



**Cambridge Assessment
International Education**

Example Responses – Paper 3

**Cambridge IGCSE™ / IGCSE (9–1)
Biology 0610 / 0970**

For examination from 2023



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Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE / IGCSE (9-1) Biology 0610 / 0970.

This booklet contains responses to all questions from June 2023 Paper 31, which have been written by a Cambridge examiner. Responses are accompanied by a brief commentary highlighting common errors and misconceptions where they are relevant.

The question papers and mark schemes are available to download from the [School Support Hub](#)

0610 / 0970 June 2023 Question Paper 31

0610 / 0970 June 2023 Mark Scheme 31

Past exam resources and other teaching and learning resources are available from the [School Support Hub](#)

Question 1

- 1 (a) Describe the meaning of the term species.

a group of organisms that can reproduce to produce fertile
offspring
 [2]

Examiner comment

A common misconception was to describe members of a species as having a similar appearance or sharing features, in other words describing how they can be classified into groups rather than into species.

- (b) Fig. 1.1 is a photograph of *Lithobius forficatus*, a species of myriapod.

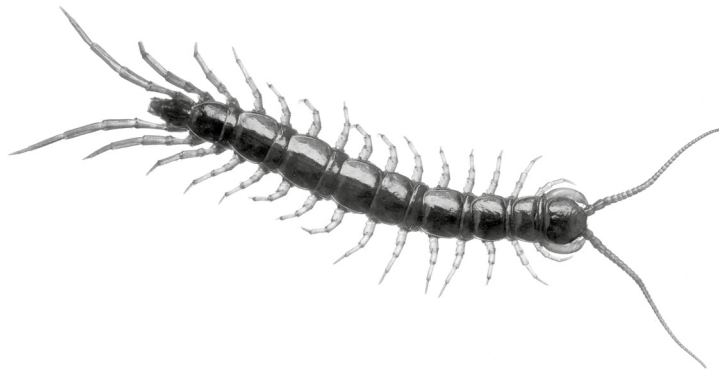


Fig. 1.1

- (i) State the genus of the organism shown in Fig. 1.1.

Lithobius..... [1]

Examiner comment

Candidates were asked to state the genus of the organism *Lithobius forficatus*. Some candidates confused genus and species and gave their answer as *forficatus*.

(ii) State **one** feature **visible** in Fig. 1.1 that identifies the organism as:

a myriapod *many pairs of legs*.....

an arthropod. *segmented body*.....

[2]

Examiner comment

- Some candidates confused the two terms, or chose an observable feature such as antennae not confined to the group in question.
- Any correct answer for *myriapod* was accepted, such as one or two pairs of legs on each segment and for *arthropod* any correct response such as exoskeleton or jointed legs was accepted.

(iii) State the names of **two** groups of arthropods, other than myriapods.

1 *insects*.....

2 *arachnids*.....

[2]

Examiner comment

- Candidates could also have given 'crustaceans' as the third acceptable answer.
- The list rule applied here, so if candidates went on to add incorrect groups of arthropods then they were penalised. Candidates should be discouraged from adding extra responses when asked for a specific number.

(iv) State **two** features of plant cells that would be **absent** in the cells of the organism shown in Fig. 1.1.

1 *chloroplasts*.....

2 *cell wall*.....

[2]

Examiner comment

- Alternative acceptable answers were 'chlorophyll' instead of 'chloroplast', 'cellulose' instead of 'cell wall', 'vacuole' and 'starch grain / granule'.
- This question proved straightforward for most candidates, even though some gave cell membrane as one of their examples.

(c) Adaptive features enable organisms to survive in their environment.

Fig. 1.2 is a photograph of another species of arthropod. Some of its adaptive features are visible in Fig. 1.2.



Fig. 1.2

(i) State **one** adaptive feature visible in Fig. 1.2 that reduces water loss when the organism is on land.

exoskeleton..... [1]

Examiner comment

- Candidates were asked what feature reduces water loss, and other correct answers included ‘shell’, ‘carapace’ or ‘hard covering’.
- Skin was not accepted as this is not a feature of Arthropods.

(ii) State the name of the kingdom that the organism in Fig. 1.2 belongs to.

animal..... [1]

[Total: 11]

Examiner comment

Some candidates were not familiar with what constitutes a kingdom.

Question 2

2 (a) Fig. 2.1 is a diagram of a human tooth.

