OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE

APPLIED SCIENCE

G623

Unit 4: Cells and Molecules

OCE/V03593

Candidates answer on the question paper

OCR Supplied Materials:
None

Other Materials Required:
- Electronic calculator
- Ruler (cm/mm)

Friday 22 May 2009
Morning

Duration: 45 minutes

*G 6 2 3 *

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **45**.
- 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.
- This document consists of **12** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
1	**21**	
2	**7**	
3	**7**	
4	**10**	
TOTAL	**45**	

Answer **all** the questions.

1 **(a)** A teacher produced **Worksheet 1** and **Flash Cards** to use with his class during revision. Imagine you are one of his students using these for revision.

(i) Complete **Worksheet 1**.

Worksheet 1 **Food tests**

A Benedict's reagent

B Biuret

C Ethanol

D Hydrochloric acid

E Iodine in potassium iodide solution

Complete the table by placing a tick (✔) under the appropriate letter.

feature	**A**	**B**	**C**	**D**	**E**
positive end-point when used in test is a cloudy white emulsion					
positive end-point when used in test is a lilac/mauve colour					
test reagent for lipids					
test reagent for proteins					
test reagent for reducing sugars					
test reagent for starch					
used to hydrolyse non-reducing sugars					

[7]

(ii) **Flash Cards** The flash cards were to be used to revise facts about proteins. Each card had a question on one side and the correct answer on the other side.

Question	**Answer**
Which elements are found in all proteins?	Carbon, nitrogen, oxygen and hydrogen

Fig. 1.1 Example Flash Card

State the correct answers to questions 1 to 4 in the right hand boxes.

Question 1	Answer 1
Name the type of bond that links two amino acids together in a polypeptide chain.	**[1]**

Question 2	Answer 2
What is the primary structure of a protein?	**[1]**

Question 3	Answer 3
Name **two** types of secondary structure shown by proteins.	**[2]**

Question 4	Answer 4
What is the tertiary structure of a protein?	**[1]**

(b) Maltose and sucrose are disaccharide sugars.

Every disaccharide is formed from two smaller, simpler sugars.
Use words from the list to complete sentences **(i)**, **(ii)** and **(iii)**.

condensation **dipeptide** **glycosidic** **hydrolysis**

maltose **sucrose** **water**

(i) A disaccharide sugar is formed during a ..... reaction. **[1]**

(ii) The type of bond that links two glucose molecules together in a disaccaharide is called a ..... bond. **[1]**

(iii) When two glucose molecules combine the products are

..... and ..... . **[2]**

(c) Explain what is meant by the term *fluid mosaic* as applied to the structure of the cell membrane.

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.....

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..... **[5]**

[Total: 21]

2 Imagine that you are given several thin sections of plant tissue suspended in water.

Describe how you would prepare a temporary microscope slide, for use with a light microscope, to investigate the structure of the cells in this tissue.
You can assume that a risk assessment has been done. You therefore do not need to describe one.

Use the following words in your description.

air bubbles **cover slip** **distilled water** **filter paper** **microscope slide**

mounted needle **small, fine- haired brush** **stain** **teat pipette**

In this question, two marks will be given for the organisation of your answer and for the appropriate use of English.

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..... **[5]**

Quality of Written Communication **[2]**

[Total: 7]

3 Scientists working in forensic pathology laboratories sometimes study pollen grains as part of an investigation.

Pollen grains produced by one species of plant are different from those produced by plants of another species. One difference is size. Fig. 3.1 shows two extremes of pollen grain size.

