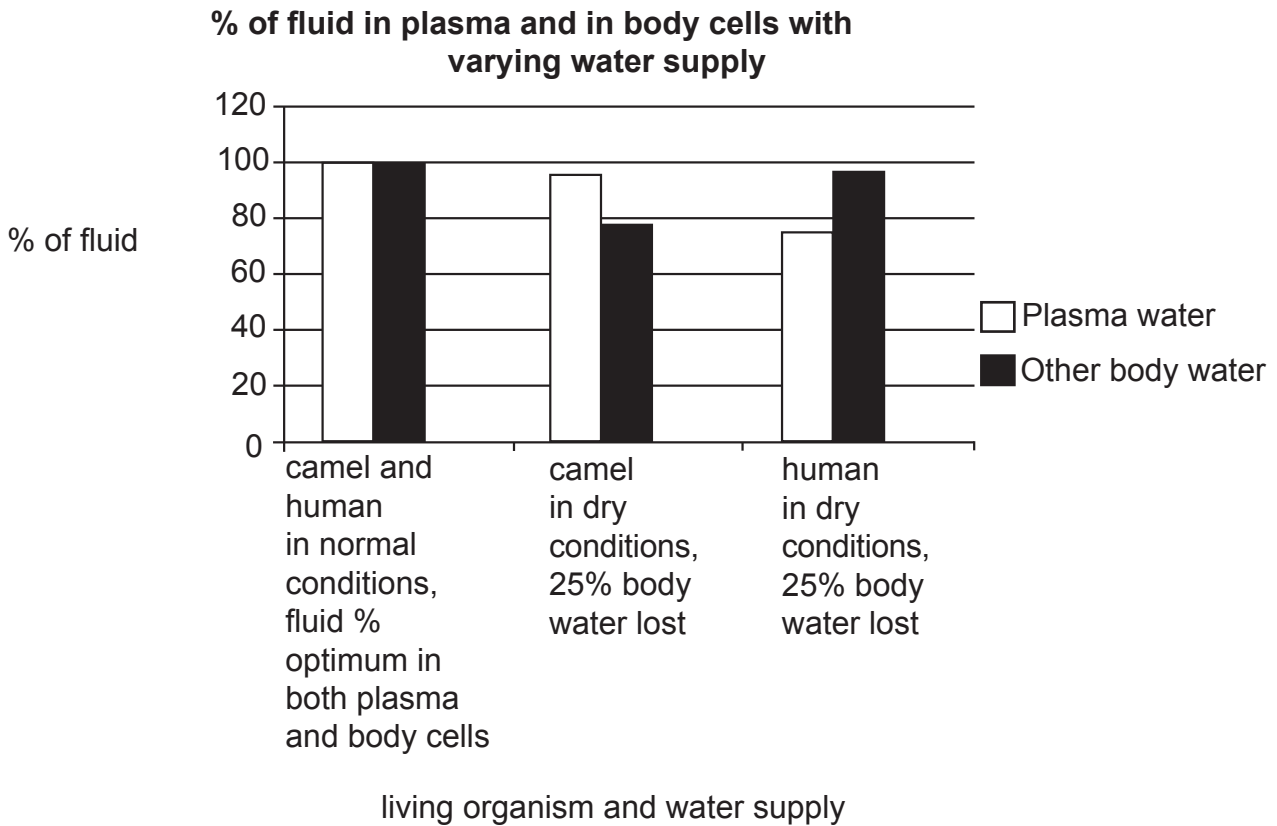


Fig. 3.2

- (i) Refer to Fig. 3.2 and state the % loss of plasma water in camels and humans when both have lost 25% of their total body water.

Camel.....

Human..... [2]

- (ii) Suggest the effect this could have on the ability of the blood to flow.

.....

..... [1]

(iii) Explain why it is important for the camel living in the hot desert environment to have a reduced water loss.

.....

