

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced GCE

BIOLOGY

2805/01

Growth, Development and Reproduction

Friday

24 JUNE 2005

Afternoon

1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Ruler (cm/mm)

Candidate Name

Centre Number

Candidate
Number

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TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks 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	13	
2	13	
3	21	
4	12	
5	17	
6	14	
TOTAL	90	

This question paper consists of 18 printed pages and 2 blank pages.

Answer **all** the questions.

1 Fig. 1.1 is a longitudinal section of the female urinogenital system in humans.

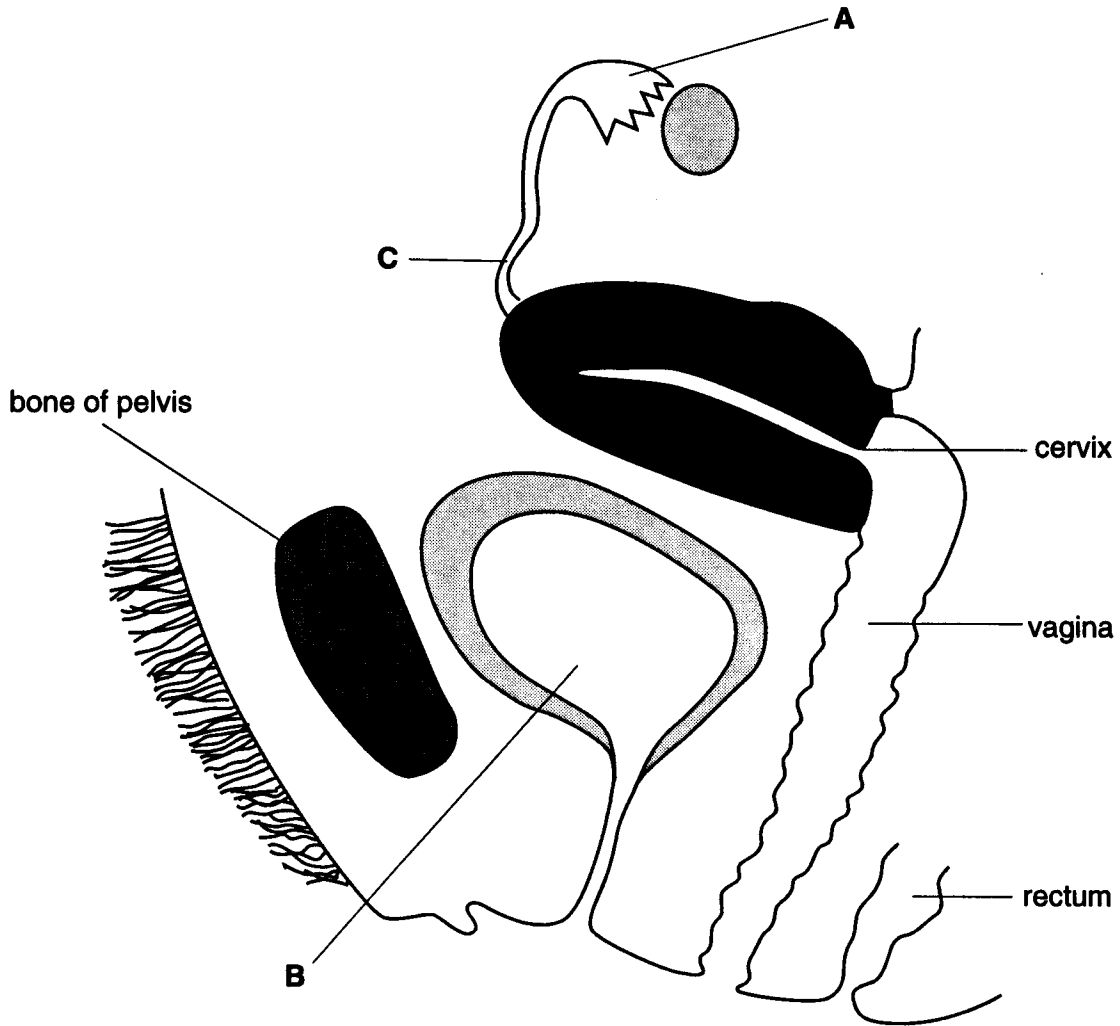


Fig. 1.1

(a) (i) Name structures **A** to **C**.