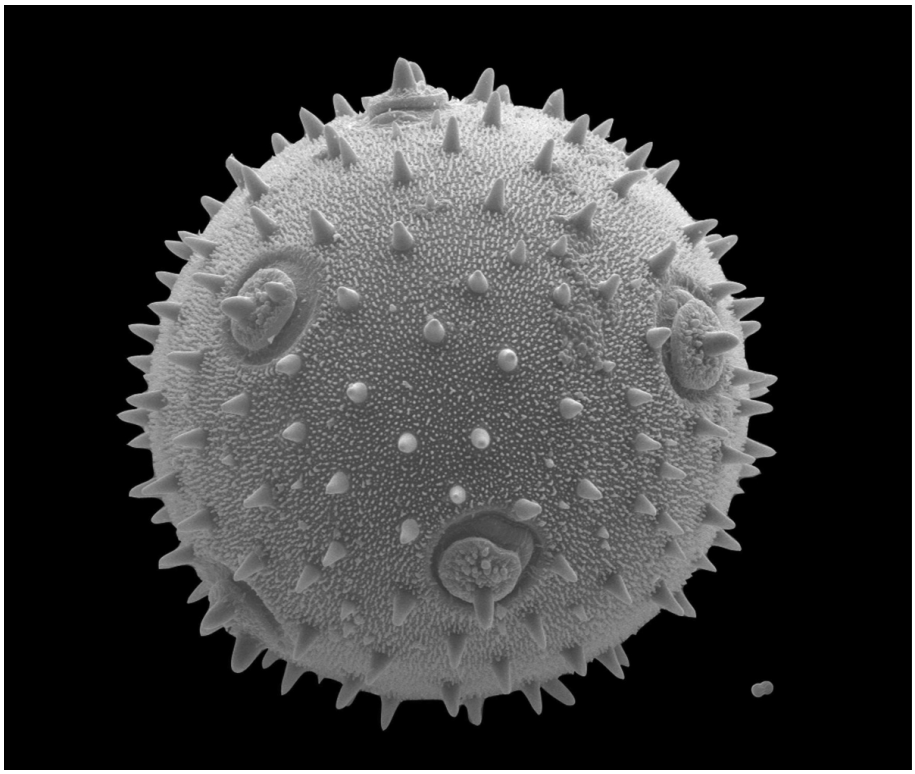

Fig. 3.1 Scanning electron microscope micrograph of *Cucurbita* and *Myosotis* pollen grains

The larger pollen grain, from a *Cucurbita* (marrow) plant, is one of the largest. The smaller pollen grain, bottom right in Fig. 3.1 is from a *Myosotis* sp. (forget-me-not) plant and is one of the smallest pollen grains.

The *Myosotis* pollen grain is 6 µm (0.006 mm) long.

Use the size of the image of the *Myosotis* pollen grain

(a) to estimate the **actual size** of the *Cucurbita* pollen grain

(Do **not** include the length of the spines in your estimation.)

actual size = ... µm **[4]**

(b) to calculate the **magnification** used to produce this image of the *Cucurbita* pollen grain.

(Do not include the length of the spines in your calculation.)

magnification = ... **[3]**

[Total: 7]

4 **(a)** Scientists working in pathology laboratories use a variety of apparatus including haemocytometers, micrometers and microscopes.

For what would they use

1 a haemocytometer

.....

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

2 a micrometer?

.....

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

(b) Fig. 4.1 shows a light micrograph of cells from a cervical smear.

Two of the cells have been labelled.

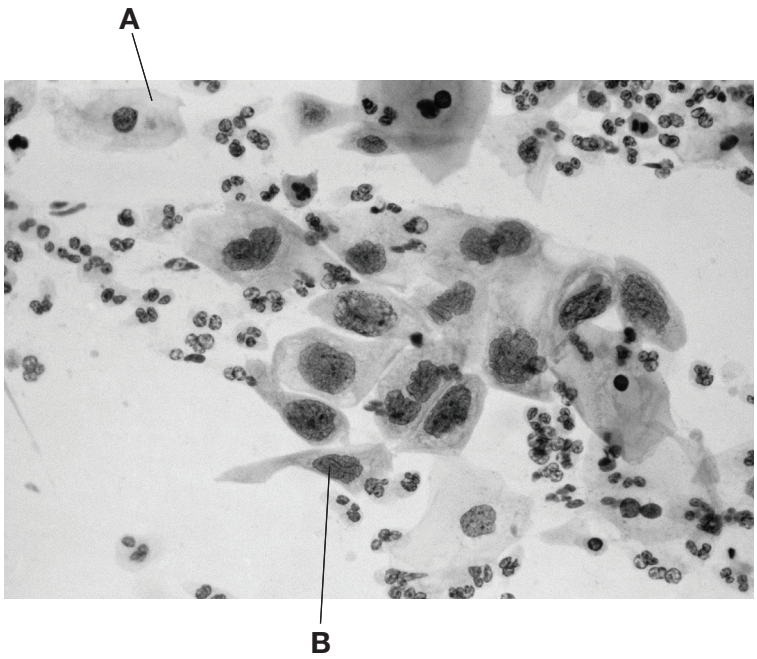

Fig. 4.1

(i) Cell **A** is a normal cell. Cell **B** is abnormal.

State how these cells differ in appearance.

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

(ii) Clearly label on Fig. 4.1:

1 another normal cell;

2 another abnormal cell. **[2]**

(iii) In practice, what else would have been used to make the identification of normal and abnormal cells easier?

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

(c) Diagnostic tests, including the use of monoclonal antibodies, can be used to identify diseases.

Fig. 4.2 shows how the various components involved in an ELISA test interact.

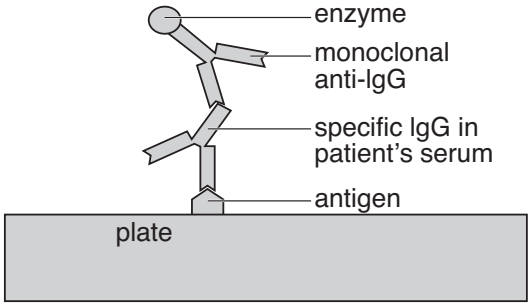

Fig. 4.2

Use your knowledge and Fig. 4.2 to explain how an ELISA test works.

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[Total: 10]

END OF QUESTION PAPER

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