

**ADVANCED GCE****BIOLOGY**

Growth, Development and Reproduction

2805/01

Candidates answer on the Question Paper

OCR Supplied Materials:

None

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

Friday 25 June 2010**Afternoon****Duration:** 1 hour 30 minutesCandidate
ForenameCandidate
Surname

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

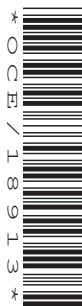
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the 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 **90**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You are advised to show all the steps in any calculations.
- This document consists of **24** pages. Any blank pages are indicated.

Examiner's Use Only:

1			
2			
3			
4			
5			
6			
Total			



Answer **all** the questions.

- 1 (a) (i) Distinguish between *absolute growth rate* and *relative growth rate*.

.....

.....

.....

..... [2]

- (ii) Explain why an absolute growth curve does **not** give an accurate indication of the true rate of growth.

.....

.....

.....

..... [2]

- (iii) Describe how the **relative growth rate** of a small mammal may be determined.

.....

.....

.....

.....

.....

.....

.....

..... [4]

- (b) The masses of five adolescent girls, measured eighteen months before their first menstrual period and eighteen months after their first menstrual period, are shown in Table 1.1.

Table 1.1

girl	mass eighteen months before first menstrual period / kg	mass eighteen months after first menstrual period / kg
P	34.1	52.7
Q	33.5	51.6
R	36.4	50.1
S	34.2	53.1
T	33.3	50.6
mean	34.3	51.6

- (i) Calculate the percentage increase **per year** in the mean mass of the girls. Show your working.

Answer =% increase y^{-1} [2]

- (ii) Girl **R** was the heaviest of the five girls eighteen months before her first menstrual period, but **not** eighteen months afterwards.

Suggest **two** possible reasons why girl **R** did not grow as fast as the other girls.

.....

 [2]

[Total : 12]

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

Explain the functions of the anterior pituitary gland **and** the functions of the thyroid gland in human growth and development.

..... [9]

Quality of Written Communication [1]

[Total : 10]

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

QUESTION 3 STARTS ON PAGE 6

- 3 Tissue culture is a method of artificial propagation in plants. One technique for carrying out tissue culture is to remove meristems from shoot tips of plants and culture them as shown in Fig. 3.1.