A

B

C [3]

(ii) Describe the function of the pelvis during pregnancy.

.....

..... [1]

(b) The squamous epithelium lining the vagina contains goblet cells, which secrete mucus with an acidic pH.

(i) State the reason why the squamous epithelium in the vagina secretes a mucus which is acidic.

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

(ii) Describe how the features of the squamous epithelium make it suitable for lining the vagina.

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..... [3]

(c) (i) As the baby moves through the cervix during birth, it must pass through the circle of bone formed by the pelvis.

Suggest one consequence of this for the development of the baby.

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..... [1]

(ii) During the birth of the baby, changes occur in the wall of the cervix and in the muscle tissue of the uterus.

Describe and explain the changes that occur in the cervix and the muscle tissue of the uterus during the birth of the baby.

cervix

uterus

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

[Total: 13]

2 (a) Fig. 2.1 is a photomicrograph of part of a pollen sac in a *Lilium* anther.

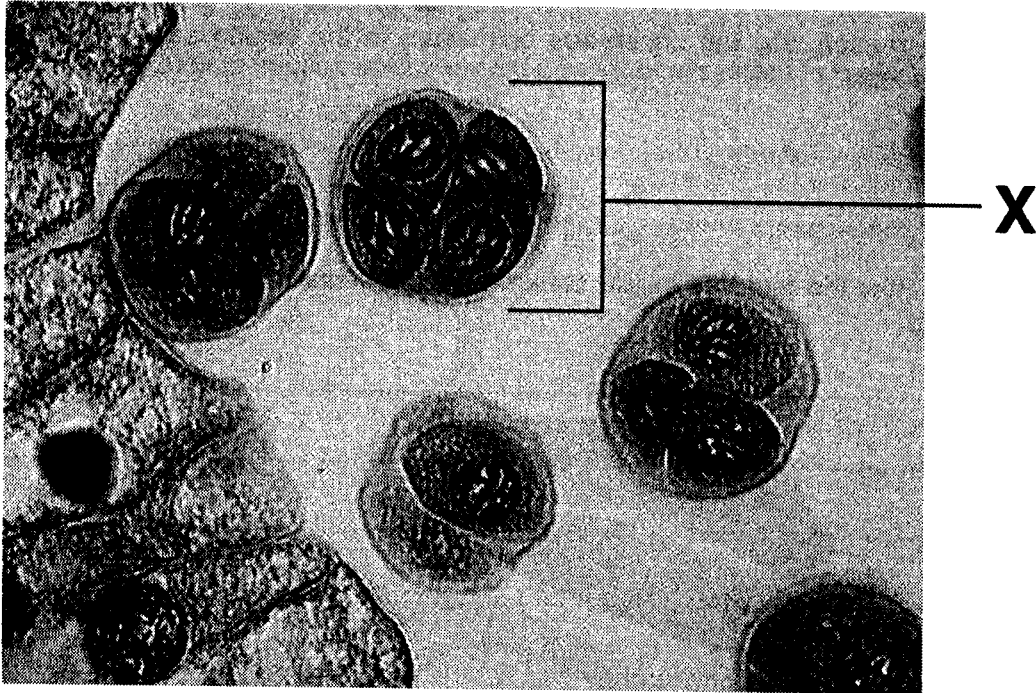


Fig. 2.1

(i) Name the structure marked X in Fig. 2.1.

..... [1]

(ii) Describe the development of structure X into mature pollen grains.

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

(iii) Describe how mature pollen grains are released from the pollen sac.

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 [2]

(b) Fig. 2.2 shows a vertical section of two flowers, Y and Z, of the primrose, *Primula vulgaris*.

