





Level 2 Biology, 2013

91156 Demonstrate understanding of life processes at the cellular level

9.30 am Friday 22 November 2013 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL	

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You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: RESPIRATION

Although aerobic respiration is an essential cell process in both plants and animals, the location and function of the cell in an organism influences the rate at which respiration takes place. Cells that carry out different levels of respiration are usually found to have different amounts of the organelle in which aerobic respiration occurs.

Discuss the process of aerobic respiration.

In your answer:

- describe the purpose of aerobic respiration
- describe what is required for aerobic respiration to occur, and name the products of the process
- name the organelle where aerobic respiration takes place, and relate its structure to its function
- give reasons for the differences in amounts of this organelle, supported by a minimum of TWO justified examples.

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The examination continues on the following page.

QUESTION TWO: PHOTOSYNTHESIS

The rate of photosynthesis is directly related to the availability of light. Normally, an increase in light intensity also leads to an increase in temperature. However, if the temperature gets too high, the rate of photosynthesis may decrease or even stop completely. Experiments have shown that if light is kept constant but temperature is varied independently, then the rate of photosynthesis can still be seen to change.

(a) With reference to the structure and function of enzymes, and the conditions that they are best suited to, explain why the rate of photosynthesis varies with changes in temperature.

(b) The leaf is made up of several different types of cells. Their shape, size, and chloroplast concentration are related to their function.

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Adapted from V. Slaughter, Living Things (London: Hodder & Stoughton, 1980), p 30.

With reference to the diagram above, discuss how the location and structure of cells AND organelles in a plant leaf can maximise the rate of photosynthesis.

In your answer:

- describe the different types of cells found in a typical leaf
- describe the structure of the organelle where photosynthesis is carried out
- explain how the structures you have described allow the functions to be carried out
- relate the structure and function of the cells and organelles to the rate of photosynthesis.

You may draw a diagram(s) in the box provided to support your answer.



QUESTION THREE: CELL DIVISION

Mitosis occurs during the life cycles of both animals and plants.

(a) Describe what is meant by mitosis.

The process of DNA replication is usually referred to as semi-conservative replication.

(b) Explain the process of how chromosomes are replicated, and why the process is known as semi-conservative replication.

You may draw a labelled diagram(s) in the box provided to support your answer.

Question Three continues on the following page.

(c) Almost all animals and plants develop from a fertilised cell that divides into different types of cells and tissues. The rates of mitosis vary considerably, depending on the location of the cells and the stage in the organism's life-cycle.

Discuss the statements above.

In your answer include:

- a description of what affects the rate of mitosis
- reasons why the stages of an organism's life-cycle have different rates of mitosis
- at least two examples, with reasons, of the parts of plants and animals where the rate of mitosis is likely to be higher.



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QUESTION NUMBER	Extr Write the que	ra paper if requir stion number(s)	ed. if applicable.	ASSESSOR'S USE ONLY