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[3]

[10]

4 Fig. 4.1 shows some of the stages in the nitrogen cycle.

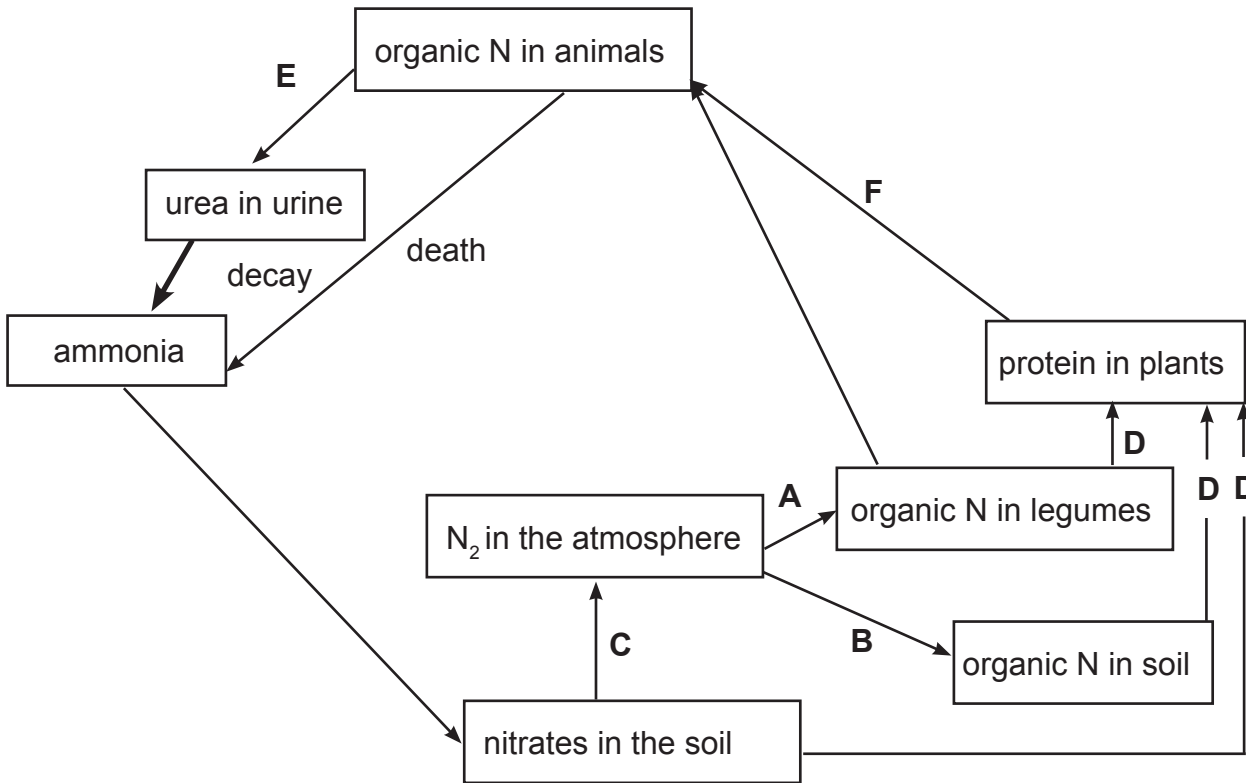


Fig. 4.1

(a) Name the processes taking place at E and F.

E.....

F.....

[2]

(b) Describe the biological processes occurring at A, B and C.

A

.....

B

.....

C

.....

[3]

(c) State **one other** way in which atmospheric nitrogen can be fixed.

.....

[1]

(d) Name and describe the process taking place at **D**.

Name

Description

.....

.....

[2]

(e) Suggest **two** human activities which influence the nitrogen cycle.

1

.....

2

.....

[2]

[10]

5 Soil erosion and desertification are world-wide problems. *Project Auxin* is engineering bacteria to help reduce soil erosion. It is hoped that using these bacteria will accelerate plant root growth and development.

The bacteria will be designed to secrete auxins. The dormant seeds' testa will be coated with the bacteria before planting. Once the seeds germinate, the bacteria will enter the root cells and release auxins.

(a) State **two** functions of the testa of a seed.

1.....

.....

2.....

.....

[2]

(b) Define the term *dormancy* as applied to seeds.

.....

.....

.....

[2]

(c) In some areas, land may become desert as a result of soil erosion. Describe the effect on human populations of land turning to desert.

.....

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[2]

(d) Fig. 5.1 shows the effect of different auxin concentrations on root length.

