19. Organisms and their environment

19.3 Nutrient cycles

Paper 3 and 4

Question Paper

Paper 3

Questions are applicable for both core and extended candidates

1 **(a)** Fig. 3.1 is a diagram of part of the carbon cycle.

Three processes that occur in the carbon cycle are labelled **Q**, **R** and **S**.

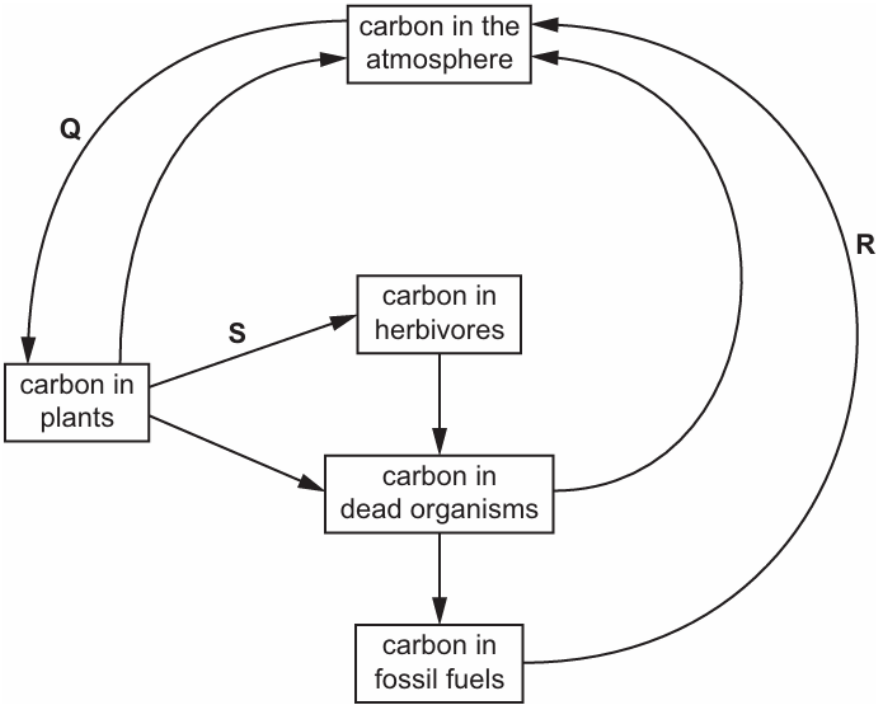


Fig. 3.1

(i) Complete the table by stating the names of processes **Q**, **R** and **S** in Fig. 3.1.

letter in Fig. 3.1	name of the process
Q	
R	
S	

[3]

(ii) Draw **one** arrow **on Fig. 3.1** to represent the transfer of carbon by respiration in herbivores. [1]

2 **(a)** Fig. 8.1 is a diagram showing part of the carbon cycle.