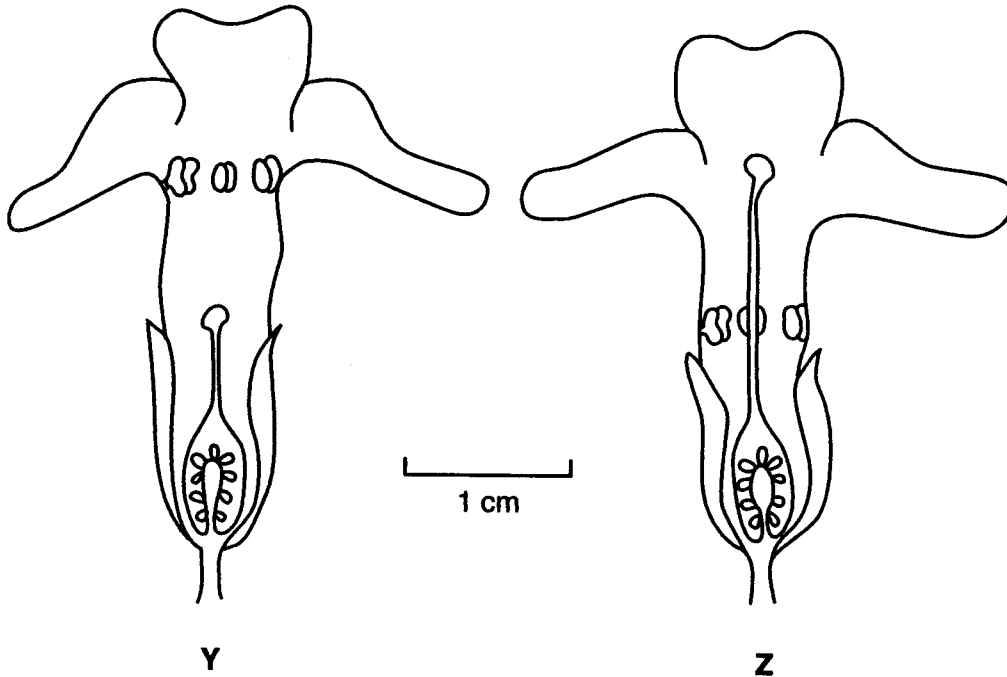


Fig. 2.2

(i) Explain how flowers Y and Z make cross-pollination most likely.

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 [3]

(II) Describe **three** advantages of cross-pollination.

1

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2

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3

..... [3]

[Total: 13]

3 (a) Fig. 3.1 shows fluctuations in the body temperature of a woman who wished to monitor her temperature to avoid becoming pregnant.