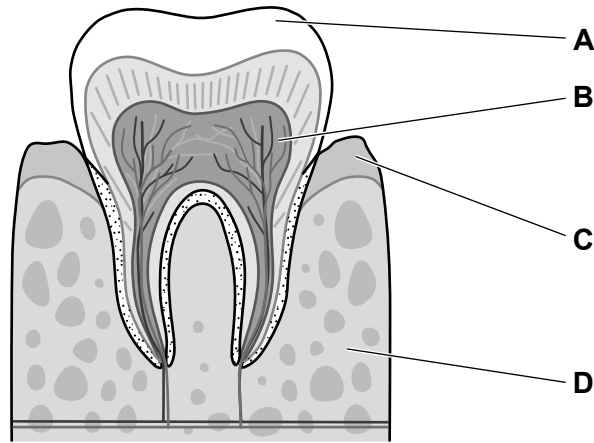


Fig. 2.1

The boxes on the left contain the letters identifying the parts in Fig. 2.1.

The boxes on the right contain the names of some parts shown in Fig. 2.1.

Draw lines to link each letter to its correct name.

Draw **four** lines.

letter in Fig. 2.1	name
A	bone
B	dentine
C	enamel
D	gum
	pulp

The diagram shows four lines connecting the letters to the names: A to bone, B to dentine, C to enamel, and D to gum.

[4]

Examiner comment

- There was some confusion over the position of the enamel and the pulp.
- Most candidates could correctly label C as the gum.

(b) Complete the sentences to describe the role of teeth in digestion.

The teeth are needed for*physical*..... digestion.

They break down food into smaller*pieces*..... .

This increases the*surface*..... area of the food for the action of biological catalysts called*enzymes*..... .

These biological catalysts are needed for*chemical*..... digestion.

[5]

Examiner comment

- ‘Mechanical’ was an acceptable alternative answer to ‘physical’.
- ‘Parts’ or ‘bits’ were acceptable rather than ‘pieces’. ‘Molecules’, a reference to ‘soluble’ and ‘particles’ were not accepted.
- Named enzymes were also ignored.

(c) State the names of **two** different types of human teeth.

1 *molars*.....

2 *canines*.....

[2]

Examiner comment

- Incisors and premolars were also correct responses
- Some candidates misunderstood what was meant by ‘types of human teeth’ and instead referred to milk teeth and permanent teeth.