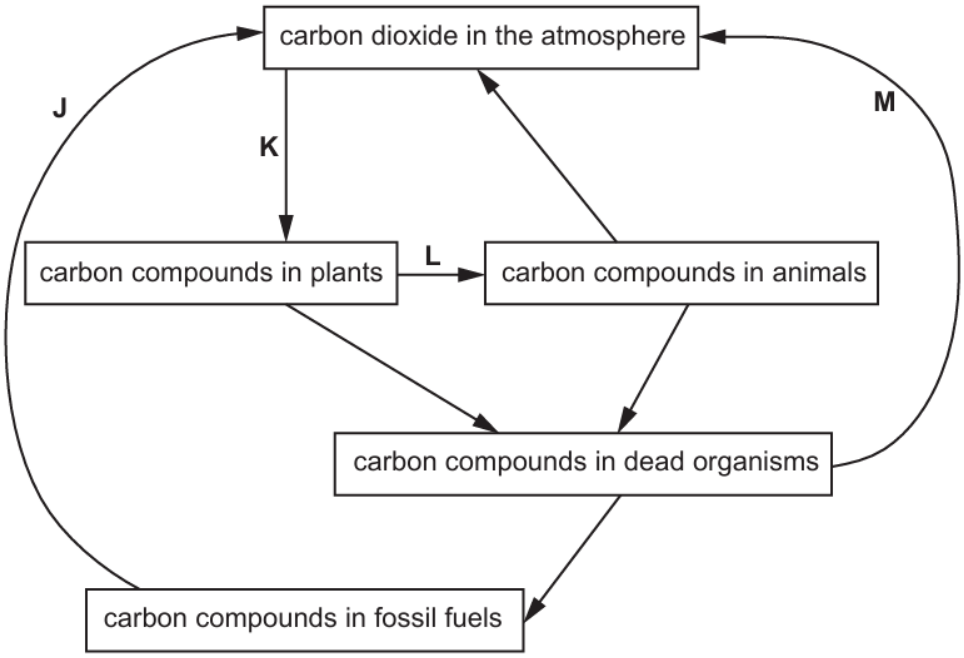


Fig. 8.1

(i) Draw **one** arrow **on Fig. 8.1** to represent respiration in plants. [1]

(ii) Identify the processes labelled **J**, **L** and **M** in Fig. 8.1.

J .....

L .....

M .....

[3]

3 **(c)** Combustion of fossil fuels releases carbon dioxide into the atmosphere.

(i) State the name of **two other** processes that release carbon dioxide into the atmosphere.

1 .....

2 .....

[2]

(ii) State the name of **one** process that removes carbon dioxide from the atmosphere.

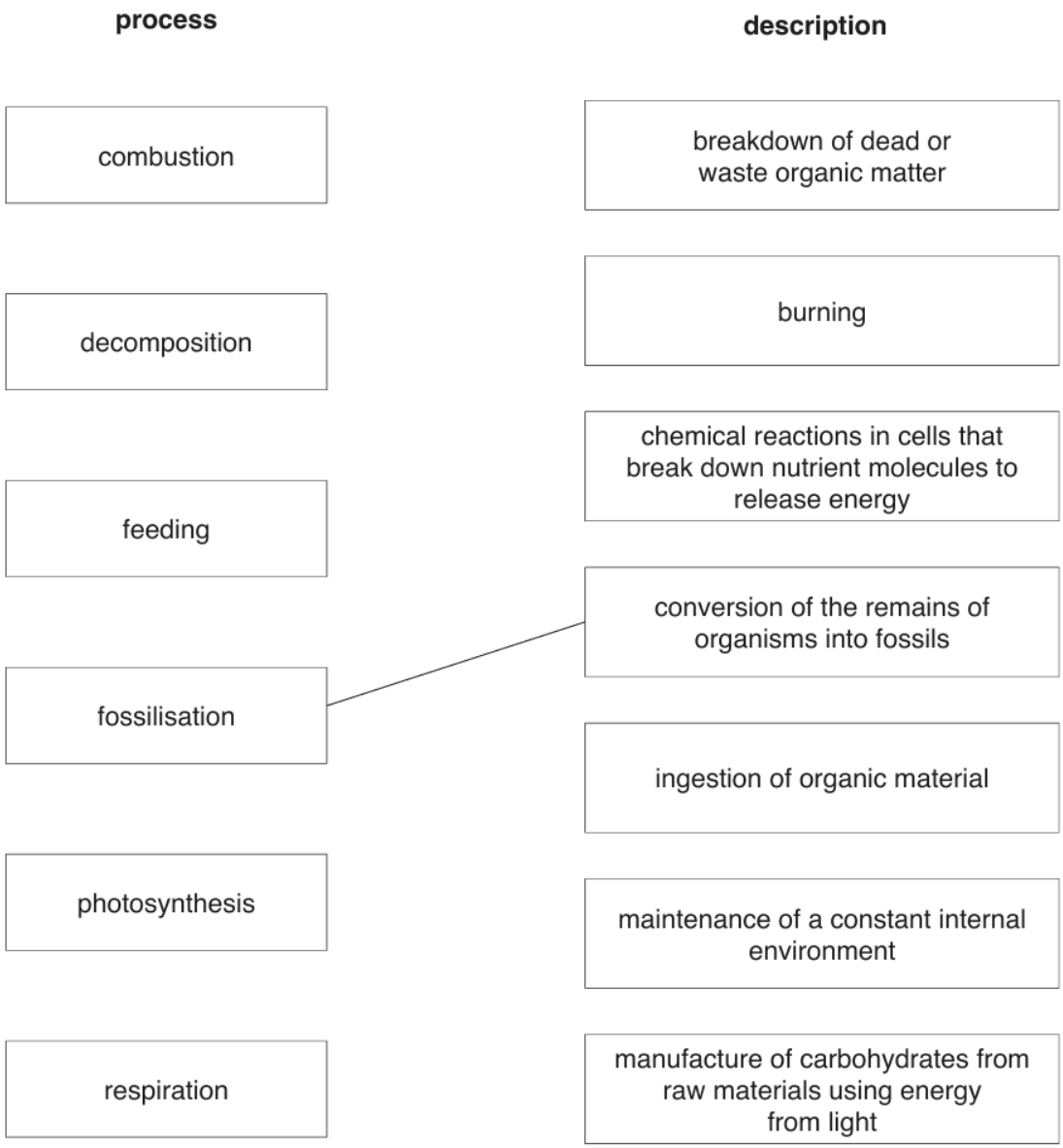
.....[1]

