Energy

Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Energy and respiration
Sub Topic	Energy
Booklet	Theory
Paper Type	Question Paper 1

Time Allowed : **48 minutes**

Score : **/ 40**

Percentage : **/100**

Grade Boundaries:

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

1 **(a)** Describe the importance of ATP in cells, giving **two** examples of processes in which it is used.

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.....

.....

.....[3]

Cells generate ATP by adding a phosphate group (P_i) to ADP.
During the complete oxidation of glucose, cells have two ways of doing this:

- substrate level phosphorylation
- oxidative phosphorylation

Figs 2.1 and 2.2 are diagrams that show the main details of these two processes (not drawn to the same scale).

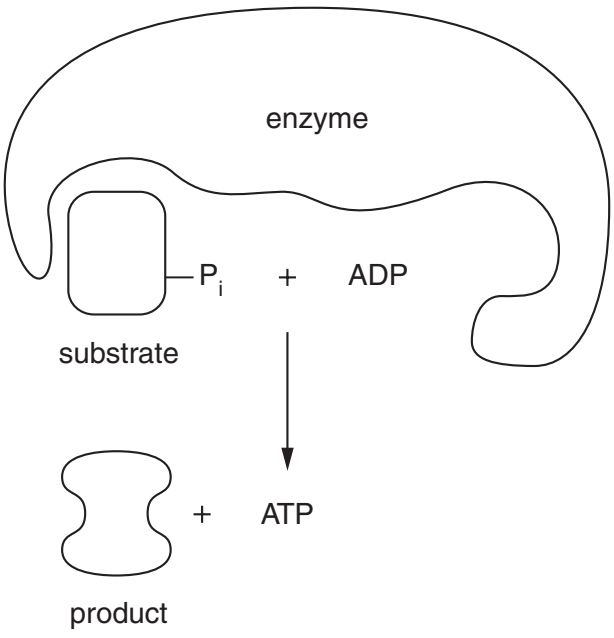

Fig. 2.1

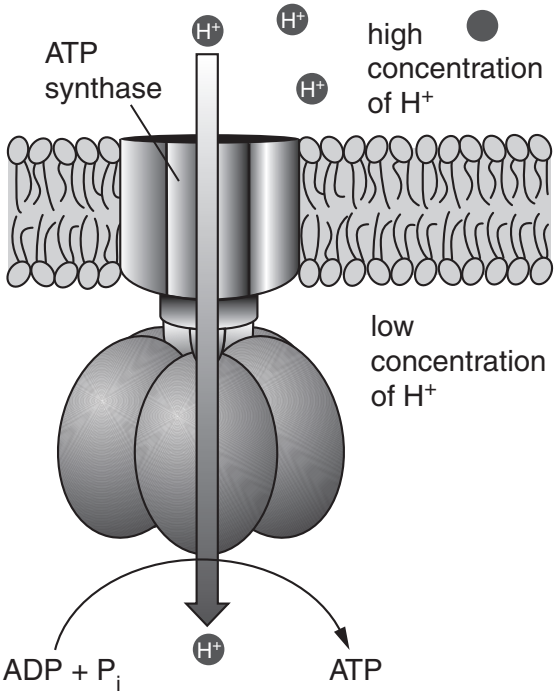

Fig. 2.2

(b) State precisely where these two processes occur in a cell.

substrate level phosphorylation

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oxidative phosphorylation

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[2]

(c) Compare the relative amounts of ATP produced by the two processes when a molecule of glucose is completely oxidised.

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.....[2]

(d) Only substrate level phosphorylation is possible in the absence of oxygen.
Explain why oxidative phosphorylation is **not** possible in the absence of oxygen.

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.....[3]

[Total : 10]

2 **(a)** State the term for each of the following:

(i) all organisms of the same species living in a defined area at a particular time.

..... [1]

(ii) the interaction of all living organisms with each other and their non-living environment in a self-contained location

..... [1]

(iii) the process of converting nitrate ions in soil to nitrogen gas in the atmosphere.

..... [1]

Mangroves are trees which grow on tropical coastlines in salt water.

Fig. 6.1 shows part of a food chain from a mangrove area.

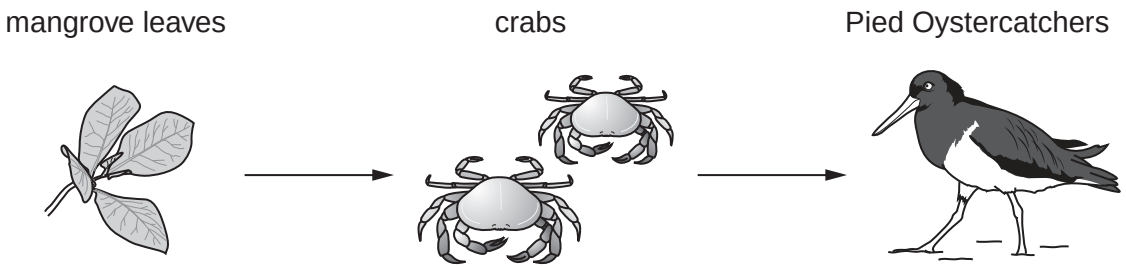

Fig. 6.1

(b) **(i)** Name the trophic level of the Pied Oystercatchers.

..... [1]

(ii) Explain why the energy taken in by the crabs is not all available to the Pied Oystercatchers.

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..... [2]

(c) The crabs in Fig. 6.1 also feed on mangrove leaves that have fallen to the ground. The leaves which are not eaten supply a source of nitrogen for the mangrove trees.

Explain how nitrogen from compounds in the dead leaves is made available to the growing plants.

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..... [4]

[Total: 10]

3 **(a)** Complete the passage with the most appropriate term.

Within each ecosystem there is a ..... of organisms that interact with each other and with their environment. Each species fills a particular ..... within the ecosystem. Feeding relationships in food webs are an example of the interactions species have with each other. In old field ecosystems in North America, producers, such as blue grass, provide energy for grazing animals. These animals form the .... in the food chain. [3]

(b) Very little of the energy consumed by grazing animals is available to carnivores.

State two reasons why this is so.

1. .....

.....

2. .....

.....[2]

[Total: 5]

4 **(a)** Describe how ATP is synthesised by oxidative phosphorylation. [8]

(b) Using examples, outline the need for energy in living organisms. [7]

[Total: 15]