

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY

2801

Biology Foundation

Tuesday

8 JUNE 2004

Morning

1 hour

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

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	7	
2	12	
3	14	
4	13	
5	6	
6	8	
TOTAL	60	

This question paper consists of 12 printed pages and 4 blank pages.

Answer **all** the questions.

1 State the word or phrase that best describes the following.

(a) A structure made up of different types of tissue working together to perform a particular function.

.....[1]

(b) An organism that obtains its food by eating **only** producers.

.....[1]

(c) All the living organisms, of all species, that are found in a particular habitat at a particular time.

.....[1]

(d) A region on the surface of an enzyme molecule where a substrate can bind.

.....[1]

(e) The energy that must be provided for a chemical reaction to take place.

.....[1]

(f) A length of DNA that codes for a particular polypeptide.

.....[1]

(g) The ability of a microscope to distinguish between two separate points.

.....[1]

[Total: 7]

2 (a) Describe the role of mitosis.

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

Fig. 2.1 is a diagram that shows the stages of the mitotic cell cycle.

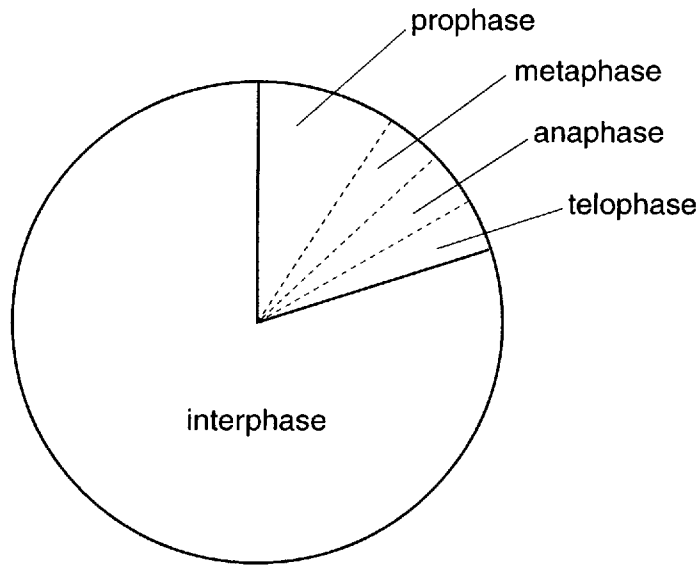


Fig. 2.1

(b) (i) Which processes must occur in a cell during interphase before mitosis can take place?

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

(ii) Draw an arrow on Fig. 2.1 to indicate the sequence in which the stages occur during the mitotic cell cycle. [1]

(c) Name the stage of mitosis shown in Fig. 2.1 in which each of the following events occurs.

(i) Chromosomes split at centromeres.

.....[1]

(ii) Chromosomes become visible.

.....[1]

(iii) Nuclear envelope re-forms.

.....[1]

(iv) Chromatids move to opposite poles of the cell.

.....[1]

(v) Chromosomes line up along the equator of the spindle.

.....[1]

[Total: 12]

[Dotted lines for writing]

[9]

Quality of Written Communication [1]

[Total: 14]

4 A student was carrying out tests to determine which biological molecules were present in a food sample.

(a) (i) Describe a test that the student could carry out to discover whether this sample contained a lipid.

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

(ii) State what would be seen if a lipid was present.

.....[1]

(b) Describe how the **structure** of a phospholipid differs from that of a triglyceride.

You may use the space below for a diagram to help your answer.

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

[3]

(c) (i) Describe a test that the student could carry out to discover whether the food sample contained protein.

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

(ii) State what would be seen if protein was present.

.....[1]

(d) Explain what is meant by the primary and secondary structure of a protein.

primary structure

.....
.....

secondary structure

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

[Total: 13]

5 An important enzyme that is used in respiration is succinate dehydrogenase. Its substrate is succinate, which is converted into fumarate. Malonate acts as a **competitive** inhibitor, but does **not** bind permanently to the enzyme.

(a) Describe how malonate inhibits the enzyme. You may use the space below for a diagram to help your answer.

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

[3]

(b) Explain what would happen to the reaction if the concentration of succinate was increased relative to the concentration of malonate.

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

[3]

[Total: 6]

Fig. 6.1 shows that the red blood cells do not all haemolyse at the same salt concentration.

- (i) Using Fig. 6.1, state the salt concentration at which the percentage of haemolysed red blood cells is equal to those that are not haemolysed.

..... g dm⁻³ [1]

- (ii) Suggest why different red blood cells haemolyse at different salt concentrations.

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

- (c) An experiment was carried out to investigate the uptake of potassium ions by carrot tissue. The experiment was carried out as follows:

- a carrot was cut into discs of uniform size
- the discs were divided into four groups
- equal volumes of a solution containing potassium ions were added.

The temperature remained constant at 21°C and the experiment was carried out for the same length of time in each case. The experiment was carried out in different oxygen concentrations. The results are shown in Table 6.1.

Table 6.1

oxygen concentration / arbitrary units	0	4	11	20
rate of uptake of potassium ions / arbitrary units	7	27	92	100

- (i) Using the information given in Table 6.1, state the **main** process by which potassium ions enter the carrot cells.

.....[1]

- (ii) Give a reason for your answer to (i).

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

- (iii) Suggest an explanation for the uptake of potassium ions in the absence of oxygen.

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

[Total: 8]