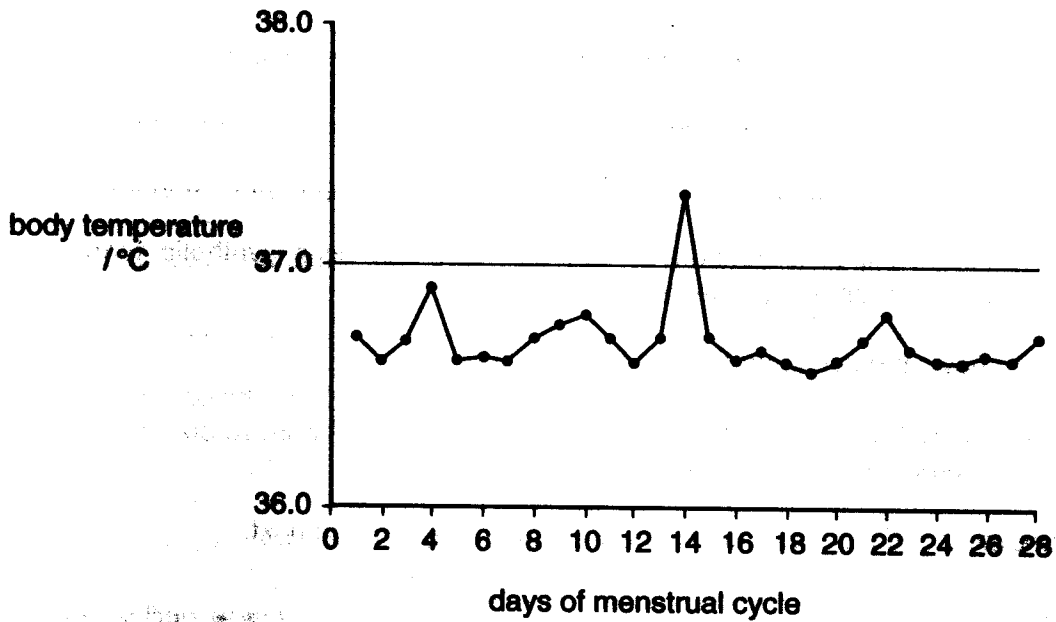


Fig. 3.1

(i) State the days of the menstrual cycle when the woman is most at risk of becoming pregnant. Give reasons for your answer.

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..... [3]

(ii) Explain why this method of contraception is estimated to be only 80% reliable.

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..... [2]

(iii) Suggest the precautions which must be taken if using this method of contraception.

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..... [2]

(b) The combined pill is a method of contraception that uses synthetic forms of the hormones oestrogen and progesterone.

Fig. 3.2 shows the concentrations in the blood of:

- hormones from the **combined pill**
- hormones from the **ovarian follicle**

measured from day 17 of one menstrual cycle to day 5 of the next.