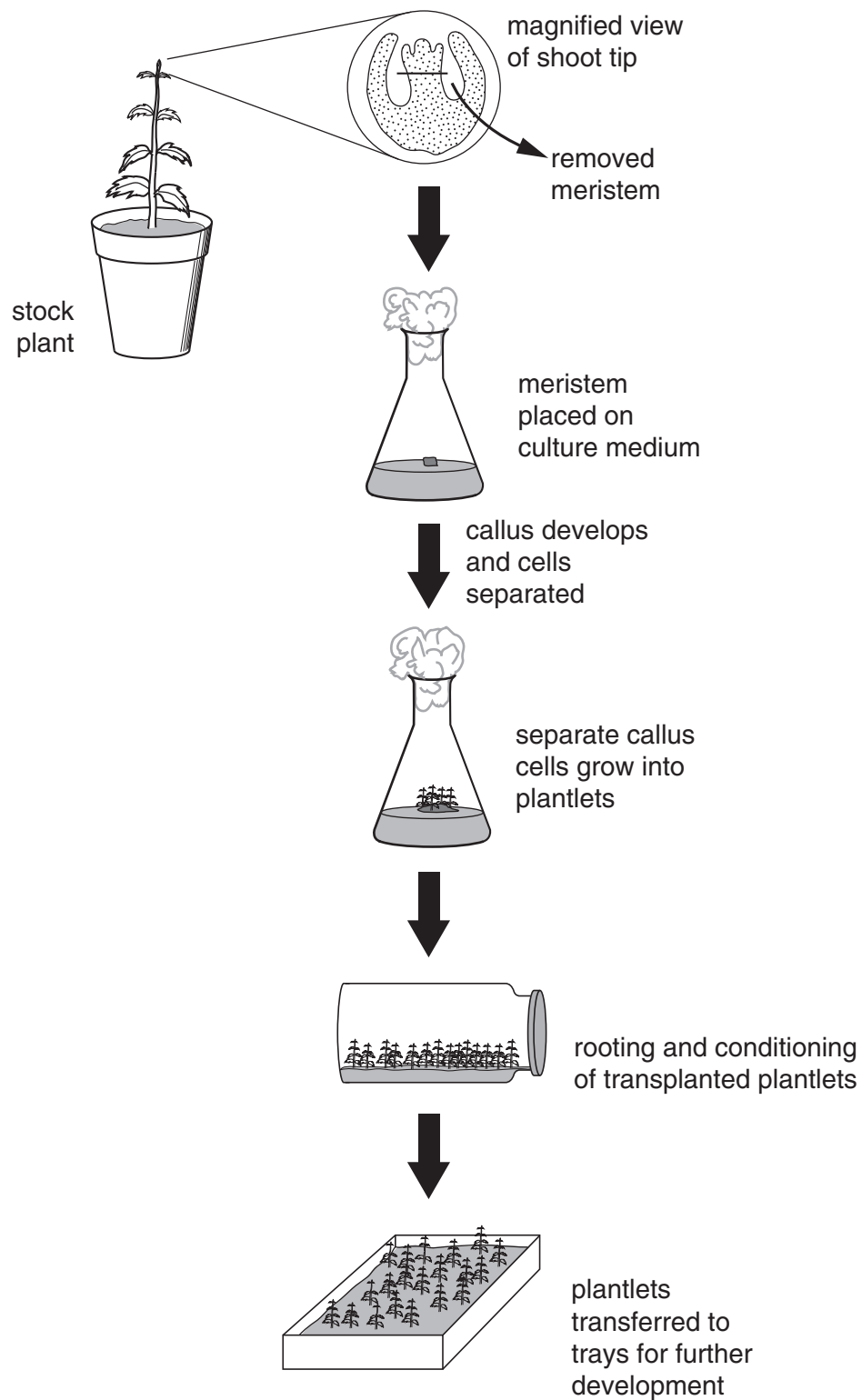


Fig. 3.1

- (a) State **one** advantage of using meristems in plant tissue culture.

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

- (b) With reference to Fig. 3.1, explain how a large number of plantlets are produced from one meristem.

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

- (c) Outline **two** advantages and **two** disadvantages of using this technique instead of seed production to produce food plants.

advantages

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

disadvantages

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

Many flowering plants naturally reproduce sexually and asexually.

- (d) Describe how **two** named methods of asexual reproduction that occur naturally in plants have been developed commercially.

1.....

 2.....

 [2]

The healing of damaged plant tissues often involves the production of a mass of undifferentiated cells called a callus. A callus can be created artificially by placing meristematic tissue in a suitable growth medium. Callus cells will develop into plantlets when grown under appropriate conditions.

- (e) (i) Name the type of cell division which produces the callus.

..... [1]

- (ii) Explain what is meant by the term '*undifferentiated*'.

.....

 [2]

- (f) Describe the changes which may occur within callus cells as they develop.

.....

 [4]

[Total : 17]

- 4 The flowers of the white dead nettle, *Lamium album*, are heavily scented and form conspicuous clusters between the dark green leaves. Fig. 4.1 shows a half flower of the white dead nettle.

