

Biodiversity

Question Paper 7

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Biodiversity, classification and conservation
Sub Topic	Biodiversity
Booklet	Theory
Paper Type	Question Paper 7

Time Allowed : 60 minutes

Score : / 50

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 (a) Complete the table below by describing **one** role in living organisms for each of the ions listed.

ion	role in living organisms
calcium	
iron	
potassium	

[3]

- (b) Fig. 3.1 shows part of the nitrogen cycle in a field grazed by cows.

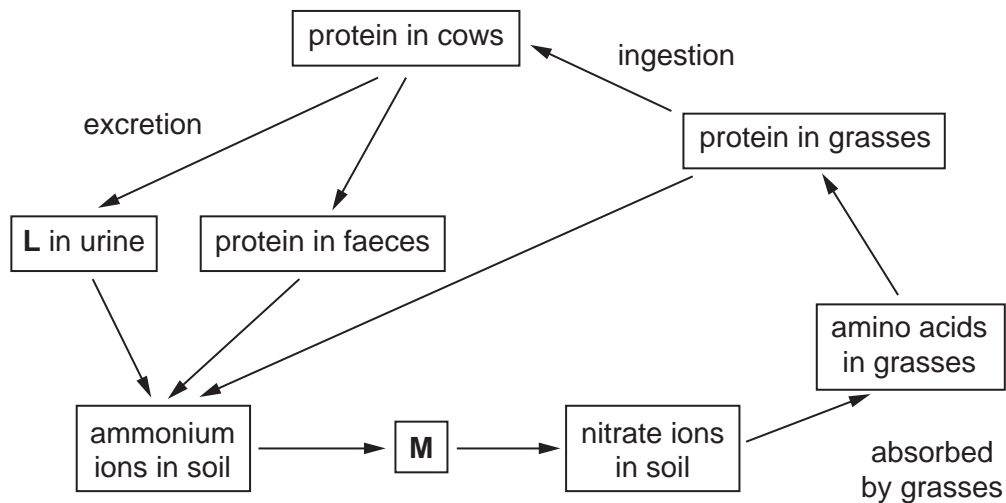


Fig. 3.1

- (i) Name substances **L** and **M**.

L

M[2]

- (ii) Name the process by which ammonium ions are converted to nitrate ions in the nitrogen cycle.

.....[1]

- (c) Some young grass plants were grown with their roots in a mineral solution that contained nitrate ions. The plants were divided into two batches, **N** and **P**.

Cyanide, which inhibits aerobic respiration, was added to the solution given to the plants in batch **P**.

The quantity of nitrate ions in the plants was determined at regular intervals for 70 hours.

After 60 hours, the mineral solution was replaced by distilled water.

The results are shown in Fig. 3.2.