Question 3

3 Fig. 3.1 is a photomicrograph of a sample of human blood.

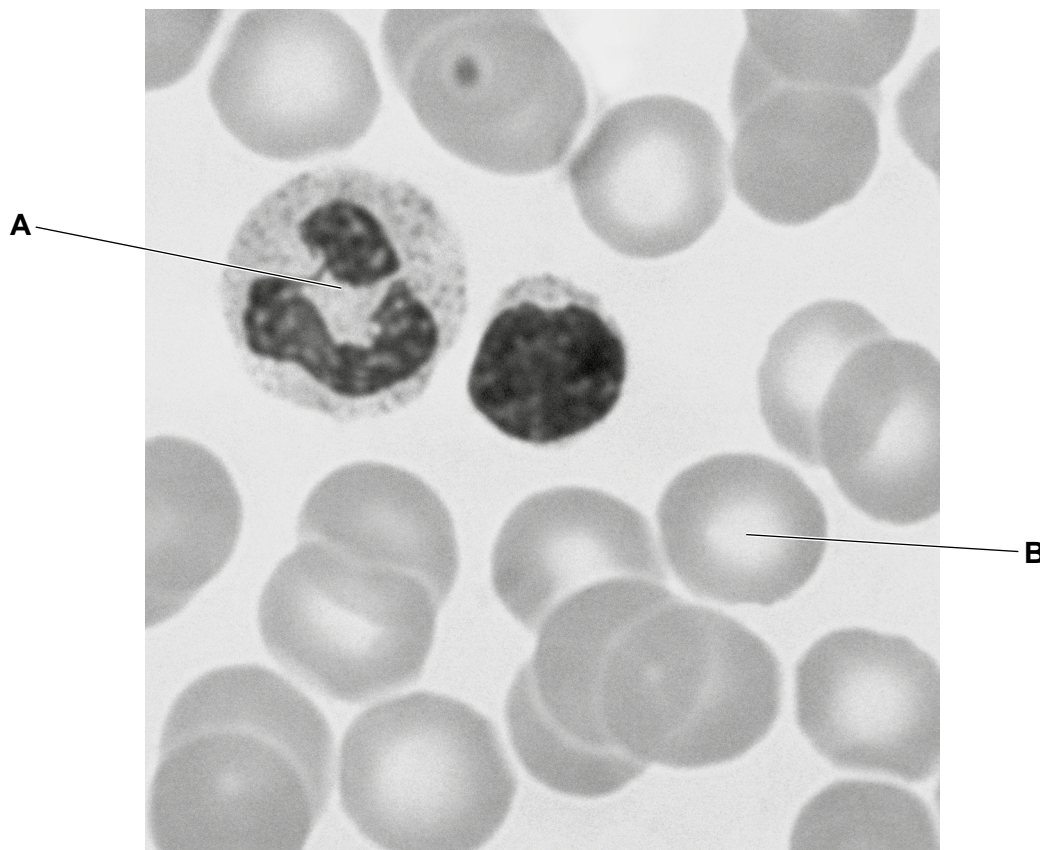


Fig. 3.1

(a) Identify and describe the functions of the cells labelled **A** and **B** in Fig. 3.1.

A is a white blood cell which carries out phagocytosis.

B is a red blood cell which transports oxygen.

..... [4]

Examiner comment

- The white blood cell could be described as a phagocyte and the red blood cell as an erythrocyte.
- Candidates were also awarded a mark for describing the white blood cell as producing antibodies, even though the diagram showed a phagocyte.
- A description of phagocytosis was also accepted, such as ‘destroying pathogens’, but references to fighting and attacking, and defending against pathogens were not accepted.
- Describing the red blood cell as ‘transporting substances as well as oxygen’ were not accepted, and references to carbon dioxide were ignored.
- If the blood cell was wrongly identified, candidates could still be awarded marks for linking the correct function to it.

(b) Describe how platelets in the blood prevent disease.

to clot the blood to prevent entry of pathogens

.....

.....

.....

..... [2]

Examiner comment

- Candidates needed to refer to sealing the wound in order to stop pathogens (or a named pathogen) from entering.
- References to germs, infections or disease were ignored.
- References to platelets preventing blood loss were ignored as this was not in the context of the question.

(i) Circle the names of **two** excretory products in humans.

amino acids cellulose carbon dioxide glucose

lipase oxygen urea

[2]

Examiner comment

This question asked about human excretory products and many candidates knew this, although some confused urea and amino acids.

(ii) State the names of **two** hormones that are produced by the reproductive organs.

1 *testosterone*

2 *oestrogen*

[2]

Examiner comment

- Any two reproductive hormones were acceptable, so progesterone was also accepted but not references to follicle stimulating hormone as this is not produced by the reproductive organs.
- Although correct spelling was not necessary, candidates needed to be careful not to give words which hybridise the names of two hormones.

Question 4

4 (a) Fig. 4.1 is a diagram of a cross-section of a root.

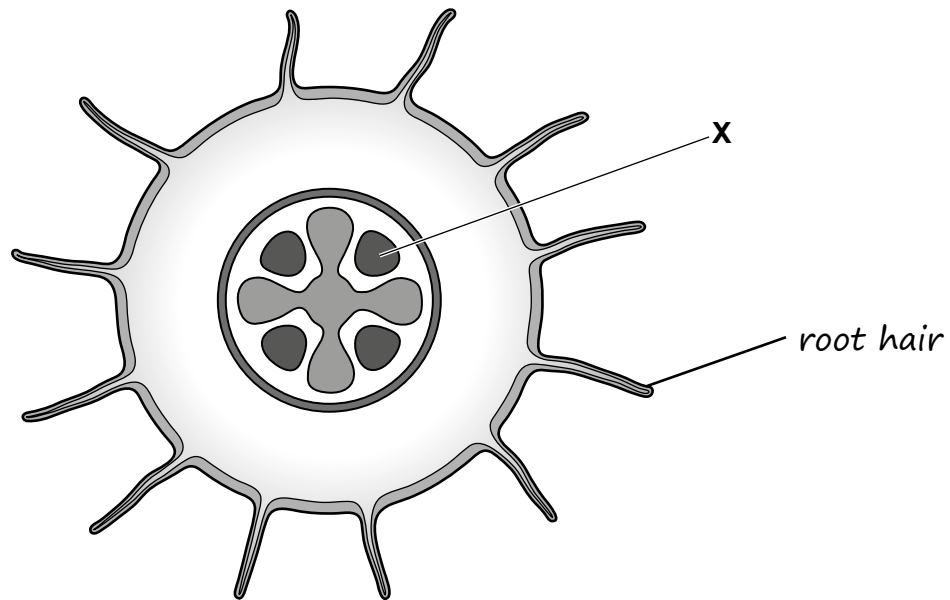


Fig. 4.1

(i) Circle two substances transported by the part labelled X in Fig. 4.1.