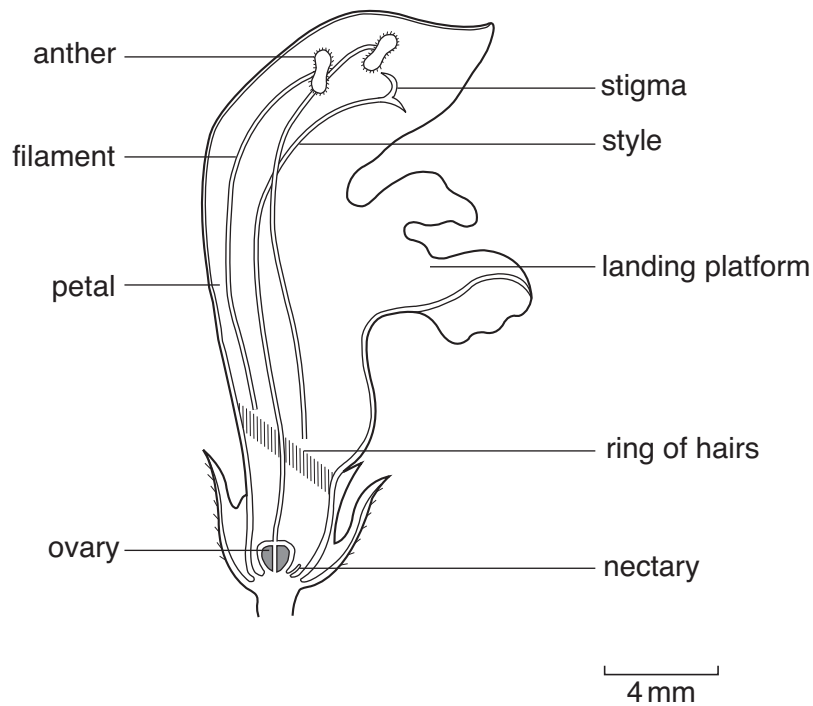


Fig. 4.1

- (a) With reference to Fig. 4.1, describe how pollination occurs in flowers like the white dead nettle.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

A strawberry, which is a 'false fruit', consists of a fleshy receptacle on the surface of which lie the 'seeds' or achenes.

In an investigation, strawberry plants were divided into three groups, **A**, **B** and **C**. After pollination, all the 'seeds' were removed from the surfaces of the developing fruits on the plants in groups **A** and **B**. The fruits in group **B** were smeared with a paste containing synthetic auxin, a plant growth regulator. The fruits in group **A** were smeared with paste without the synthetic auxin. The fruits in group **C** were left to develop normally.

The results of each treatment are shown in Fig. 4.2.

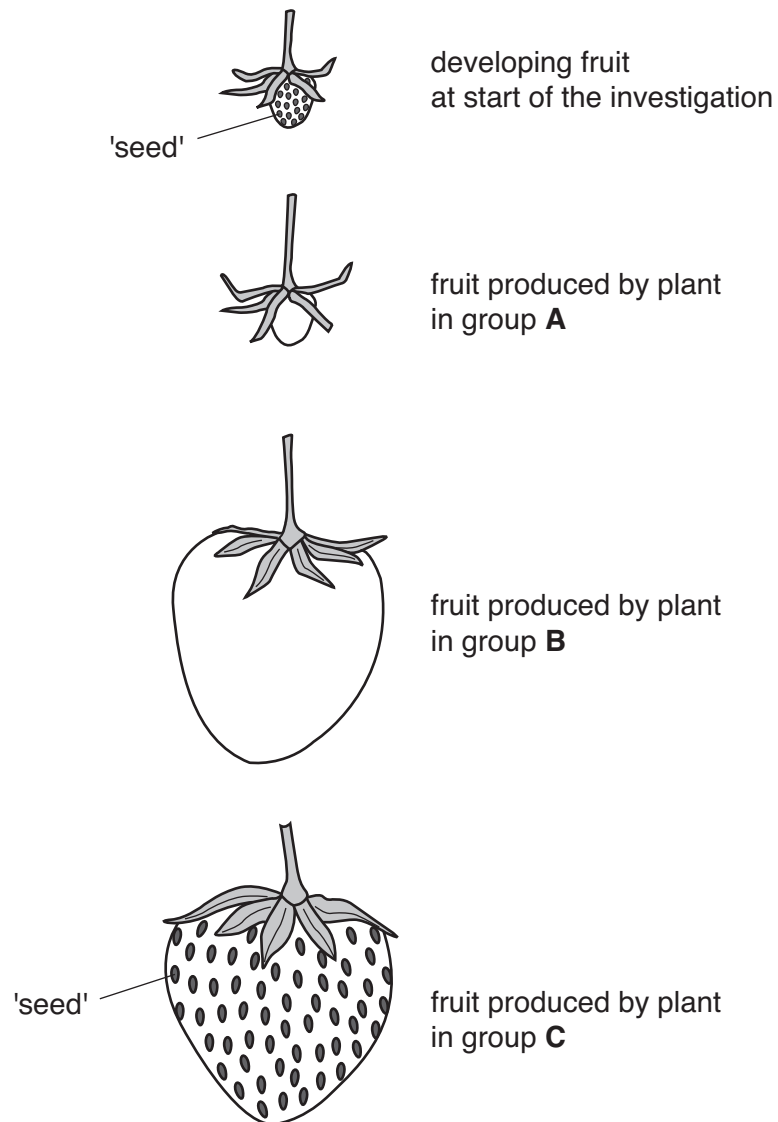


Fig. 4.2

- (b) Compare the effect on fruit development of treatments **A** and **B**.