4 The boxes on the left contain the names of processes from the carbon cycle.

The boxes on the right contain some descriptions of processes.

Draw **one** straight line from each process to link the process to its description.

An example has been done for you.



[5]

[Total: 5]

5 **(a)** Fig. 5.1 shows part of the carbon cycle. Some of the arrows are missing.

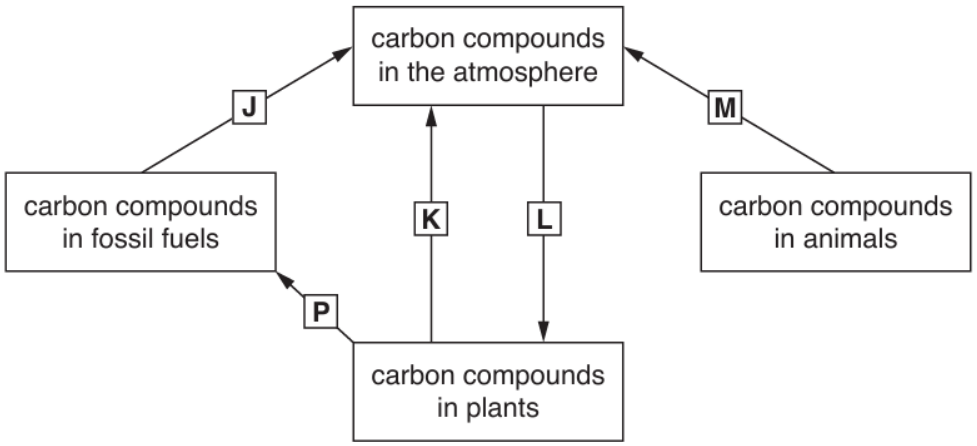


Fig. 5.1

(i) State **all** the letters in Fig. 5.1 that represent respiration.

.....[2]

(ii) State the name of the process that the letter **J** represents.

.....[1]

(iii) Draw an arrow on Fig. 5.1 to represent the process of feeding. [1]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

6 Fig. 7.1 is a flowchart showing the stages of eutrophication. **(extended only)**

(a) Complete Fig. 7.1.