amino acids	cellulose	fatty acids	glucose
glycogen	starch	sucrose	

[2]

Examiner comment

This question proved to be difficult for some candidates, and many gave starch as an answer.

(ii) Label the part of the root in Fig. 4.1 that absorbs mineral ions from the soil with a label line and the correct name. [2]

Examiner comment

- This question was marked in two parts. One mark was awarded for the line touching the correct structure and one for the root hair or root hair cell being correctly named.
- Many candidates labelled and named the xylem, confusing the absorption of mineral ions with their transport.

(b) Mineral ions are absorbed by active transport and are transported with water in the xylem.

(i) Describe what is meant by the term active transport.

movement of substances across a cell membrane from a low concentration to a high concentration using energy

.....

.....

.....

.....

.....

..... [3]

Examiner comment

- There were three separate mark points here, marked independently.
- The first mark was awarded for recognising this is movement across a cell or partially permeable membrane. However, if candidates named the substance as water then this was incorrect as osmosis is a passive process.
- The second mark point was awarded for the correct direction of movement, low to high concentration, or against (or up) the concentration gradient. Some candidates contradicted themselves by saying low to high concentration, and down the concentration gradient.
- The third mark was awarded for recognising this requires energy or ATP.

(ii) State **one** function of xylem other than transport.

support..... [1]

Examiner comment

A description of support was accepted, for example, 'to hold the plant upright'.

(c) Transpiration is the loss of water vapour from leaves.

State **two** environmental factors that affect the rate of transpiration.

1 *wind*.....

2 *temperature*..... [2]

Examiner comment

- All valid responses were accepted, including air movement as an alternative to wind, humidity, light intensity, but not just 'light' on its own.
- Some candidates were distracted by the word 'environmental' and gave answers such as pollution or climate change.

