

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced GCE**

**BIOLOGY**

**2804/01**

Central Concepts

Monday

**17 JUNE 2002**

Morning

1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Candidate Name	Centre Number	Candidate Number												
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> </tr> </table>							<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> </tr> </table>						

**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 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.

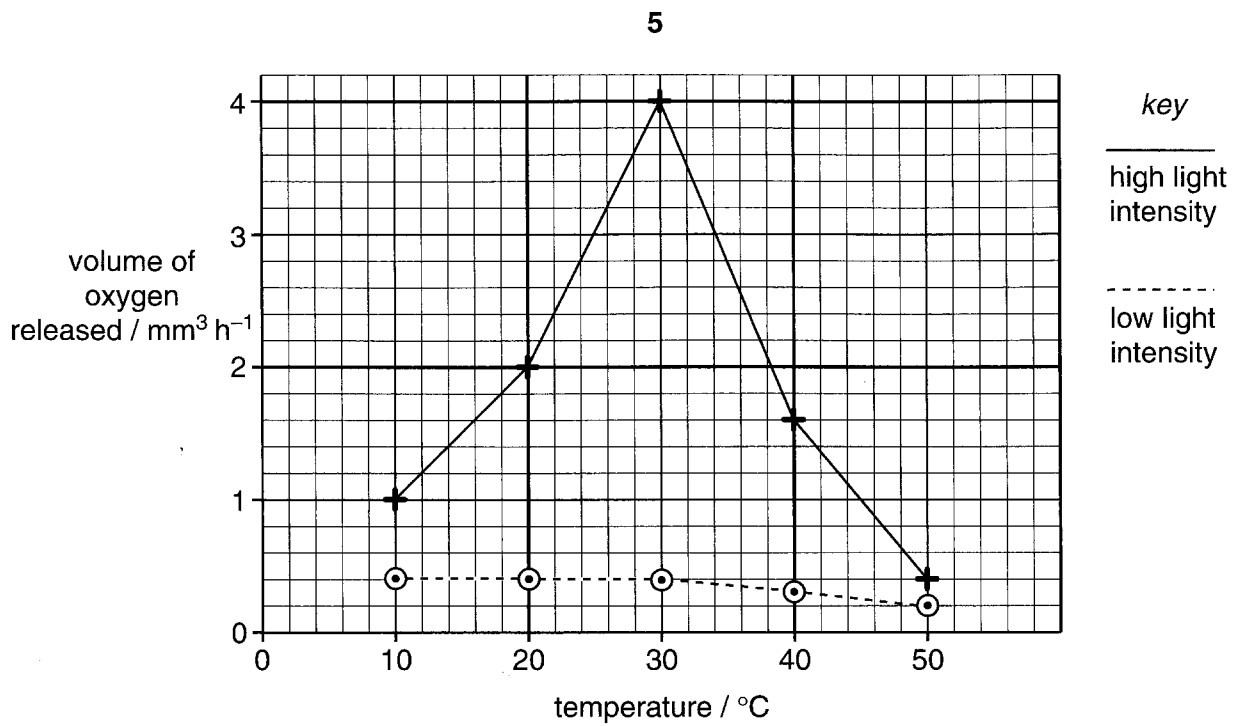
<b>FOR EXAMINER'S USE</b>		
Qu.	Max.	Mark
1	15	
2	15	
3	16	
4	14	
5	16	
6	14	
<b>TOTAL</b>	<b>90</b>	

**This question paper consists of 14 printed page and 2 blank pages.**









(b) With reference to Fig. 2.2,

(i) describe the results obtained for the two different light intensities;

high light intensity .....

.....

.....[2]

low light intensity .....

.....

.....[2]

(ii) explain the differences in the results.

.....

.....

.....

.....

.....

.....[4]

(c) Suggest why the volume of oxygen released does not give the true rate of photosynthesis.

.....

.....[1]

[Total : 15]

3 (a) Explain the term *primary succession*.

.....

.....

.....[2]

Fig. 3.1 shows a primary succession in a temperate climate.

X represents an example of deflected succession.

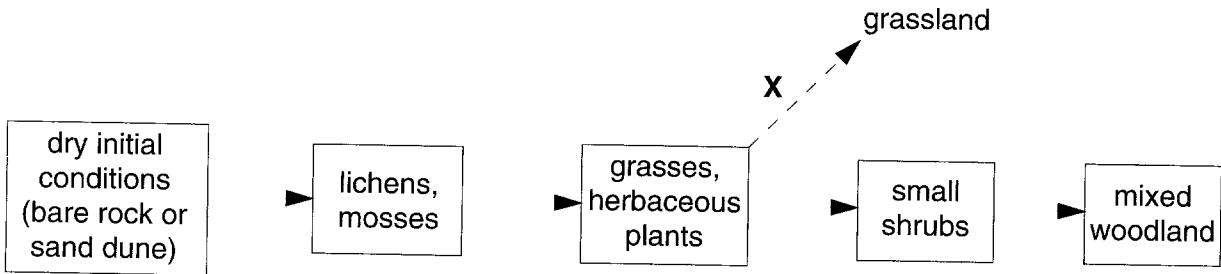


Fig. 3.1

(b) Explain the role of pioneer plants in succession on a bare rock or sand dune.

.....

.....

.....

.....

.....[3]

(c) Suggest how deflected succession X could be caused.

.....

.....

.....[2]

(d) Explain how biomass changes during a primary succession.

.....

.....

.....[2]



4 In certain breeds of domestic fowl the gene determining feather colour has two alleles that are codominant. The allele  $C^B$  when homozygous produces black feathers; the allele  $C^W$  when homozygous produces white feathers.

The gene for feather shape also has two codominant alleles. The allele  $A^S$  when homozygous produces straight feathers; the allele  $A^F$  when homozygous produces frizzled feathers.

