



**ADVANCED SUBSIDIARY GCE
BIOLOGY**

2801

Biology Foundation

TUESDAY 16 JANUARY 2007

Afternoon

Time: 1 hour

Additional materials:
Electronic calculator
Ruler (cm/mm)



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	11	
2	15	
3	12	
4	14	
5	8	
TOTAL	60	

This document consists of **10** printed pages and **2** blank pages.

PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

- 1 (a) Complete the following passage by inserting the most suitable terms in the blank spaces.

Living organisms are interacting constantly with each other and with the environment. Each individual organism is a member of a group, the, which consists of all the individuals of a species in an area. This area is known as the All the organisms of the different species in an area form a group called the All the species and the non-living components interacting within an environment are collectively known as the Photosynthetic organisms such as green plants form the first feeding or level in the food chain and are known as because they can manufacture their own food. Animals are dependent upon the photosynthetic organisms to obtain energy and are known as [7]

- (b) In coastal regions, unusually high tides can cause flooding of land that is not normally covered by sea water.

Explain how plants living in these regions would be affected by the change in water potential (Ψ) of the soil caused by such flooding.

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..... [4]

[Total: 11]

2 Fig. 2.1 represents the structure of the plasma (cell surface) membrane.

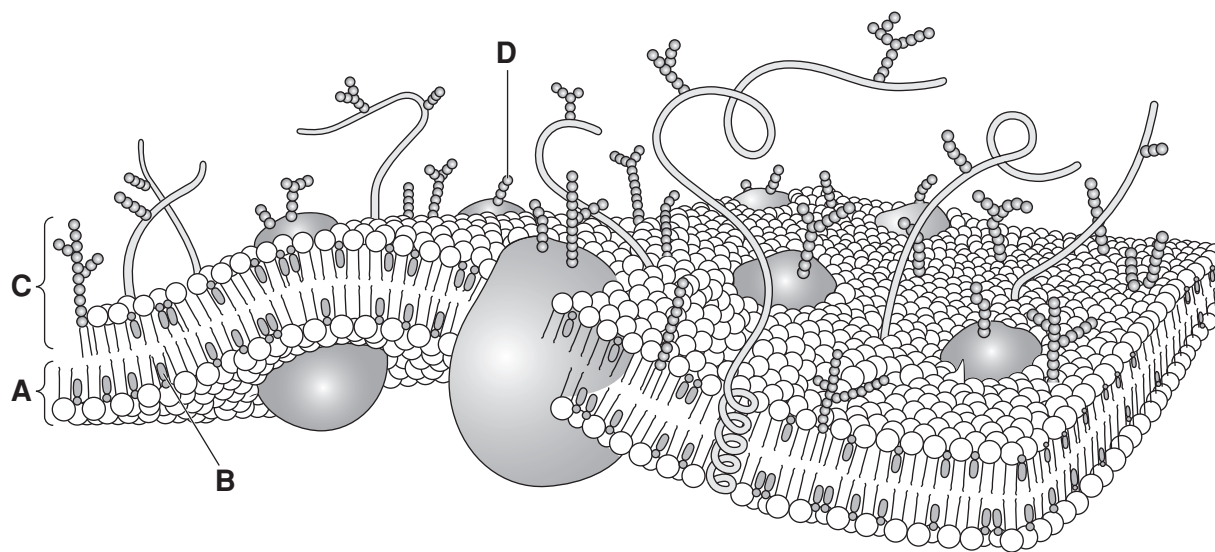


Fig. 2.1

(a) (i) State the name given to the model of membrane structure shown in Fig. 2.1.

..... [1]

(ii) Name the parts labelled A to D.

A

B

C

D [4]

(b) In this question, one mark is available for the quality of spelling, punctuation and grammar.

Outline the roles of membranes at the **surface** of cells and **within** cells.