Question 5

5 Fig. 5.1 shows a pyramid of numbers for a food chain.

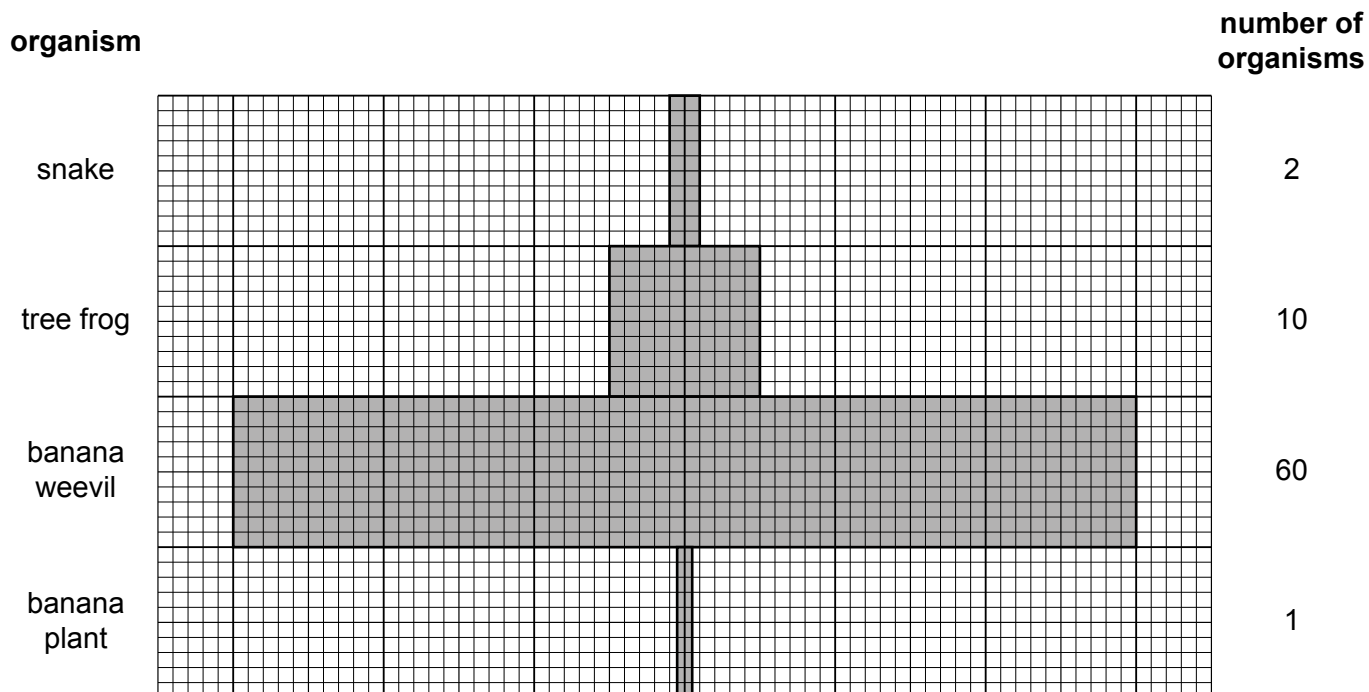


Fig. 5.1

(a) Write the food chain for the pyramid of numbers shown in Fig. 5.1.

banana plant → banana weevil → tree frog → snake [2]

Examiner comment

- Most candidates could work out the food chain from the figure given, although some wrote down the numbers of organisms rather than the names.
- Candidates needed to draw arrows, and not just connecting lines.

(b) Identify the number of trophic levels in Fig. 5.1.

.....4..... [1]

Examiner comment

- Many candidates did not understand what a 'trophic level' meant.
- Many candidates gave '3' as their answer, and it is likely that they discounted the plant in their calculation to get to this answer.

(c) The words in the list can be used to describe the organisms shown in Fig. 5.1.

carnivore consumer decomposer herbivore producer

Choose words from the list to describe the:

banana plant *producer*

tree frog *consumer* and *carnivore* [3]

Examiner comment

- Candidates could give ‘consumer’ and ‘carnivore’ in either order.
- Perhaps because of its name, candidates often described the tree frog as a herbivore.

(d) State **one** advantage of using a pyramid of biomass rather than a pyramid of numbers.

a pyramid of biomass takes the size of the organisms into account

.....

..... [1]

Examiner comment

- Only a few candidates were able to give an advantage of a pyramid of biomass.
- Most answers referred to ‘being more accurate’ without saying why, or simply that it is easier to read.
- Few candidates understood that it was related to allowing for the different sizes of organisms, and it was not clear that candidates understood the term ‘biomass’.

(e) Describe how plants synthesise carbohydrates.

carbohydrates are synthesised during the process of photosynthesis

using carbon dioxide, water and light energy

.....

Examiner comment

- Some candidates did not realise that this was a question about photosynthesis and gave an answer describing how carbohydrates could be used to synthesise other substances.
- There were other ways to answer the question, for example candidates could have included a reference to glucose being produced, or a correct reference to the role of chloroplasts or chlorophyll.
- If photosynthesis was mentioned it had to be in the correct context.
- Candidates could also have given a correct word equation if it referenced the reactants, products and light energy and chlorophyll.

Question 6

- 6 (a) Fig. 6.1 is a graph that shows the concentration of dissolved oxygen in the water at increasing distances along a river.

Untreated sewage is released into the river. This is marked on the graph in Fig. 6.1.