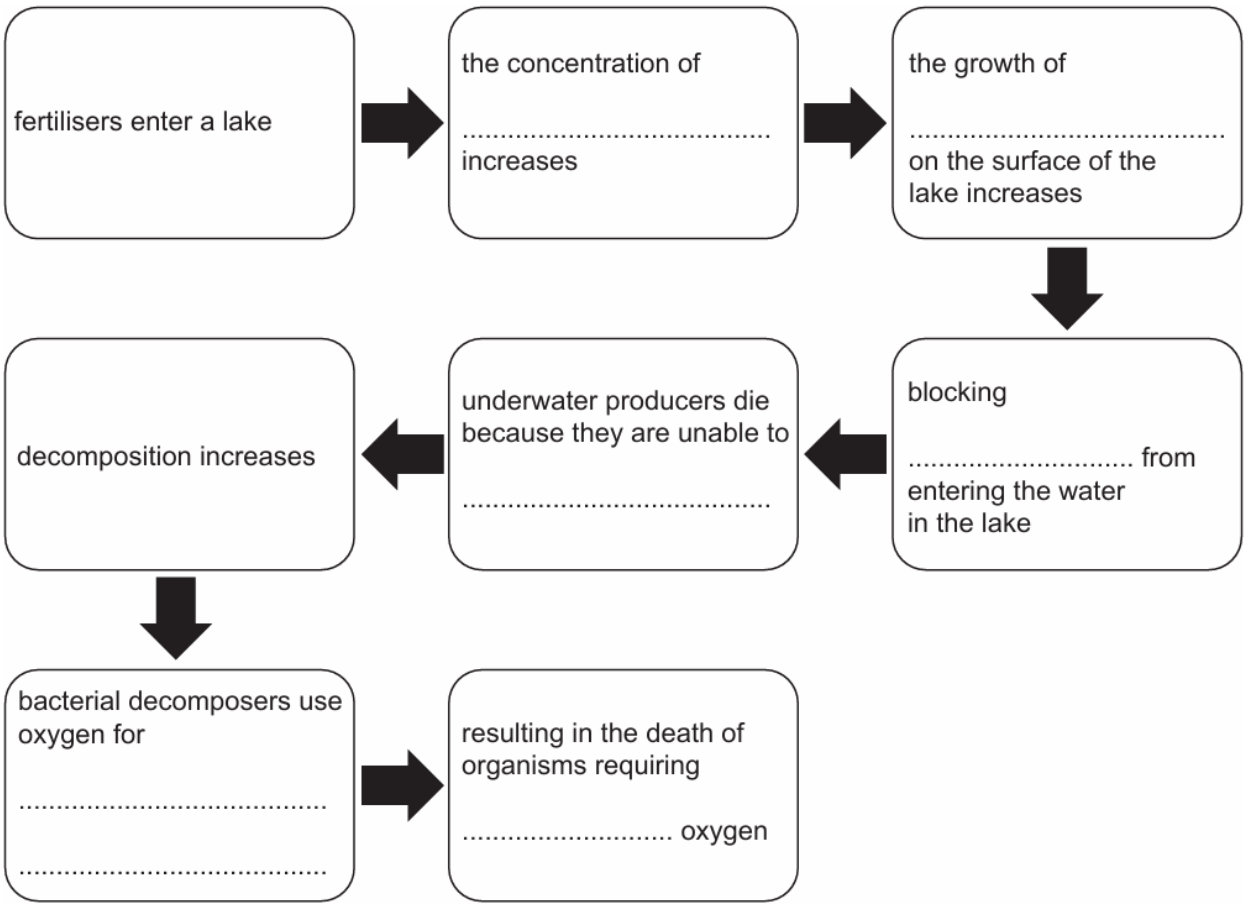


Fig. 7.1

[6]

7 **(a)** The flow chart in Fig. 6.1 shows one pathway of nitrogen as it travels through the nitrogen cycle.

