Chapter 2

Organisation of the organism

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All living organisms are placed into groups according to their features.
Myriapods are one of the main groups of arthropods.

(a) State **two** features of myriapods that can be used to distinguish them from other arthropods.

1 .....

2 .....
[2]

Fig. 1.1 shows that there are four main groups of arthropods.

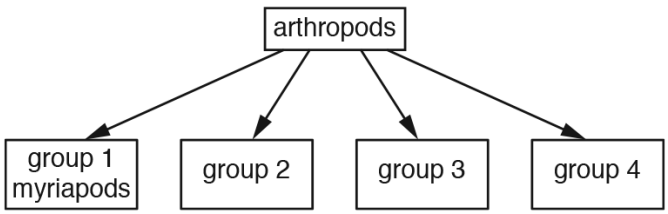

Fig. 1.1

(b) State the names of **two** of the other groups of arthropods in Fig. 1.1.

1 .....

2 .....
[2]

(c) Myriapods can be classified into four classes, **1**, **2**, **3** and **4**.

Fig. 1.2 is a dichotomous key that can be used to distinguish the four classes of myriapods.

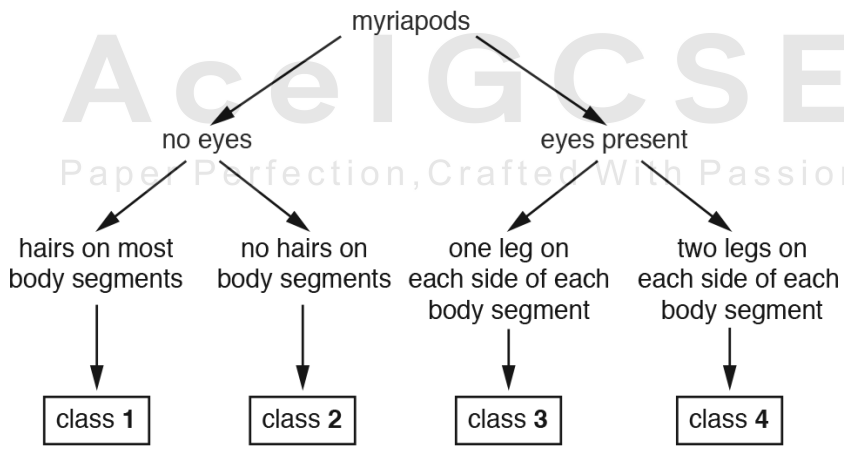

Fig. 1.2

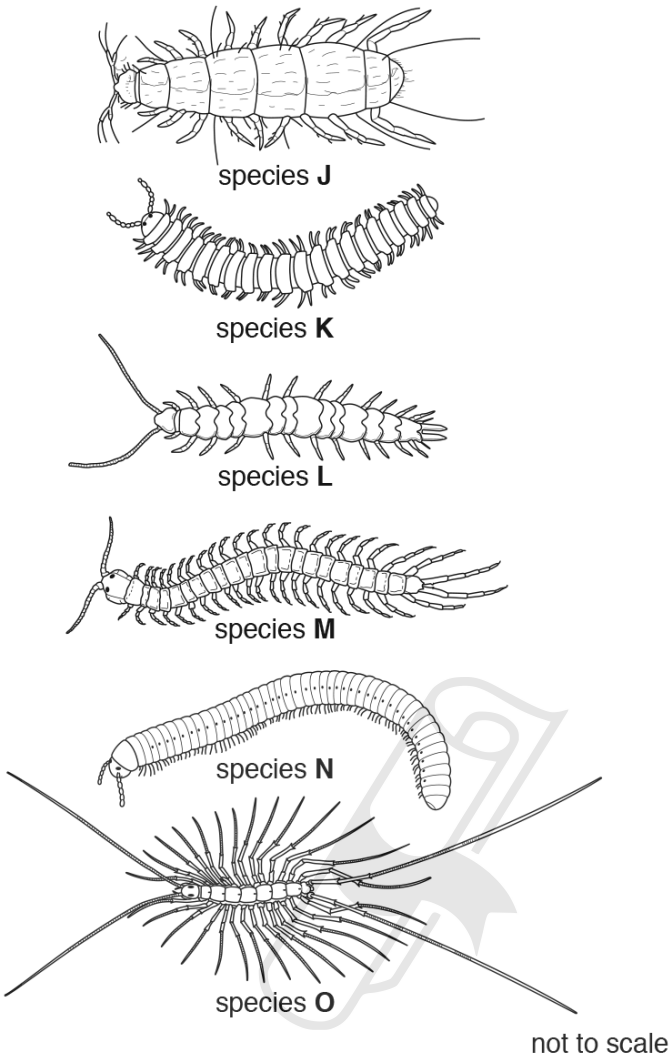

Fig. 1.3

Complete Table 1.1 by using the key in Fig. 1.2 to classify the six myriapods in Fig. 1.3 into the four classes.