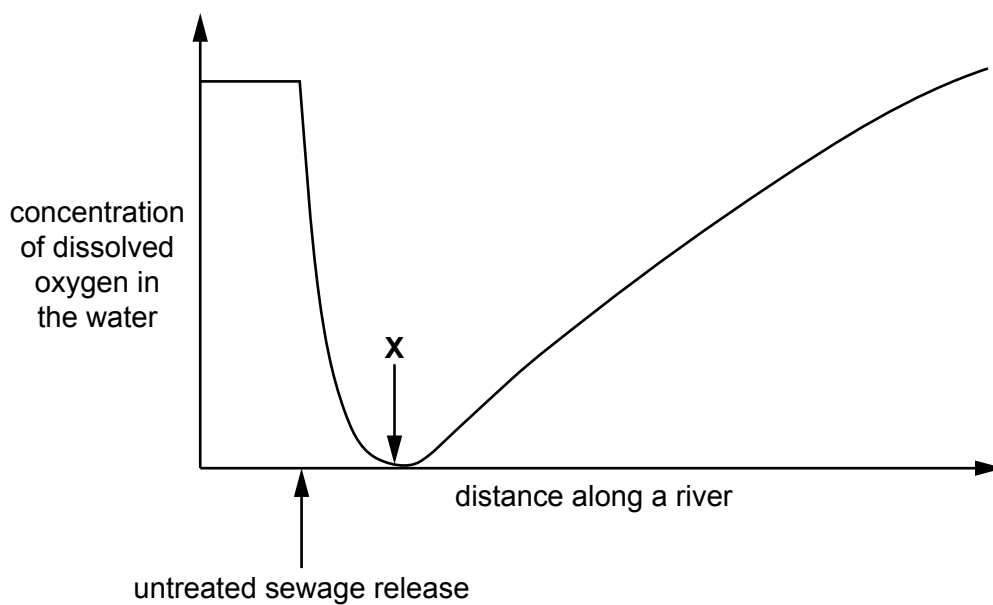


Fig. 6.1

- (i) Describe the results shown in Fig. 6.1.

*At the start the concentration of dissolved oxygen is high and stable.
 The sewage causes the concentration of oxygen to decrease rapidly.
 After point X the concentration of oxygen increases slowly and
 eventually reaches and exceeds the initial level.*

.....

 [3]

Examiner comment

- Candidates needed to examine the figure carefully to make sure they understood what it was showing before attempting to write an answer.
- Candidates often missed the point at which the dissolved oxygen began to increase, and there was no reference to point X or from the minimum point.
- When describing results from a graph, candidates needed to remember that a rapid decrease or a gradual increase was significant and should be commented on.

- (ii) Predict **and** explain the effect on the organisms in the river of the dissolved oxygen concentration at **X** in Fig. 6.1.

the organisms die because there is no oxygen for respiration.....

.....

Examiner comment

- It was important that candidates related the lack of oxygen at X to a lack of survival, so any comment implying the number of organisms decreased was accepted.
- The second point was to relate the need for oxygen to allow respiration to occur.
- It was not enough for candidates just to refer to organisms suffocating or being unable to breathe.

- (b) Describe why it is important for humans that sewage is treated before entering rivers.

it is important for humans that sewage is treated to prevent the spread of disease.....

.....

[1]

Examiner comment

- Candidates needed to say more than ‘it prevents pollution’.
- Any valid point was accepted here, so references to making water safe to drink, or to avoid contaminating the fish humans eat was acceptable.
- Some candidates did not relate their answer to humans, instead referring to the organisms in the water or eutrophication occurring.

- (c) Pollution can cause organisms to become extinct.

State **three** other factors that can cause extinction.

1 *climate change*.....

2 *habitat destruction*.....

3 *introduction of new predators*.....

[3]

Examiner comment

- Climate change included global warming, drought, and enhanced greenhouse effect.
- Alternative acceptable answers included habitat destruction/deforestation, poaching or hunting, disease, and lack of food.
- Candidates needed to read the stem of the question carefully as ‘pollution’ was already given.

Question 7

7 (a) Fig. 7.1 is a diagram showing some of the organs in the human body.