.....

.....

.....

..... [2]

- (c) (i) Suggest an explanation for the effect of the 'seeds' on fruit development in the strawberry plant.

.....

.....

.....

..... [2]

- (ii) Outline how your explanation in (i) could be tested experimentally (full practical details are **not** required.)

.....

.....

.....

.....

.....

..... [3]

QUESTION 4(d) STARTS ON PAGE 12

Fig. 4.3 shows the effect of temperature on the uptake of oxygen by germinating seeds of cultivated flax, *Linum usitatissimum*.

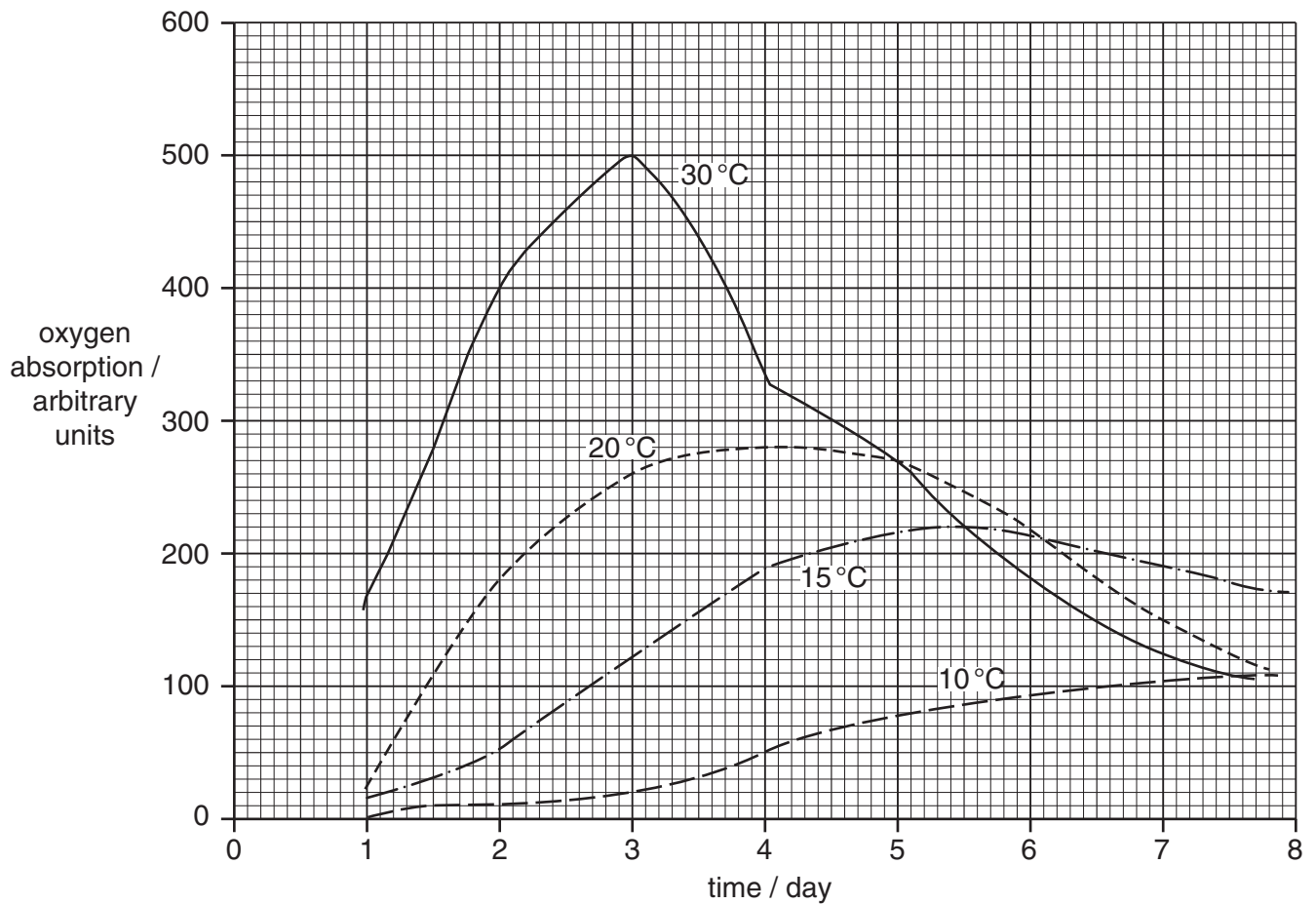


Fig. 4.3

(d) With reference to Fig. 4.3,

(i) describe the effect of temperature on the uptake of oxygen;

..... [4]

- (ii) explain why temperature affects the uptake of oxygen by germinating seeds.

.....

.....

.....

.....

.....

..... [3]

[Total : 19]

QUESTION 5 STARTS ON PAGE 14

- 5 (a) Fig. 5.1 shows part of a section of a seminiferous tubule.

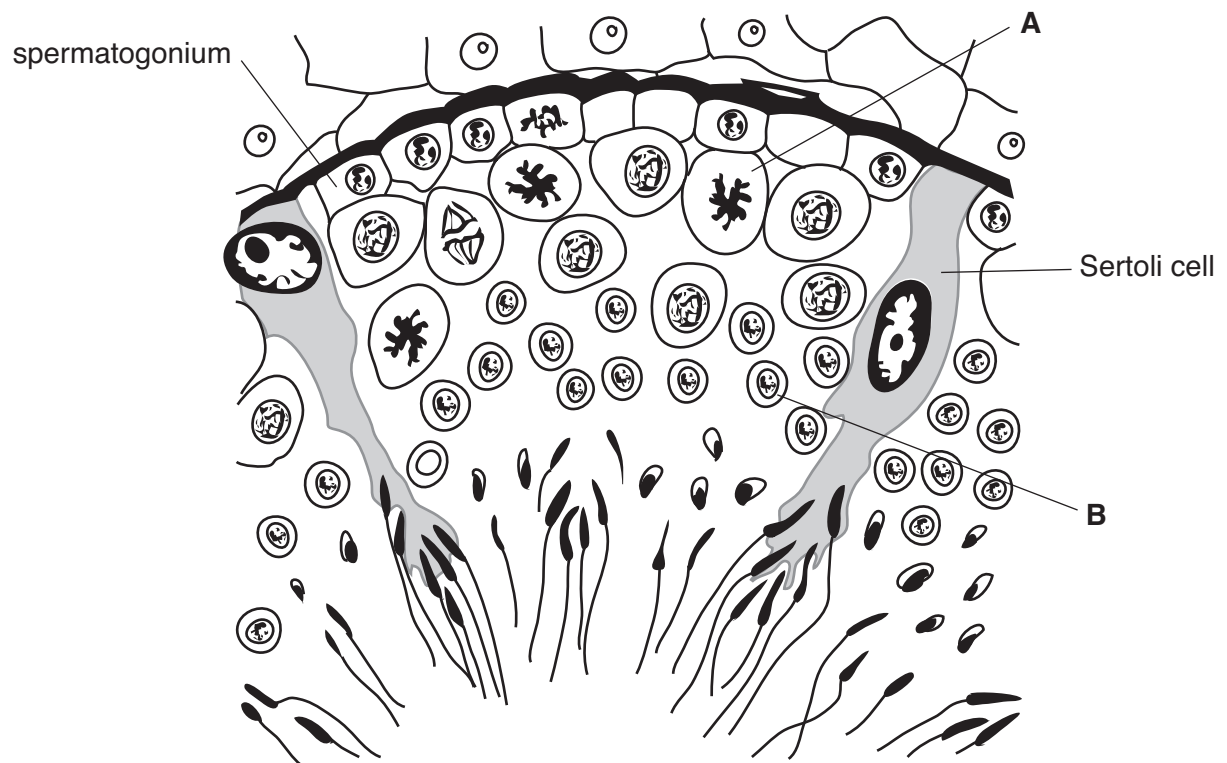


Fig. 5.1

Name the cells labelled **A** and **B**.