Table 1.1

class	letter(s) of species from Fig. 1.3 in each class
1	
2	
3	
4	

[3]

(d) Fig. 1.4 is a photograph of the myriapod, *Apheloria virginiensis*.

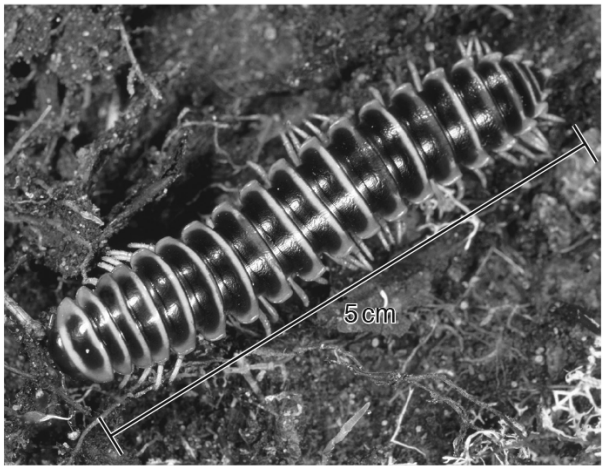

Fig. 1.4

(i) State the genus name and kingdom name for the myriapod shown in Fig. 1.4.

genus .....

kingdom .....

[2]

(ii) *A. virginiensis* releases the poison cyanide when it is attacked by predators. Cyanide stops enzymes in the mitochondria from functioning.

Suggest why cells die if the mitochondria do not function.

.....

.....

..... [1]

[Total: 10]

A researcher used a light microscope to observe epithelial cells from a human cheek.
Fig. 1.1 is a photograph that the researcher made of these cells.

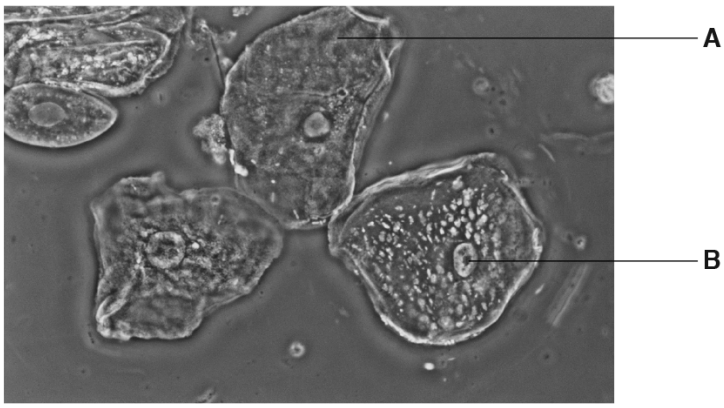

Fig. 1.1

(a) (i) Name the parts labelled **A** and **B**.

A .....

B .....
[2]

(ii) The cells in Fig. 1.1 each have a cell membrane.