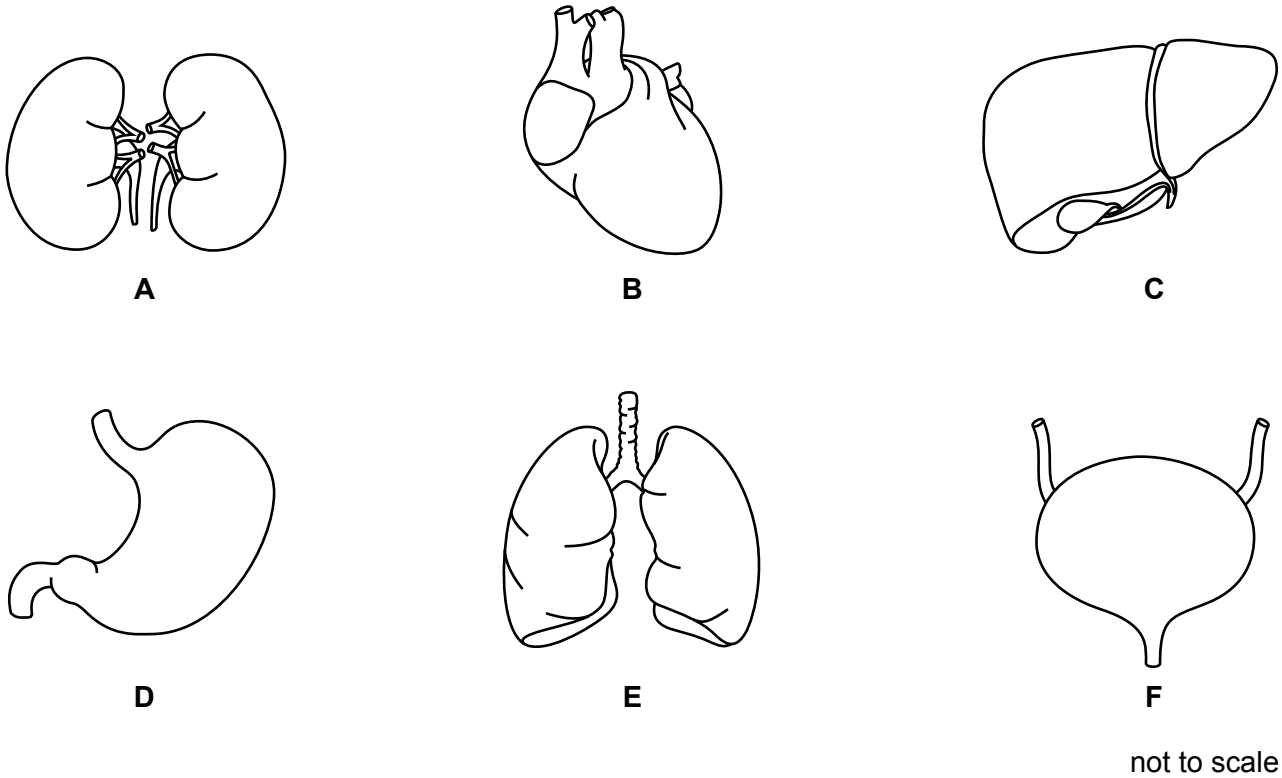


Fig. 7.1

Table 7.1 shows the names of some of the organs in Fig. 7.1, the identifying letters of some of these organs and their functions.

Complete Table 7.1.

name	letter in Fig. 7.1	function
<i>lungs</i>	<i>E</i>	excretes carbon dioxide from the body
heart	B	<i>pumps blood</i>
<i>bladder</i>	F	stores urine
<i>kidney</i>	<i>A</i>	excretes urea, excess water and ions

[6]

Examiner comment

- A common misconception was that the kidney stores urine and that the liver excretes urea.
- References to the heart transporting blood were ignored, as it was the pumping action that was required.

(b) State the names of **two** organs from the human female reproductive system.

1 *vagina*.....

2 *uterus*.....

[2]

Examiner comment

- Oviduct / fallopian tube, ovary or cervix were all accepted here.
- A few candidates gave organs from the male reproductive system, so had not read the question carefully.

(c) Excretion and reproduction are two characteristics of all living organisms.

Place ticks (✓) in **two** boxes to show other characteristics of all living organisms.

breathing	
eating	
growing	✓
moving	✓
sleeping	
talking	

[2]

Examiner comment

- A common mistake was to include breathing instead of growing.
- Candidates should be discouraged from placing more ticks than required by the question.

Question 8

8 (a) Fig. 8.1 is a diagram representing a reflex action.

When the knee is tapped with a small rubber hammer, the leg will immediately straighten.