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..... [9]

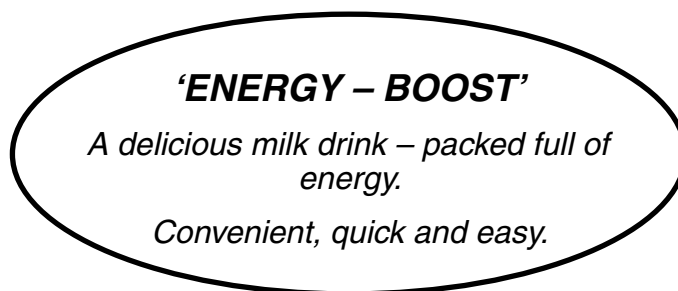
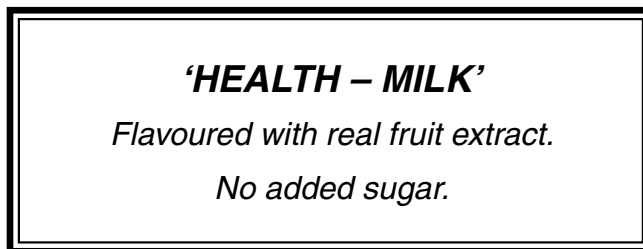
Quality of Written Communication [1]

[Total: 15]

[Turn over

- 3 'Health – Milk' and 'Energy – Boost' are flavoured milk drinks.

The manufacturers make the following claims:



The two different flavoured milk drinks and a sample of fresh milk were all tested for the presence of some biological molecules.

The methods used and the results obtained are shown in Table 3.1.

Table 3.1

method used	colour change observed for		
	fresh milk	'Health – Milk'	'Energy – Boost'
a few drops of iodine solution added	remains yellow	remains yellow	remains yellow
5 cm ³ biuret solution added	blue to lilac	blue to lilac	blue to lilac
5 cm ³ Benedict's reagent added and solution boiled	blue to green	blue to green to yellow	blue to green to yellow to orange
<ul style="list-style-type: none"> • sample that has been tested with Benedict's reagent is filtered • the filtrate (solution) is boiled with 5 cm³ dilute acid, cooled and neutralised • then 5 cm³ Benedict's reagent is added and the solution is boiled 	remains blue	blue to green to yellow to orange	blue to green to yellow to orange to red

(a) Using **only** the information in Table 3.1, state the biological molecules present in

(i) fresh milk;

.....
..... [2]

(ii) 'Health – Milk'.

.....
..... [3]

(b) What **differences** between 'Health – Milk' and 'Energy – Boost' are identified by the information in Table 3.1?

.....
.....
.....
..... [2]

(c) Explain why the claims made by the manufacturer for 'Health – Milk' could be misleading.

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.....
.....
..... [3]

(d) Suggest why it would **not** be appropriate to test milk for lipids using the emulsion test.

.....
..... [1]

(e) Milk is a good source of calcium in the human diet.

State **one** use of calcium in the body.

..... [1]

[Total: 12]

4 Fig. 4.1 is an electron micrograph of part of a cell from a human liver.

This cell is responsible for converting glucose in the body into glycogen for storage. The glycogen can be seen as granules in the cytoplasm.

