

**ADVANCED GCE  
BIOLOGY**

Growth, Development and Reproduction

**FRIDAY 22 JUNE 2007**

**2805/01**

Afternoon

Time: 1 hour 30 minutes

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	16	
2	17	
3	12	
4	10	
5	16	
6	19	
<b>TOTAL</b>	<b>90</b>	

This document consists of **20** printed pages, **4** blank pages and an insert.

Answer **all** the questions.

1 (a) Fig. 1.1, on an insert, shows a transverse section through part of a human testis.

(i) Complete the table below by writing the name of **one** type of cell from the human testis that matches the description in each case.

description of type of cell	name of type of cell
contains the diploid number of chromosomes	.....
produced by the second division of meiosis (meiosis II)	.....
grows into primary spermatocyte	.....
secretes fluid into lumen of seminiferous tubule	.....
matures into sperm	.....

[5]

(ii) Describe how the hormone testosterone is involved in spermatogenesis.

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

(b) Describe what happens to mature spermatozoa after they leave the seminiferous tubules until they are ejaculated in semen.

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

- (c) It has been suggested that radiation from frequent mobile phone use may reduce sperm counts in men.

Hungarian scientists carried out a study to compare the sperm counts of men who used mobile phones frequently with those of men who did not use mobile phones. They reported their findings in 2004:

- the scientists studied 221 men over a period of 13 months
  - they measured the sperm counts of the men
  - the sperm counts of men who used mobile phones frequently were found to be approximately 30% lower than the sperm counts of men who did not use mobile phones.
- (i) In their report, the scientists stated that further controlled studies were needed before conclusions could be drawn.

Suggest **two** improvements that could be included in further studies.

1 .....

.....

2 .....

..... [2]

- (ii) Suggest **one** way in which spermatozoa could be affected by the radiation from mobile phones.

.....

..... [1]

[Total: 16]



.....  
.....  
.....  
.....  
.....  
.....  
..... [6]

Quality of Written Communication [1]

- (b) Grafting is another method commonly used for artificial propagation of plants, particularly fruit trees. A piece of shoot (the scion) is grafted on to a root system (the stock) from another plant. Desirable characteristics of the scion and stock can be chosen.

Fig. 2.1 shows stages in the grafting process.

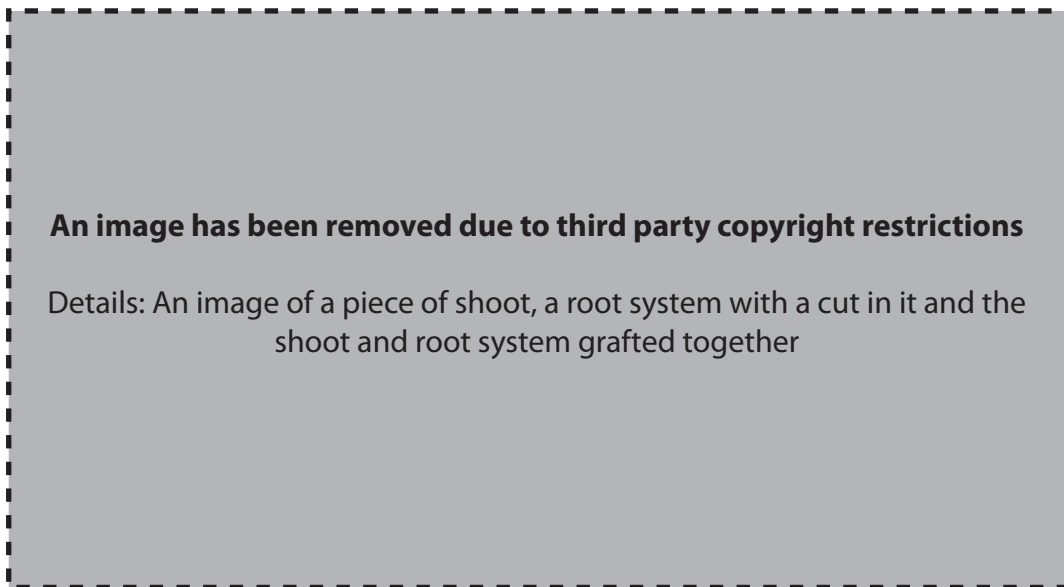


Fig. 2.1

- (i) Describe two advantages of producing new fruit trees by grafting rather than growing from seed.