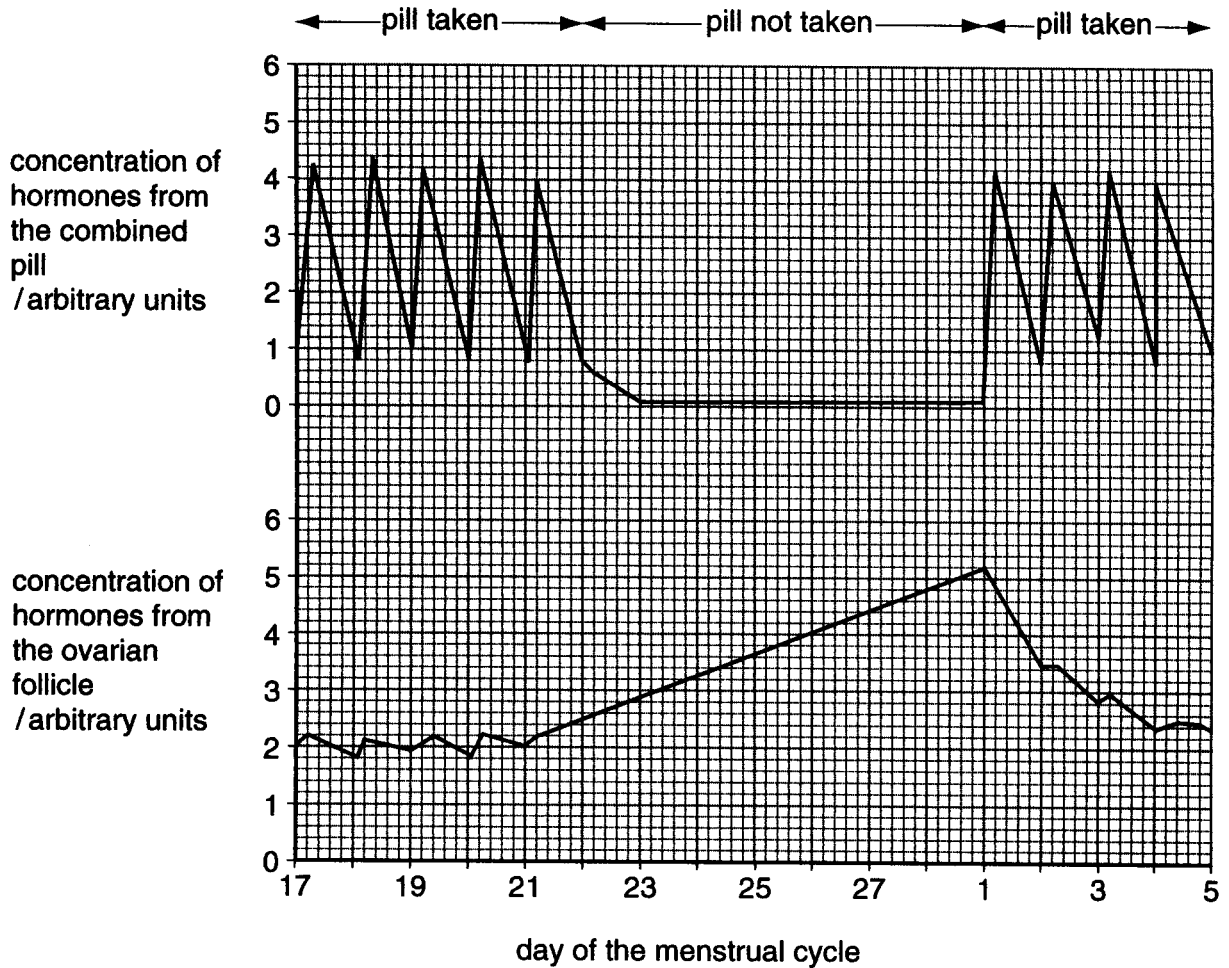


Fig. 3.2

(i) Explain the changes in the concentration of hormones from the combined pill shown in Fig. 3.2.

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..... [3]

(ii) Using the information in Fig. 3.2, describe and explain the effect of the combined pill on the ovarian follicle between day 17 of one menstrual cycle and day 5 of the next.

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..... [5]

(c) Other methods of contraception being developed include vaccines against:

- human chorionic gonadotrophin (HCG);
- the proteins on the head of the sperm that normally bind to receptors on the zona pellucida.

Explain how contraception may be achieved by using vaccines against:

(i) HCG;

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(ii) the proteins on the head of the sperm.

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..... [5]

(iii) Suggest **one disadvantage** of using vaccination as a method of contraception.

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..... [1]

[Total: 21]

4 Micropropagation is one method of plant tissue culture that involves the use of meristematic tissue. This tissue is particularly useful when the plant to be cultured is to be genetically modified.

(a) State one place where meristematic cells are found in flowering plants.

..... [1]

(b) Explain why meristematic tissue is particularly useful when the plant is to be genetically modified.

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..... [3]

5 Hormones control all aspects and stages of the reproductive cycle in women.

(a) Outline the hormonal causes of premenstrual tension.

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..... [3]

(b) An investigation was conducted to measure the changes in the average number of oocytes in the ovaries, between birth and 56 years.

Table 5.1 shows the results of this investigation.

Table 5.1

age/years	average number of oocytes per female
birth	712 000
7	468 635
14	402 067
21	175 700
28	166 231
35	89 145
42	39 874
49	9 956
56	3 450

(i) Suggest two reasons for the decline in oocyte numbers between birth and age 35 years.

1

.....

2

..... [2]

- (ii) Calculate the percentage loss of oocytes between the ages of 42 and 56 years. Show your working and give your answer to the nearest whole number.

Answer =% [2]

- (c) The reduction in oocyte numbers increases after the menopause. Describe the hormonal changes which occur during the menopause that may contribute to this loss.

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..... [3]

Question 5 is continued on page 16

- 6 (a) Algae are photosynthetic Protocists. Some algae are microscopic, consisting of single cells, long filaments or balls of cells. These algae form phytoplankton in lakes.

In the United Kingdom, during mid to late summer, the cells of these algae may divide rapidly, forming thick layers over the surface of lakes. This rapid reproduction is called an 'algal bloom'.

- (i) Outline the way in which algal cells divide to form an algal bloom.

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..... [3]

- (ii) Suggest **two** environmental factors which may increase the chances of an algal bloom.

1

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2

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- (iii) Outline the likely effects of an algal bloom on a lake ecosystem.

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..... [3]