Complete the flow chart in Fig. 6.1. **(extended only)**

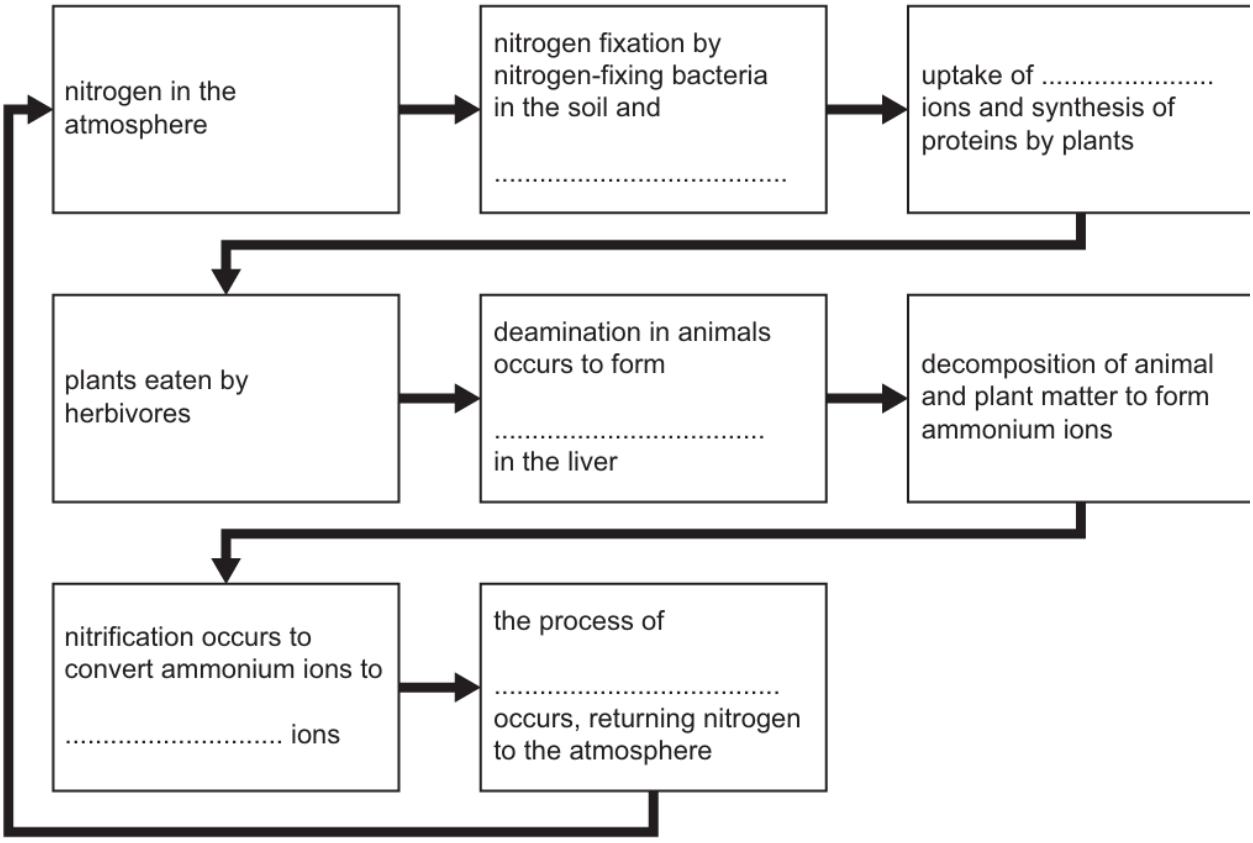


Fig. 6.1

[5]

(b) State the names of **two** processes that occur in both the carbon and nitrogen cycles. **(extended only)**

1 .....

2 .....

[2]

8 **(d)** Many species of bacteria do not cause disease. Bacteria are very important in many biological processes.

State the names of **three** natural processes involving bacteria that are important to ecosystems. **(extended only)**

1 .....

2 .....

3 .....

[3]

9 Fires release carbon dioxide into the atmosphere.

(a) **(i)** State **one** other natural process that releases carbon dioxide into the atmosphere.

.....

.....

..... [1]

(ii) Carbon dioxide is a greenhouse gas.

State the name of **one** other greenhouse gas.

..... [1]

10 Researchers investigated the effect of adding cattle manure (cattle faeces) to fields where snap bean plants, *Phaseolus vulgaris*, were grown. Cattle manure contains some protein.

(a) Explain how protein in the cattle manure is converted to the type of ions that plants can absorb. **(extended only)**

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..... [5]

11 **(d)** Some bacteria are involved in the nitrogen cycle. **(extended only)**

Fig. 1.3 shows part of the nitrogen cycle.

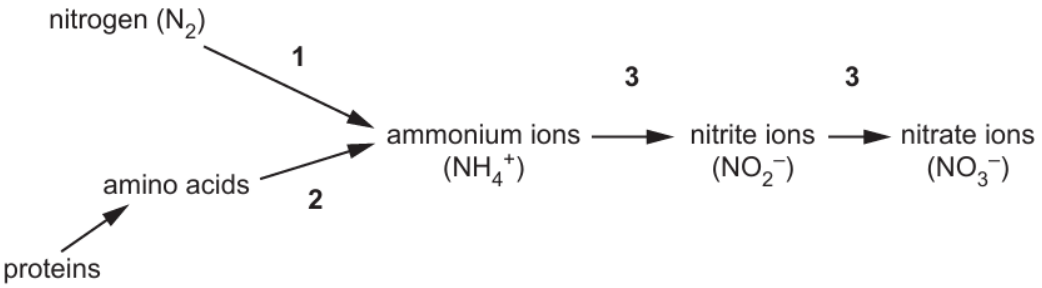

Fig. 1.3

State the processes that are represented by **1**, **2** and **3** on Fig. 1.3. **(extended only)**

1 .....

