2019 M44

2019L025A1EL

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2019

Biology

Section A and Section B
Higher Level

Tuesday 11 June – Afternoon 2:00 – 5:00

160 marks

Section C is supplied separately

You must return this examination booklet with the answerbook used to answer the questions in Section C

Examination Number					

Centre Stamp

2019L025A1EL0112

Instructions

Write your Examination Number in the box on the front cover.

There are three sections in this examination.
Section **A** and Section **B** are in this examination booklet.
Section **C** is in a separate question paper.

This examination carries 400 marks in total.

It is recommended that you spend not more than 30 minutes on Section A and 30 minutes on Section B, leaving 120 minutes for Section C.

Section **A**: Answer any **five** questions from this section.
Each question carries 20 marks.
Write your answers in the spaces provided in **this examination booklet**.

Section **B**: Answer any **two** questions from this section.
Each question carries 30 marks.
Write your answers in the spaces provided in **this examination booklet**.

This examination booklet will be scanned and your work will be presented to an examiner on screen. Anything that you write outside of the answer areas may not be seen by the examiner.

Write your answers in blue or black pen. You may use pencil for graphs and diagrams only.

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Section A

Answer any five questions.
Write your answers in the spaces provided.

1. Answer any **five** of the following parts (a) to (f):

(a) State the two main reasons why food is required by all living organisms.

1.
2.

(b) What is the ratio of hydrogen atoms to oxygen atoms in a carbohydrate?

(c) Give a structural role of lipids in cells.

(d) Give a metabolic role of lipids in cells.

(e) Give an example of a fat-soluble vitamin.

(f) Name a disorder due to a dietary deficiency of the vitamin referred to in (e).

2. In relation to the principles of experimentation:

(a) What is meant by the term *hypothesis*?

(b) Explain what is meant by *double-blind testing*.

(c) Explain the necessity for random selection.

(d) Give two other features of good experimental design.

1.
2.

(e) Where are the results of scientific research usually first published?

(f) Why is it important that scientists publish the results of their research?

3. Organisation is one of the characteristics of life. This includes organisation of cells.

(a) What is meant by the term *tissue*?

(b) Name two types of animal tissue.

1.
2.

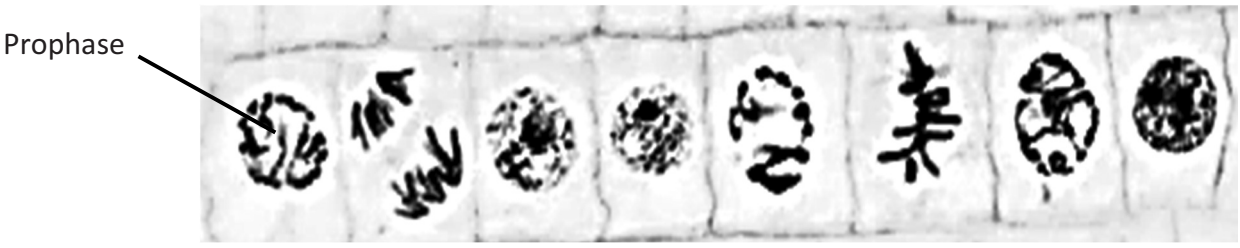
(c) State how each of these tissue types is adapted to carry out its function.

1.
2.

(d) Stem cell research is an application of tissue culture.
What is meant by the term *tissue culture*?

(e) Give one other application of tissue culture.

4. The photograph below is of plant cells undergoing different stages of mitosis.
The cells are not shown in any particular order.



(a) Which type of microscope is used in the school laboratory to observe cells like these?

(b) The first cell is in prophase. Give two observable events that happen during prophase.

1.
2.

(c) On the photograph, use the letter **M** to label a cell that is undergoing metaphase.

(d) On the photograph, use the letter **A** to label a cell that is undergoing anaphase.

(e) After mitosis, the cell divides in two.
This happens differently in animal cells and in plant cells.
Describe what happens in animal cells **and** in plant cells during this stage.

Animal cells.
Plant cells.

5. Some typical human red blood cells are shown below. They are disc shaped.

(a) What word is used to describe the shape of the two faces of these cells?

(b) Red blood cells are wider than some capillaries.
What feature of red blood cells allows them to pass through the narrow capillaries?