1 .....

.....

2 .....

..... [2]

- (ii) Suggest **two** desirable characteristics that could be chosen for the scion and **two** desirable characteristics that could be chosen for the stock in fruit tree production.

*scion*

1 .....

2 .....

*stock*

1 .....

2 ..... [4]

- (iii) The scion and stock are tied together so that their cut surfaces are in close contact.

Explain why the cut surfaces of the scion and stock need to be kept in close contact.

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

- (iv) Any shoots that grow directly from the **stock** are cut off.

Explain why these shoots are not left to grow and produce fruit.

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

[Total: 17]

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3 (a) Early in pregnancy, the hormone Chorionic Gonadotrophin (CG) is secreted. The first sign of pregnancy is usually a missed menstrual period.

(i) State **one** site of secretion of CG.

..... [1]

(ii) Explain how secretion of CG causes menstrual periods to stop.

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

CG is transported in the blood of a pregnant woman and can be detected in her urine.

(b) State **one** conclusion that can be drawn about the size of CG molecules.

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

(c) The flow chart in Fig. 3.1 shows the major maternal blood vessels through which blood containing CG flows before reaching the kidneys.

Complete the flow chart with the names of the correct **blood vessels**.

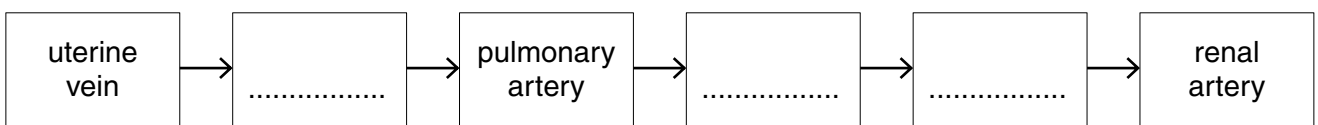


Fig. 3.1

[3]

(d) The presence of CG in the urine can be used in pregnancy testing. Information about a pregnancy testing kit is given below and in Fig. 3.2.

- An absorbent membrane is dipped into urine.
- The membrane contains free antibodies that are specific to CG.
- The free antibodies are attached to coloured markers.
- There is a line of immobilised antibodies above position A.
- A positive result is shown by a coloured line at position A.