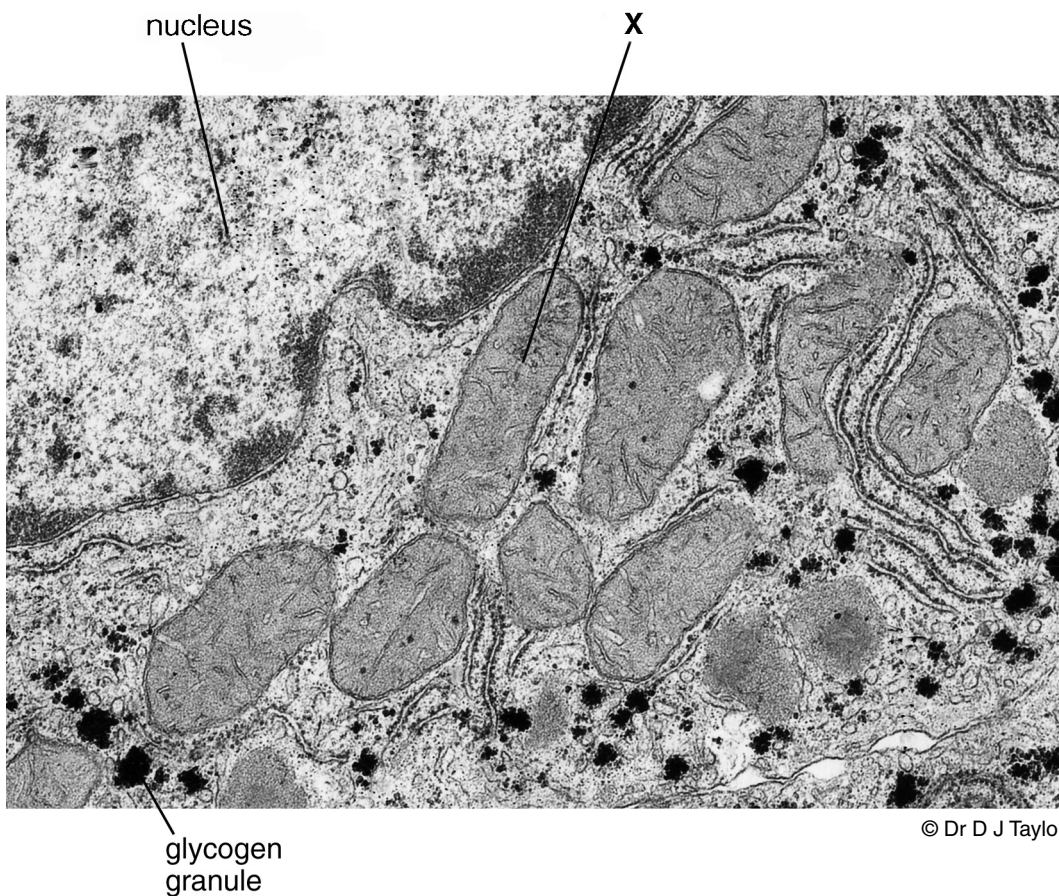


Fig. 4.1

(a) (i) Describe the molecular structure of glycogen.

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.....

..... [4]

(ii) Name the type of chemical reaction that takes place during the formation of glycogen.

..... [1]

(b) The formation of glycogen is one of many enzyme-controlled reactions carried out by liver cells in humans. The liver is a very active organ and generates a lot of heat. The temperature must not be allowed to increase too much as it will affect the rate at which glucose is converted into glycogen.

(i) Suggest the optimum temperature for these enzyme-controlled reactions.

..... [1]

(ii) A **significant** increase in temperature above the optimum has an effect on the rate of an enzyme-controlled reaction.

Explain why this is so.

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..... [4]

(c) (i) Identify the organelle labelled **X** in Fig. 4.1.

..... [1]

(ii) Suggest why liver cells of the type shown in Fig. 4.1 contain many of these organelles.

..... [1]

(d) The haploid number of chromosomes for a human is 23.

(i) State the number of chromosomes present in the nucleus of the liver cell.

..... [1]

(ii) Name the type of nuclear division that produced this liver cell.

..... [1]

[Total: 14]

- 5
- DNA is found in the nucleus of a cell.
 - During interphase DNA replicates.
 - DNA is involved in the transcription stage of protein synthesis.

The following statements, **A** to **H**, refer to events that may take place during:

- ◆ DNA replication **only**
- ◆ transcription **only**
- ◆ **both** DNA replication **and** transcription
- ◆ **neither** DNA replication **nor** transcription.

Complete the table by marking the appropriate boxes with a tick (✓) if the event takes place or a cross (✗) if it does not take place.

		DNA replication	transcription
A	Nucleotides line up along an exposed DNA strand.		
B	The whole of the double helix 'unzips'.		
C	Uracil pairs with adenine.		
D	A tRNA triplet pairs with an exposed codon.		
E	Both DNA polynucleotide chains act as templates.		
F	Adjacent nucleotides bond, forming a sugar-phosphate backbone.		
G	The original DNA molecule is unchanged after the process.		
H	Adenine pairs with thymine.		

[8]

[Total: 8]

END OF QUESTION PAPER

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Copyright Acknowledgements:

Fig. 4.1 Dr D J Taylor

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