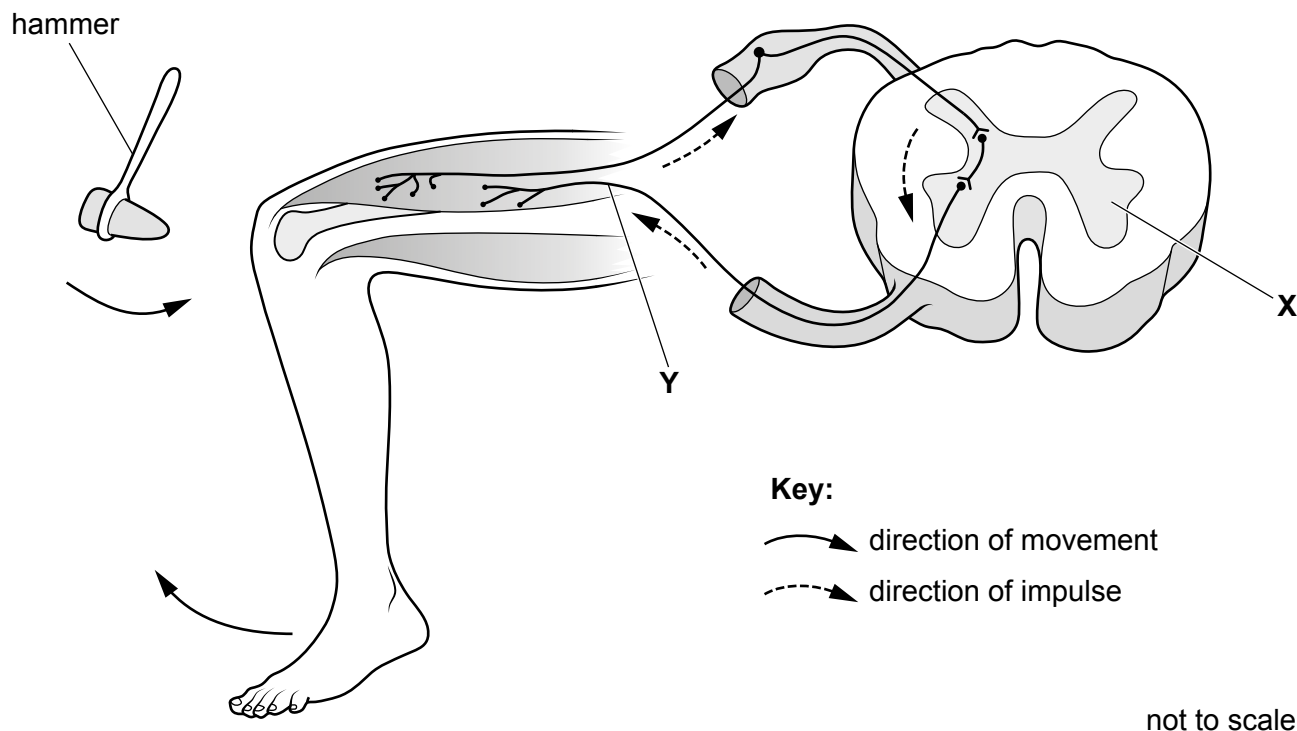


Fig. 8.1

(i) Identify the parts labelled X and Y in Fig. 8.1.

X spinal cord.....

Y motor neurone.....

[2]

Examiner comment

- 'Grey matter' was accepted as an alternative for 'spinal cord'.
- Candidates had difficulty in identifying the spinal cord. A common misconception was that it was bone.
- The motor neurone was often referred to simply as a 'neurone'. Axon was accepted here.

(ii) State the name of the effector in the example shown in Fig. 8.1.

muscle..... [1]

Examiner comment

- 'Quadriceps' was also accepted.
- Rather than the muscle, some candidates named the hammer and misinterpreted what was meant by an effector.

(iii) Describe the stimulus in the example shown in Fig. 8.1.

the hammer tapping the knee
.....
.....
..... [1]

Examiner comment

Candidates just needed to refer to the action of the hammer, but some went on to describe in great detail an entire reflex arc which was unnecessary as the question asked only for the stimulus.

(iv) State **two** features of reflex actions.

1 *rapid*
.....
2 *automatic*
..... [2]

Examiner comment

- All valid answers such as ‘immediate’, ‘does not require conscious thought’, ‘involuntary’ or ‘innate’ were accepted.
- Candidates needed to be aware that terms such as ‘uncontrollable’ have a different meaning.

(b) The shortest neurones in the human body are 0.0004 mm.

The longest neurones are 1.5 m.

Calculate how many times longer the longest neurones are than the shortest.

Space for working.

3.75 x 10⁶
..... [2]

Examiner comment

- The correct answer in any form was awarded full marks.
- Where candidates gave the incorrect answer, they were awarded marks for converting both values to the same unit.
- If candidates did not convert both values to the same unit, they were given a mark for reaching an answer of 3750.

(c) State the name given to the junction between neurones.

synapse
..... [1]

Examiner comment

- Candidates needed to give the correct term here, so ‘gap’ or ‘junction’ was not accepted.
- Many candidates did not know the correct term for the junction between neurones.

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