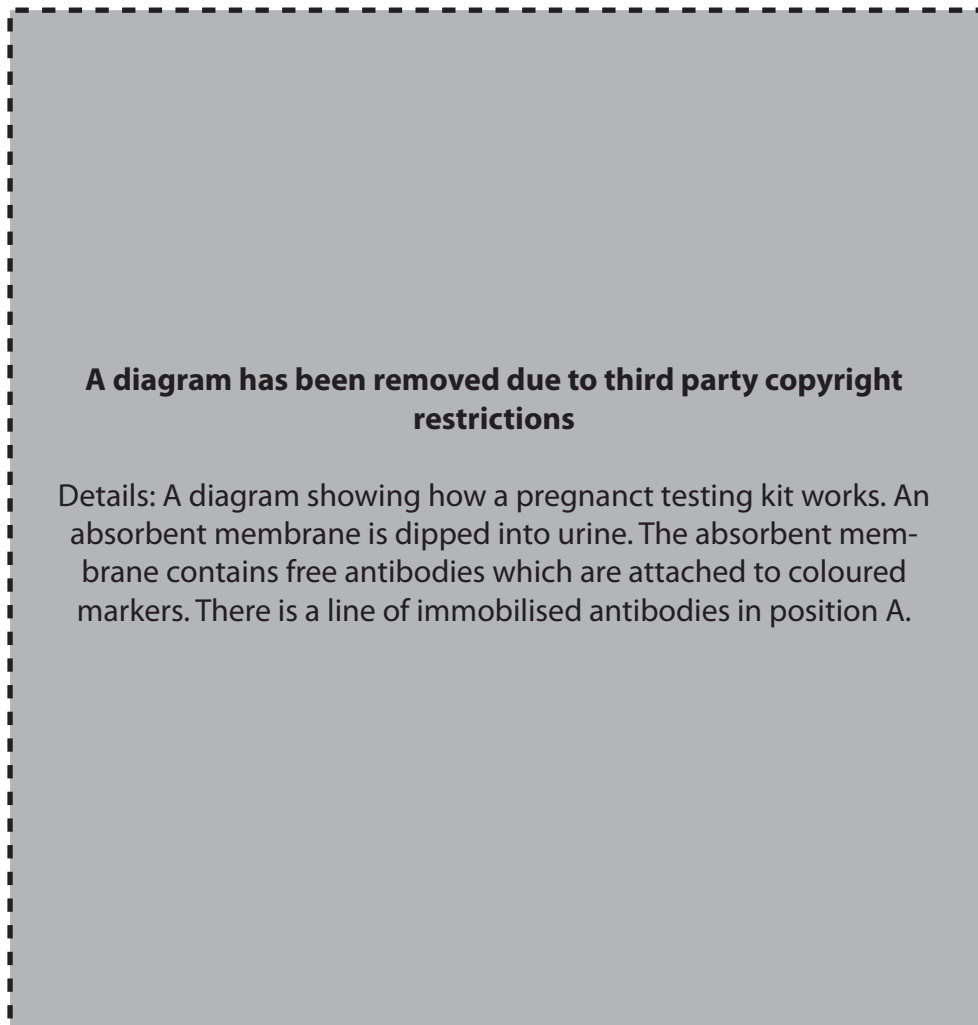


Fig. 3.2

Using information from Fig. 3.2, explain how the presence of CG in the urine results in a coloured line at position **A**.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

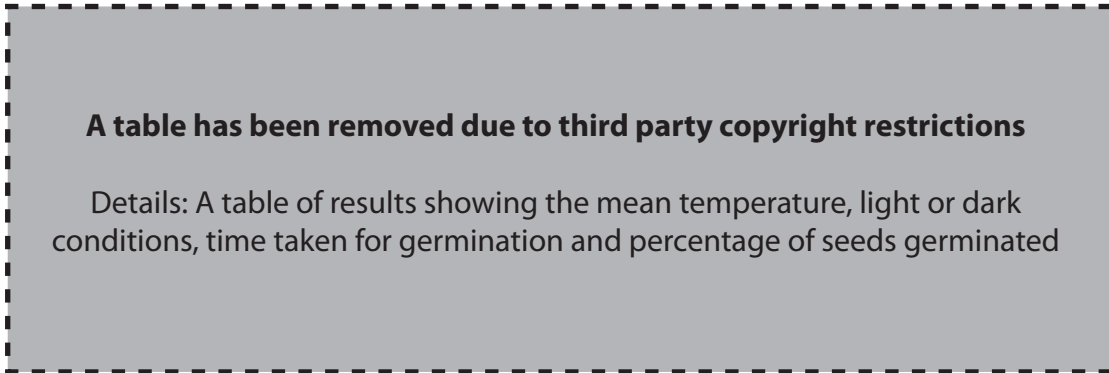
[Total: 12]

- 4 (a) An investigation was carried out into the effect of temperature and light on the germination of seeds of *Delphinium ajacis* .

Three batches, each of 50 seeds , were placed on thin, damp paper towels. Each batch was placed in a plastic bag to retain moisture. The batches were left in different conditions.

For each batch, the time taken for seeds to germinate and the percentage of seeds germinated were measured. The results are shown in Table 4.1.

Table 4.1



- (i) Calculate the number of seeds that germinated at 20°C in the dark .

Show your working.

Answer = ..... [2]

(ii) Using information from Table 4.1, describe and explain how temperature and light affect the germination of seeds of *Delphinium ajacis*.

temperature .....

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

light .....

.....  
.....  
.....  
..... [4]

(iii) State two other environmental factors necessary for seed germination.

1 .....

2 ..... [2]

(b) The following advice is given to gardeners:

**An extract of text has been removed due to third party copyright restrictions**

Details: A piece of advice given to gardeners about germinating delphinium seeds in the dark

Suggest reasons for these observations.

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

[Total: 10]

5 (a) Growth is a characteristic of all living organisms.