2 .....

3 .....

[3]

12 **(b)** Nitrogen is an important element for organisms.

In a livestock farm, waste from animals contains protein. This waste is often spread on farmland as a fertiliser.

Describe how the nitrogen in protein is recycled in the soil into a form that plants can absorb and use. **(extended only)**

.....

.....

.....

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.....

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.....

..... [5]

13 **(c)** Ammonium ions are an important part of the nitrogen cycle. They can be converted into nitrate ions, which are used by plants and protoctists such as diatoms. **(extended only)**

(i) State the name of the molecules that are converted into ammonium ions in the nitrogen cycle.

..... [1]

(ii) State the name of the process of converting ammonium ions into nitrate ions.

..... [1]

(iii) Explain the effects of nitrate ion deficiency on plant growth.

.....

.....

.....

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.....

.....

..... [3]

14 Fig. 7.1 shows part of the nitrogen cycle. **(extended only)**

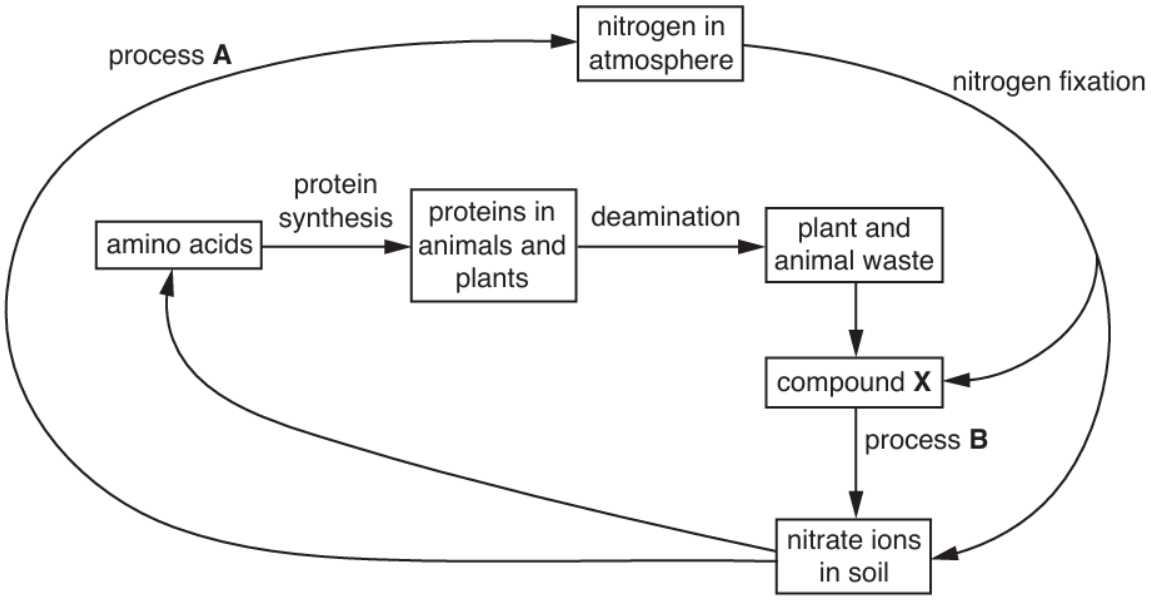

Fig. 7.1

(a) (i) State **two** ways that nitrogen fixation can occur.

1 .....

2 .....

[2]

(ii) State the names of processes **A** and **B** in Fig. 7.1.

process **A** .....

process **B** .....

[2]

(iii) State the name of compound **X** in Fig. 7.1.

..... [1]

15 Carbon dioxide forms approximately 0.04% of the atmosphere.

Fig. 6.1 shows part of the carbon cycle.