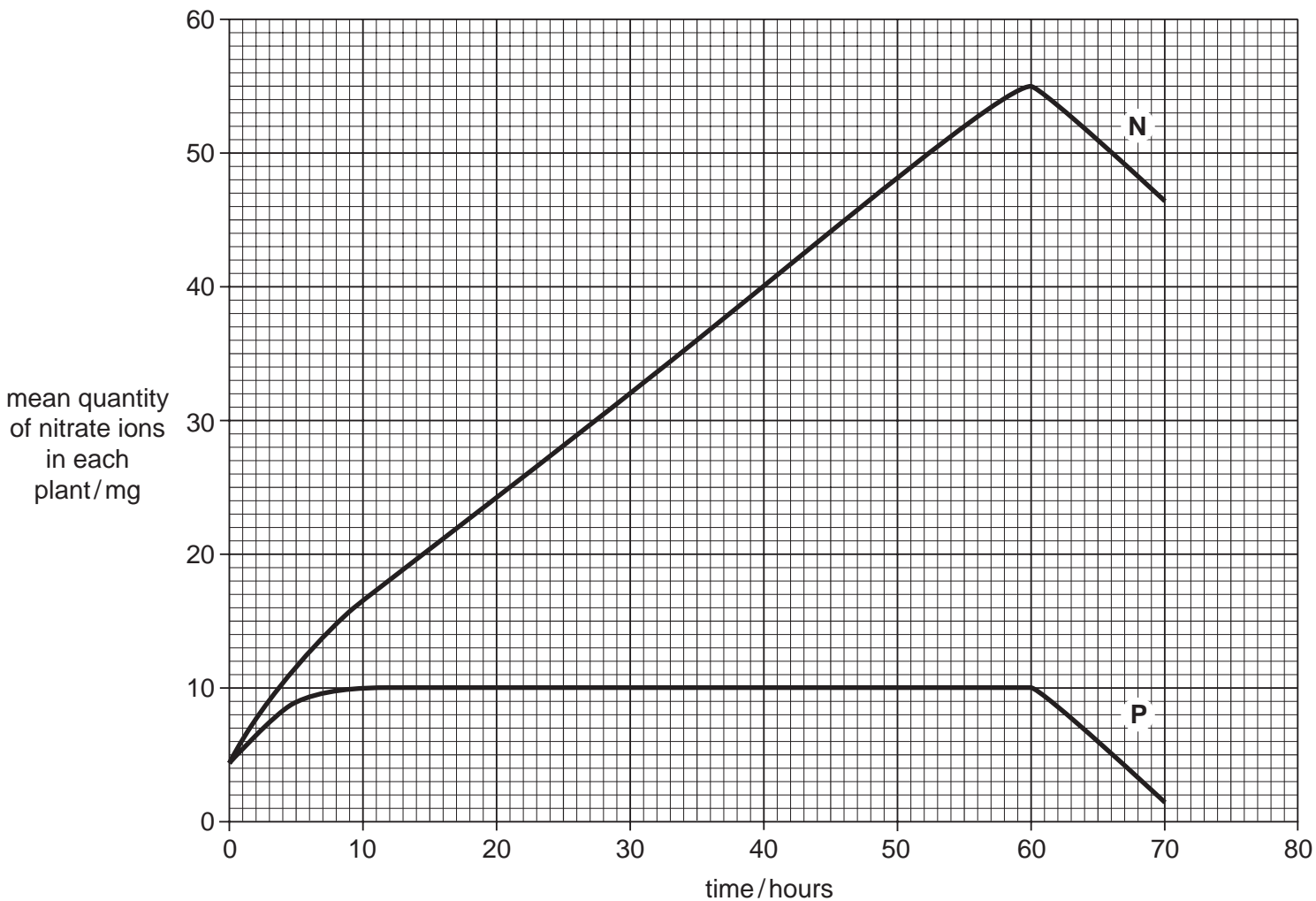


Fig. 3.2

Using the data in Fig. 3.2,

- (i) calculate the rate of absorption of nitrate ions in batch **N** between 40 and 60 hours. Show your working.

Answer = mg per hour [2]

2 Fig. 2.1 shows the flow of energy through an ecosystem.

All the figures are in $\text{kJ m}^{-2} \text{ year}^{-1}$.