(c) Name the molecule in red blood cells that carries oxygen.

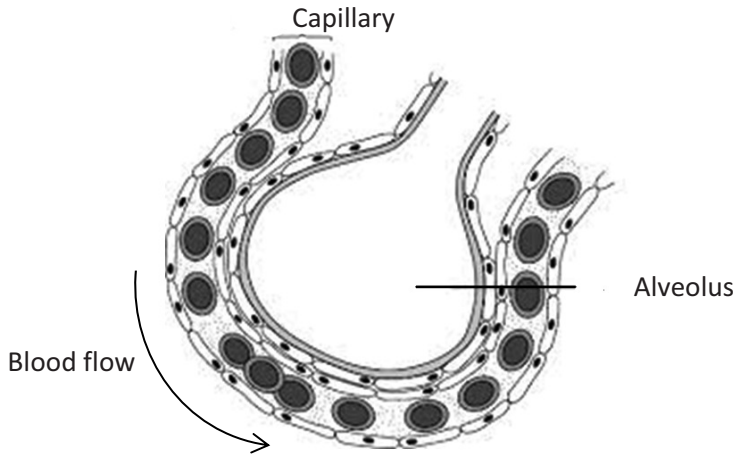
(d) Human red blood cells live for about 120 days.
Give a reason for this, based on the composition of these cells.

(e) Give a location in the body where red blood cells are:

1.	Produced.
2.	Usually broken down.

(f) Red blood cells are transported in the blood plasma.
Name the transport fluid in humans that does not contain red blood cells.

6. The diagram shows microscopic detail of an alveolus and a capillary from the human lung.



(a) Name the blood vessel from which the capillary arises.

(b) Give any three features of alveoli or their capillaries that allow for efficient gas exchange.

1.
2.
3.

(c) Name a disorder of the human breathing system and suggest how it is caused and treated.

Name.
Cause.
Treatment.

Section B

Answer any two questions.
Write your answers in the spaces provided.
Part (a) carries 6 marks and part (b) carries 24 marks in each question in this section.

7. (a) State a use of each of the following in the biology laboratory.

(i) Biuret reagent (a solution containing copper sulfate and sodium hydroxide).

(ii) Benedict's (or Fehling's) solution.

(b) (i) When preparing a sample of cheek cells on a microscope slide, why did you:

1. Place a coverslip over the cells?
2. Apply methylene blue to the cells?

(ii) When extracting DNA from plant tissue, why did you use:

1. Washing-up liquid?
2. Freezer-cold ethanol?

(iii) When using seeds to investigate the effect of IAA on plant tissue, why did you:

1. Carry out a serial dilution of an IAA solution?
2. Place the seeds on a grid in Petri dishes?

(iv) When carrying out an activity to investigate osmosis:

1. Why did you use Visking™ tubing?
2. How did you know osmosis had taken place?

8. (a) Yeast cells produce alcohol (ethanol) in a process called fermentation.

(i) Is oxygen necessary for this process?

(ii) Where in the cell does this process take place?

(b) Answer the following in relation to a laboratory activity you carried out to prepare alcohol using yeast, and to show its presence.

(i) Draw a labelled diagram of the apparatus you used.

(ii) From which substance did the yeast make the alcohol?

(iii) What is the optimum temperature for this fermentation process?

(iv) How did you maintain this temperature at a constant level for the duration of the fermentation?

(v) How did you know when the fermentation was finished?

(vi) How did you test for the presence of alcohol?

(vii) Give the colour of the positive result of the test.

9. (a) In the course of your practical studies you prepared and examined with a microscope a transverse section (T.S.) of a dicotyledonous (dicot) plant stem.
What is meant by the term *dicotyledonous*?

(b) Answer the following questions in relation to your preparation and microscopic examination of a transverse section of a dicotyledonous stem.

(i) Name the plant you used.

(ii) Why is it important to use a very thin section when examining the tissues in the stem?

(iii) Describe two steps you took to cut the stem safely.

1.

2.

(iv) How did you transfer the section to the microscope slide?

(v) Name the part of the microscope you used to bring the section into a sharp focus.

(vi) Draw a labelled diagram of the section that you observed under the microscope.

Do not write on this page

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