A

B [2]

You will gain credit if you relate your description to the stages of spermatogenesis shown in Fig. 5.1.

[8]

© OCR 2010

(c) Fig. 5.2 is a drawing of a human sperm in longitudinal section.

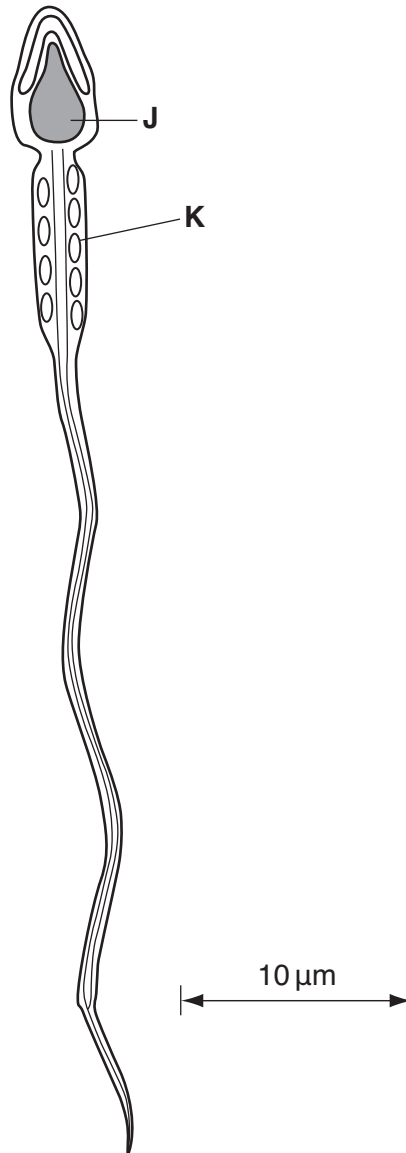


Fig. 5.2

(i) Describe the contents of structure **J**.

.....

.....

.....

..... [2]

(ii) Outline the function of the structure labelled **K**.

.....

.....

.....

..... [2]

17
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE
QUESTION 5 CONTINUES ON PAGE 18

- (d) Dioxin has long been recognised as an extremely toxic substance which, amongst other things, affects the reproductive system in humans.

In 1976, an industrial accident resulted in a massive release of dioxin into the air around a factory in Europe. The concentration of dioxin gas in the air breathed by the local population became twenty times higher than the normal level.

An investigation was conducted between 1977 and 1996 on the population surrounding the factory to discover:

- if exposure to dioxin changed the proportion of male and female births
- whether the father's or the mother's exposure had the greatest effect on the proportion of male and female births.

The results of this investigation are shown in Table 5.1.

Table 5.1

concentration of dioxin in father's blood/ppt	concentration of dioxin in mother's blood/ppt	number of male births	number of female births	proportion of male births in total births
not exposed	not exposed	31	30	
15	15	96	121	0.442
15	not exposed	81	105	0.435
not exposed	15	120	117	0.506

ppt = parts per trillion

- (i) Calculate the proportion of male births in the total sample, where neither the father nor the mother was exposed to dioxin.

Show your working in the space below.

Write your answer in Table 5.1.

(ii) Comment on the results of this investigation.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total : 21]



- (a) Using the information in Fig. 6.1, describe **and** explain the changes that occur in the concentration of progesterone during pregnancy.

[5]

- (b) Shortly after implantation occurs, HCG appears in the urine of pregnant women. The HCG can be detected using pregnancy testing kits, which contain antibodies specific to HCG. If HCG is present in the sample of urine placed in the testing kit, the antibodies bind to the HCG. This results in a colour change.

- (i) State how antibodies used in the pregnancy testing kits are specific to HCG.

.....
 [1]

- (ii) The antibodies used in the testing kit are produced by cells that have been cloned.

Suggest **one** advantage of using antibodies produced by cells that are all part of the same clone.

.....
 [1]

The human placenta acts as the gaseous exchange system, the digestive system and the excretory system for the fetus. This involves the exchange of a wide variety of solutes between the blood of the mother and that of the fetus.

- (c) State and describe **two** different mechanisms by which **named** substances cross membranes in the placenta.

.....

 [4]

[Total : 11]

END OF QUESTION PAPER

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.