The heterozygote for feather colour is grey and the heterozygote for feather shape is mildly frizzled. The two genes involved are **not** sex linked.

(a) (i) State what is meant by each of the following terms:

*codominant* .....  
.....  
*heterozygote* .....  
.....[2]

(ii) Draw a genetic diagram to show the results of a cross between a grey, mildly frizzled hen and a white, frizzled cockerel.

<i>parental phenotypes</i>	grey, mildly frizzled hen	white, frizzled cockerel
<i>parental genotypes</i>	.....	.....
<i>gametes</i>	.....	.....

*offspring genotypes* .....  
*offspring phenotypes* .....  
*phenotypic ratio* .....[5]



A breeder wishes to obtain domestic fowls which are all grey in colour and mildly frizzled.

(b) List the **two** crosses that will produce such a population.

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

(c) Fig. 4.1 shows a diploid cell with two pairs of chromosomes.

Complete the diagram to show the possible combinations of these chromosomes in the four gametes produced by meiosis. [2]

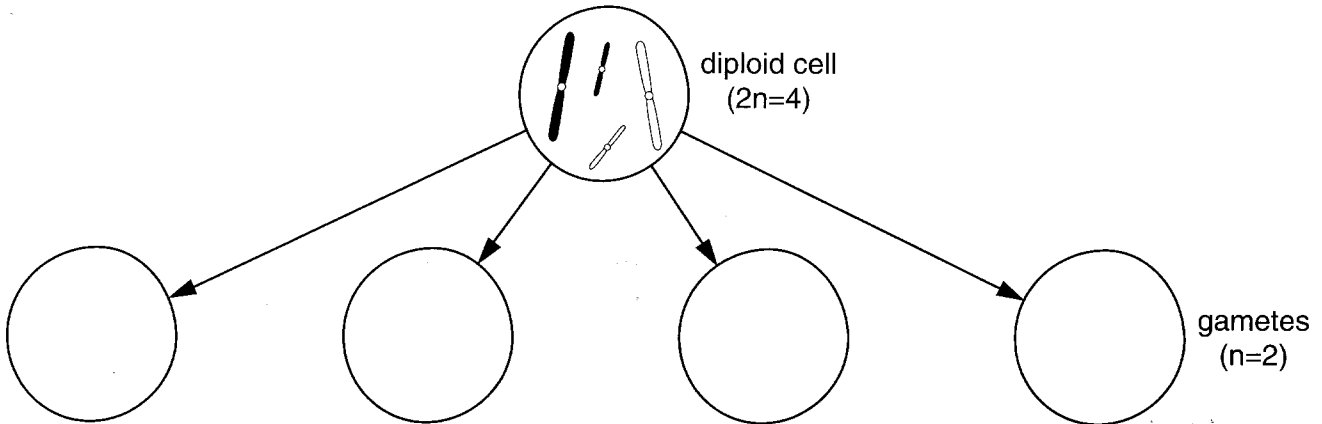


Fig. 4.1

(d) List **three** sources of variation in the process of meiosis.

1. ....  
.....  
2. ....  
.....  
3. ....  
.....[3]

[Total : 14]



**Table 5.1**

distance from mine working that seeds were collected / m	mean height of surviving seedlings / cm	
	batch <b>A</b>	batch <b>B</b>
10	3.9 (20)	4.0 (20)
20	3.8 (20)	4.1 (20)
30	4.0 (12)	4.9 (20)
40	3.7 (4)	4.8 (20)
50	3.8 (2)	4.9 (20)

figures in brackets ( ) indicate the numbers of seedlings that survived after two weeks

**(b) (i)** Describe the results shown in Table 5.1.

.....

.....

.....

.....

.....[4]

**(ii)** Explain why seedlings collected closer to the mine grow successfully in a dilute solution of copper ions.

.....

.....

.....

.....[3]

**(iii)** Suggest why some copper tolerant plants exist at least 50 metres away from the mine area.

.....

.....

.....[2]

[Total : 16]

- 6 One example of chemical communication in flowering plants is the mobilisation of food reserves in the germination of cereal grains, such as wheat and barley. Fig. 6.1 shows some of the principal features associated with food reserve mobilisation in a cereal grain.

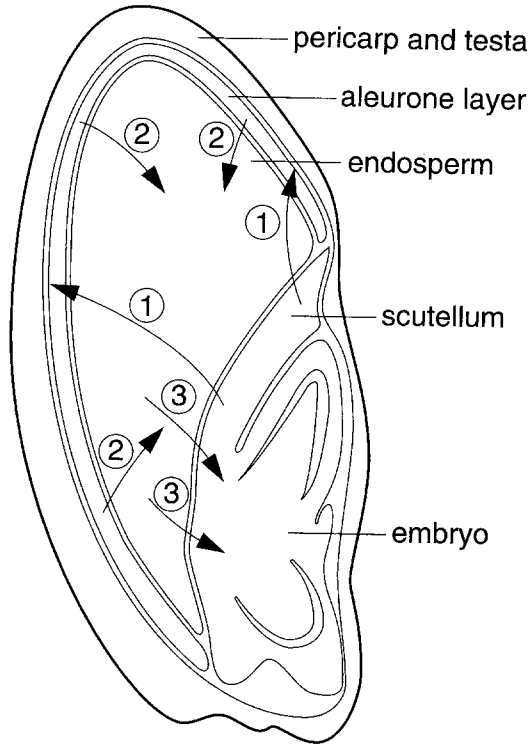


Fig. 6.1

- (a) With reference to Fig. 6.1, describe the processes indicated by the numbered arrows on the diagram.

1. ....  
 .....  
 .....

2. ....  
 .....  
 .....

3. ....  
 .....  
 ..... [6]