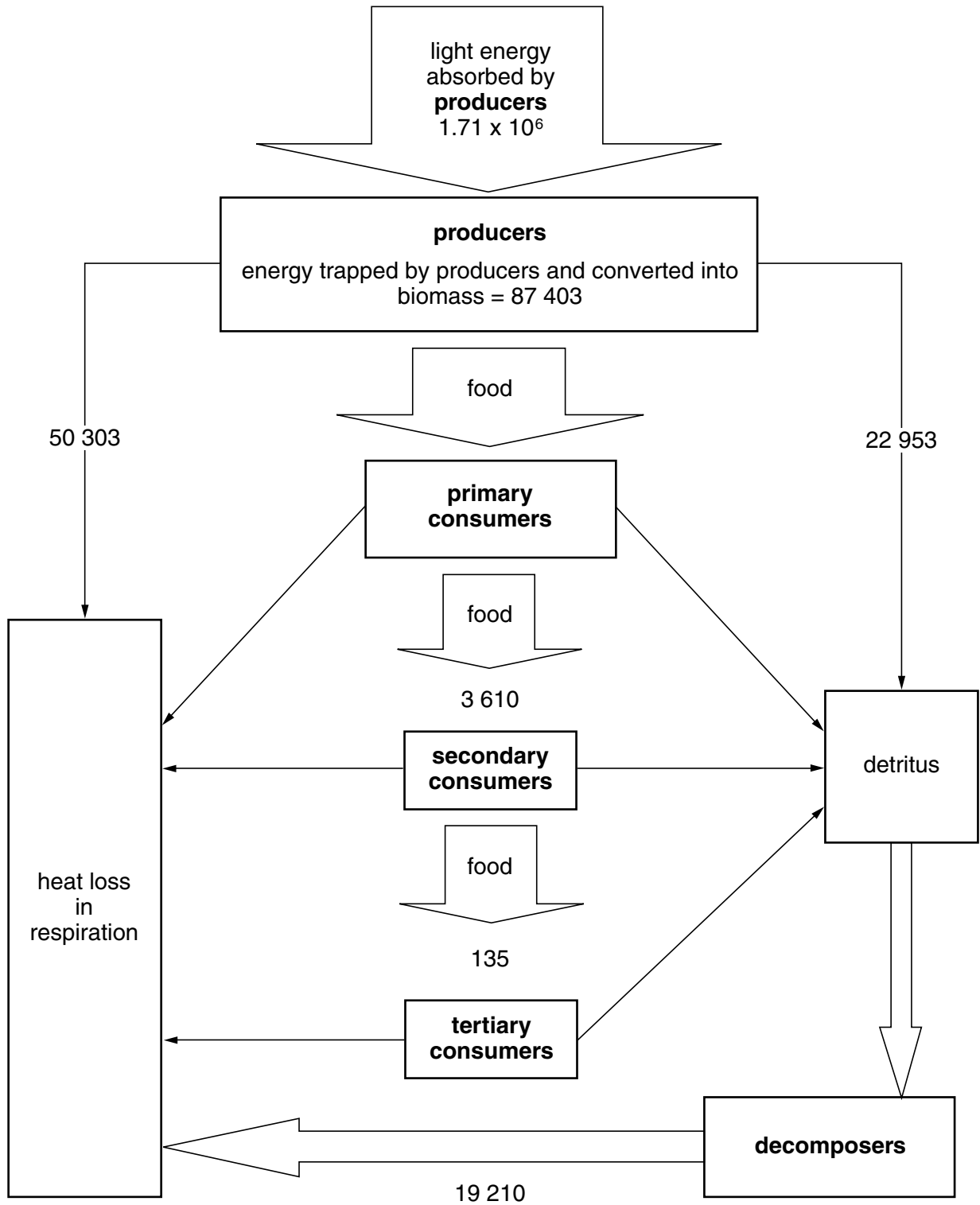


Fig. 2.1

- (a) Calculate how much energy is available to the primary consumers in this ecosystem.

.....[1]

- (b) The efficiency of energy transfer between trophic levels is calculated by comparing the energy available to a trophic level with the energy available to the next trophic level. Between secondary and tertiary consumers, this is calculated as follows.

$$\frac{\text{energy available to tertiary consumers}}{\text{energy available to secondary consumers}} \times 100 \%$$

Use the formula above to calculate the efficiency of energy transfer between the secondary consumers and the tertiary consumers in this ecosystem.

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

- (c) In some food webs, individual consumer species feed at different trophic levels.

With reference to Fig. 2.1, explain an advantage of this for these consumer species.

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

- (d) Explain the role of decomposers in the cycling of carbon and nitrogen in ecosystems.

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

[Total: 8]

- 3 (a) The plant *Rafflesia arnoldii*, which grows in the jungles of South East Asia, is noted for producing the largest flower of all plants.
- The flower is reddish-brown and can grow up to one metre in diameter.
 - The flower gives off a smell similar to rotting flesh to attract flies, which then pollinate it.

Fig. 6.1 shows a flower of *R. arnoldii*.



Fig. 6.1

R. arnoldii is classified as an endangered species.

Suggest why *R. arnoldii* has become an endangered species.

.....

.....

.....

.....

.....

.....

..... [3]

(b) (i) Explain the meaning of the term *biodiversity*.

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

(ii) Suggest reasons for maintaining **plant** biodiversity.