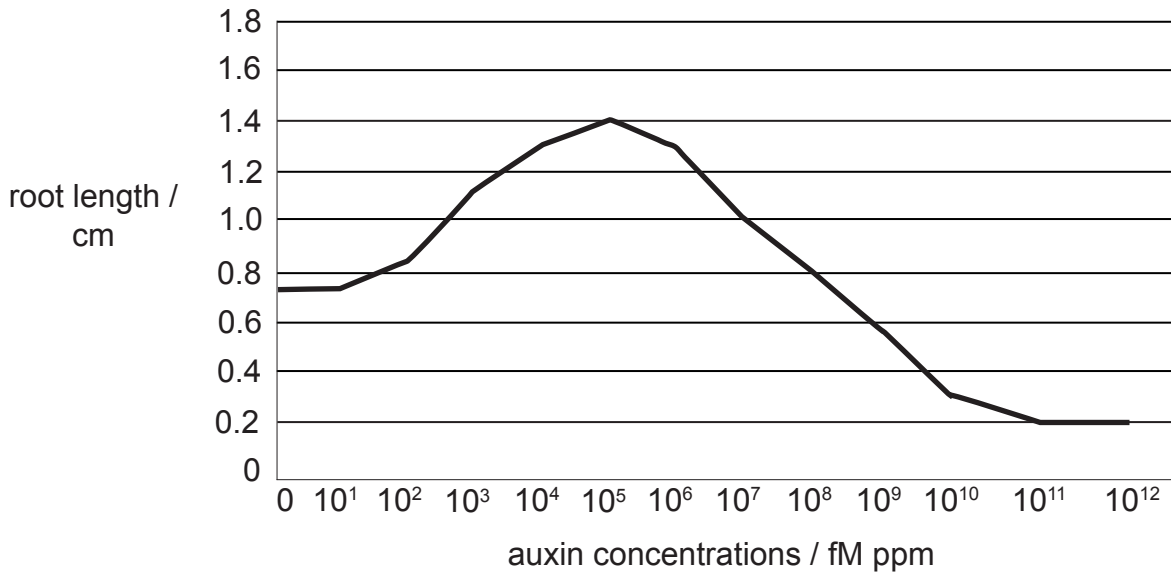


Fig. 5.1

(i) State the function of auxins.

.....

[1]

(ii) With reference to Fig. 5.1 describe the effect of changing the auxin concentration on root growth.

.....

[4]

(iii) Deduce from Fig. 5.1 the optimum auxin concentration which should be produced by the bacteria in the roots. Give a reason for your answer.

Optimum auxin concentration

Reason.....

.....

[2]

(e) Explain how *Project Auxin* could help to reduce soil erosion.

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[2]

(f) Suggest a procedure for inserting the gene for the production of auxins into the *Escherichia coli* bacteria.

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[5]

[20]

SECTION B

Answer any **two** questions from this section.

Write your answers on the answer sheets provided at the end of the booklet.

Use labelled or annotated diagrams if they will make your answer more clearly understood.

- 6** (a) Describe the levels of structure of a protein molecule using haemoglobin as an example to illustrate your answer. [8]
- (b) With reference to the oxygen dissociation curve, explain how haemoglobin transports oxygen from the lungs to the tissues. [6]
- (c) High concentrations of carbon dioxide affect the oxygen dissociation curve. State the name of this effect and explain its importance to tissues. [6]
- [20]**
- 7** Homeostasis is the maintenance of a constant internal environment. When a person comes across a snake when walking in the veld, this internal environment is changed by the secretion of the hormone adrenaline.
- (a) Describe the effect of adrenaline on the body. [4]
- (b) The person starts running and this causes changes in the skin. Describe these changes and explain how they help to maintain a constant body temperature. [4]
- (c) With reference to negative feedback explain how the water potential of the blood is maintained, even when the person has been sweating excessively. [12]
- [20]**
- 8** (a) Describe the structure of the female reproductive system in a flower containing a fully mature ovule. [8]
- (b) Describe the changes that take place in the ovule from fertilisation to seed formation. [8]
- (c) Explain the role of named hormones in maintaining human pregnancy. [4]
- [20]**
- 9** (a) Absorption of water and minerals takes place in the roots of plants whilst absorption of nutrients in animals takes place in the small intestine. Describe the similarities and differences between the structures involved in absorption in both plants and animals. [10]
- (b) Explain the process of translocation as it occurs in the phloem of plants. [10]
- [20]**

ANSWER SHEETS FOR SECTION B

*For
Examiner's
Use*

A series of 25 horizontal dotted lines for writing answers.

This section contains 35 horizontal dotted lines for student response, spanning the width of the page. The lines are evenly spaced and extend from the left margin to the right margin, which is adjacent to the 'For Examiner's Use' area.

Dotted lines for writing.

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