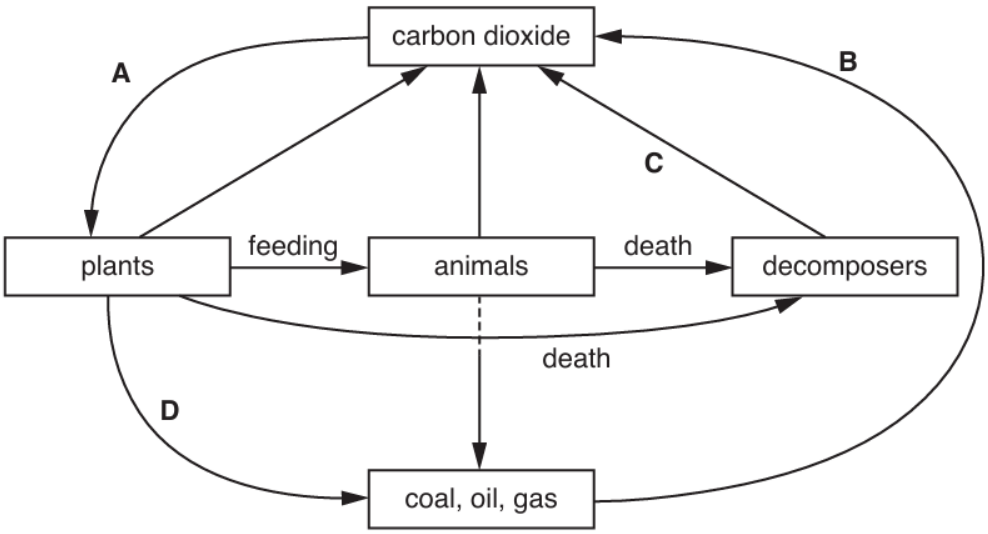

Fig. 6.1

(a) Complete Table 6.1 by naming the processes labelled **A** to **D** in Fig. 6.1.

Table 6.1

letter on Fig. 6.1	name of the process in the carbon cycle
A	
B	
C	
D	

[4]

16 Fig. 1.1 shows a pyramid of biomass and part of the carbon cycle.

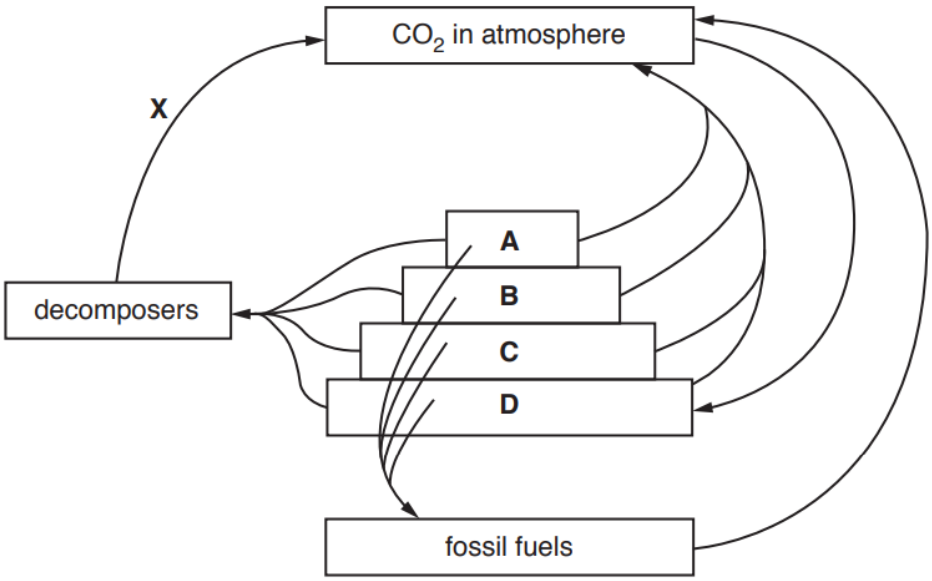

Fig. 1.1

(b) Some fungi and bacteria are decomposers.

(i) Define the term *decomposer*.

.....

.....

.....[1]

(ii) Arrow **X** on Fig. 1.1 indicates the transfer of carbon from decomposers to the atmosphere.

State the name of process **X**.

.....[1]