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

[Total: 8]

- 4 The American crocodile, *Crocodylus acutus*, was classified as an endangered species by the USA in 1975. It is found in estuarine regions of southern Florida.

Fig. 1.1 shows an American crocodile.



Fig. 1.1

The salinity of the water was thought to play a part in the distribution of the American crocodile.

(b) Much conservation work has been done in the Everglades National Park in Florida, which is a large wetland area. As a result the number of nest sites has increased from 8 in 1975 to 31 in 2000. This has led to a rise in the number of crocodiles.

(i) Calculate the percentage increase in nest sites between 1975 and 2000.

Show your working.

answer% [2]

(ii) Suggest two reasons why the population of crocodiles in the Everglades National Park has increased.

1.

.....

2.

..... [2]

[Total: 7]

- 5 (a) Describe the structure of a cellulose molecule **and** explain how cellulose is a suitable material for the cell walls of plants.

description

.....

.....

.....

.....

.....

explanation

.....

.....

.....

.....

.....

..... [4]

Animals do not have the ability to produce enzymes to digest cellulose. Most herbivores have bacteria in their digestive systems that can digest cellulose.

Fig. 5.1 shows the results of a study on 24 different herbivores. The percentage of cell wall material that was digested by each animal was determined. The time taken for the plant material to pass through the digestive system, the retention time, was also recorded.

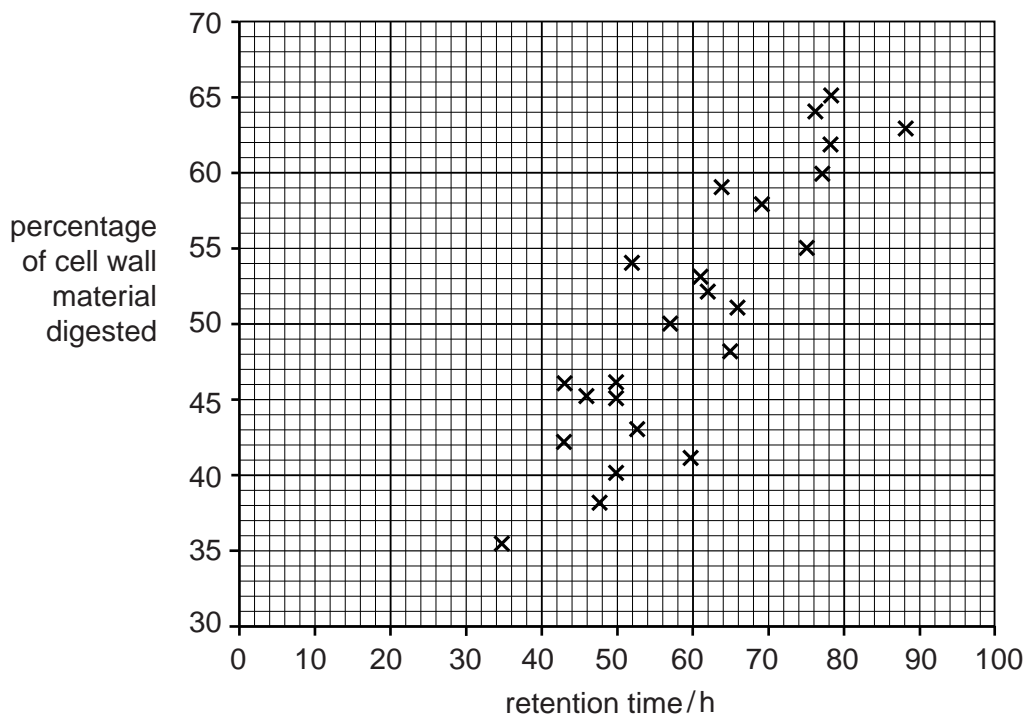


Fig. 5.1

(b) (i) With reference to Fig. 5.1, describe the results of this study.

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

(ii) Explain, in terms of energy flow in ecosystems, the importance of the results in Fig. 5.1.

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

(c) Digested material in animals is absorbed using both facilitated diffusion and active transport.

State two similarities **and** two differences between facilitated diffusion and active transport.

similarities:

- 1.
- 2.

differences:

- 1.
- 2.

[4]

[Total: 13]