Define the term *growth*.

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

(b) The growth of living organisms can be shown using growth curves. These may be absolute or relative growth curves.

State **two** advantages of using a **relative** growth curve rather than using an absolute growth curve.

1 .....  
.....  
2 .....  
..... [2]

(c) Slow growth of a human fetus can lead to:

- an increased risk of stillbirth
- difficulties during labour
- illness after birth.

(i) Describe how the growth of a fetus can be measured.

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

(ii) Suggest **two** reasons for slow growth of a fetus.

1 .....  
.....  
2 .....  
..... [2]







**18**  
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6 (a) Milk from cows may be contaminated by a wide variety of bacteria. During storage of milk these bacteria reproduce.

(i) Suggest how milk from cows may become contaminated with bacteria.

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

(ii) Describe how bacterial cells reproduce.

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

(b) Before milk from cows is processed it may be stored for several days. The number of bacteria in a sample of milk depends on several factors including:

- the number of bacteria before storage
- storage time
- storage temperature.

Fig. 6.1 shows the effects of these factors on the numbers of bacteria in samples of milk. The two samples, A and B, contained different numbers of bacteria before storage.

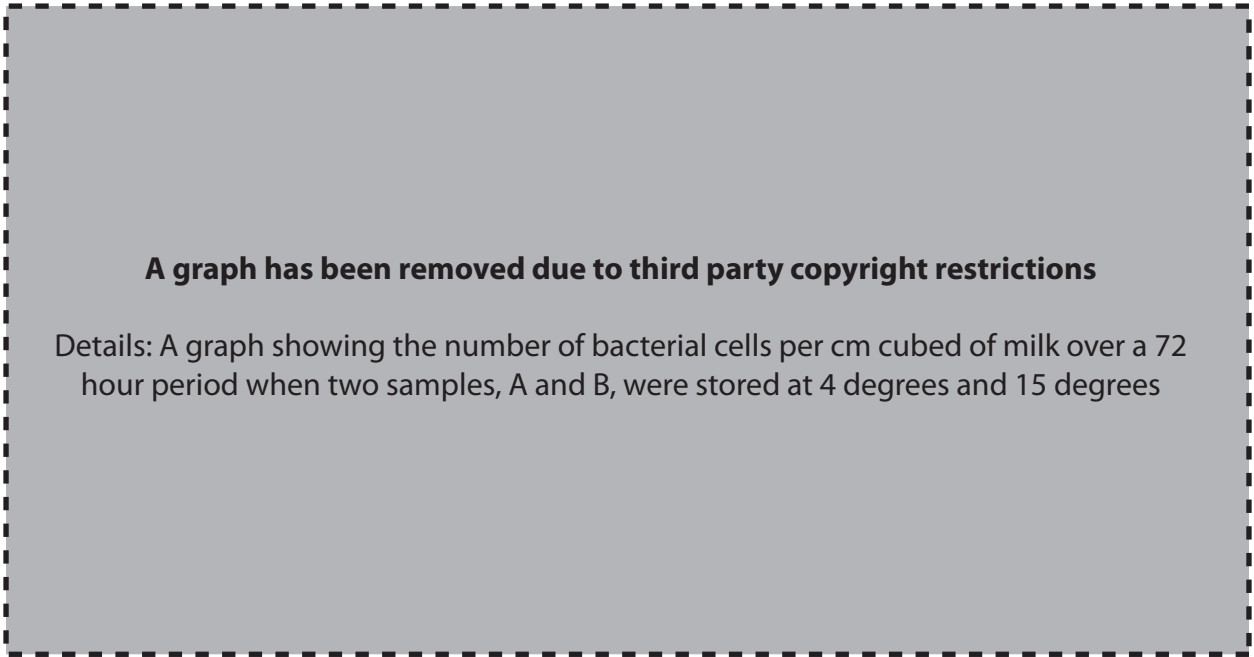


Fig. 6.1

(i) It is important that good practices are put into place before processing the milk, to limit reproduction of bacteria during storage.

State two practices that should be put in place. In each case support your answer with information from Fig. 6.1.

1 .....

.....

.....

2 .....

.....

..... [4]



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**23**  
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