State **one** of the functions of a cell membrane.

.....

.....[1]

(iii) State how the shape of the cells shown in Fig. 1.1 differs from the shape of a palisade mesophyll cell in a leaf.

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.....

.....[1]

(b) Fig. 1.2 shows an electron micrograph of a mitochondrion.

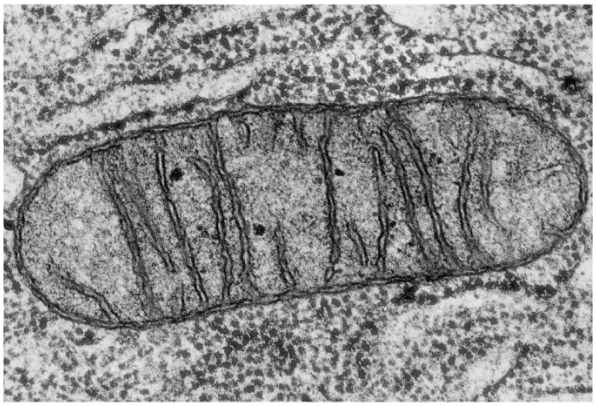

Fig. 1.2

Mitochondria have two membranes, an inner membrane and an outer membrane. The inner membrane is folded and used in respiration.

Suggest why the inner membrane of mitochondria is folded.

.....

.....

.....[1]

(c) Table 1.1 shows different specialised cells and the average number of mitochondria each cell contains.

Table 1.1

specialised cell type	average number of mitochondria
liver cell	1000–2000
red blood cell	0
sperm cell	25–75
heart muscle cell	1500

Explain the differences between the average numbers of mitochondria in the cells shown in Table 1.1.

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.....

.....

.....

.....

.....[4]

[Total: 9]

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	Answer	Mark	Partial Marks
(a)	many (body) segments ; head and, body (segments) / AW ; many legs / many pairs of legs; elongated bodies ;	2	
(b)	crustaceans ; arachnids ; insects ;	2	
(c)	<table><tr><th>class</th><th>letter(s) of species from Fig. 1.3 in each class</th></tr><tr><td>1</td><td>J</td></tr><tr><td>2</td><td>L</td></tr><tr><td>3</td><td>M,</td></tr><tr><td>4</td><td>K,N,O</td></tr></table> ;;;	3	4 rows correct = 3 2 or 3 rows correct = 2 1 row correct = 1
(d)(i)	(genus) *Apheloria* ; (kingdom) animal ;	2	
(d)(ii)	no (aerobic) respiration ; **ora** cannot release energy ; **ora**	1	

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	Answer	Mark	Partial Marks
(a) (i)	**A** cytoplasm ; **B** nucleus ;	[2]	
(ii)	forms a barrier between the cell and its surroundings ; keeps contents of cell inside ; allows / controls / (movement of) substances, into / out, of the cell / across membrane ;	[max 1]	
(iii)	irregular shape / rounded shape / not columnar / not cylindrical / not rectangular / no specific shape ;	[1]	**A ORA** if palisade cell specified
(b)	large surface area ; more surface for respiration ; allows, increased / faster / efficient, respiration ;	[max 1]	**A** more surface area for enzymes
(c)	1 mitochondria are site of aerobic respiration / production of (most of the) ATP ; 2 liver cell / heart cell, is very active / use lots of energy / respire more ; 3 e.g. function of liver cell or heart cell ; 4 sperm cells, are active / swim / beating flagella ; 5 sperm cells have few mitochondria, as they are small ; 6 red blood cells, full of haemoglobin / more space for oxygen / AW ; 7 red blood cells, use less energy / do not actively move ;	[max 4]	**mpt 1 I** respiration **R** anaerobic **mpt 3** e.g. active transport / making enzymes / making bile / muscle contraction / heart pumping **mpt 4 I** move unqualified **mpt 7 I** do not need any energy
		[Total: 9]	
