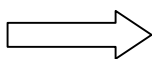


Write your Examination Number here



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION

BIOLOGY – ORDINARY LEVEL
SAMPLE

3 hours

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

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

Section C Answer any **four** questions from this section.
Each question carries 60 marks.
Write your answers in your answer book.

You should spend not more than 30 minutes on Section A and 30 minutes on Section B, leaving 120 minutes for Section C

You must return your examination paper with your answer book at the end of the examination

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Section A

Answer any five questions
Write your answers in the spaces provided

1. Complete **four** of the following sentences by putting one word in each blank space.
- (a) The hammer (malleus) is a very small bone located in the
 - (b) Bile is secreted by the
 - (c) Tiny holes called allow gases to enter and leave the leaf.
 - (d) Bones are joined to other bones by
 - (e) An animal that eats both plants and animals is called an
2. Bacterial cells have three main shapes. Two of these are shown below. Name each shape.



Name Name

Bacteria reproduce asexually by dividing in two. What term is used for this form of asexual reproduction?

What do bacteria form when environmental conditions become unfavourable?
.....

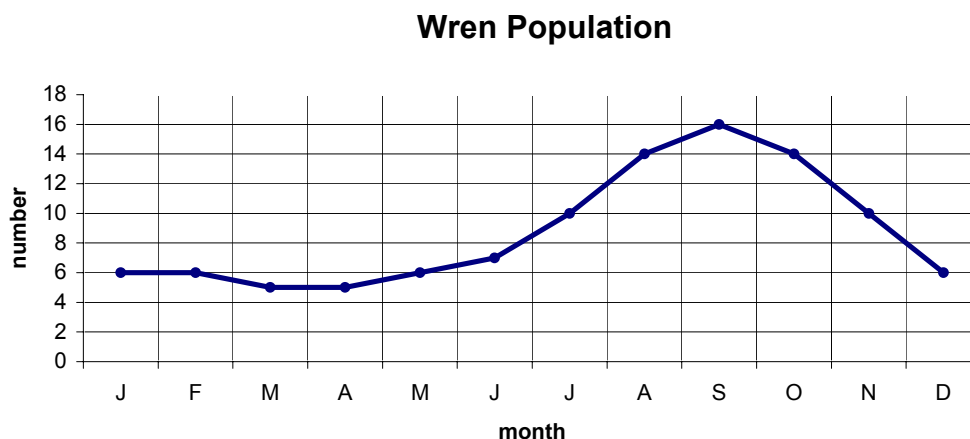
What does the term pathogenic mean in relation to bacteria?
.....

3. Select the correct term from the following list to match each of the terms in column A and write it in column B.

liver, variation, lipid, haploid, sap

A	B
Cell membrane	
Vacuole	
Mutation	
Organ	
Gamete	

4. The graph below shows the changes in the number of wrens in a small wood over a twelve month period.



How many wrens were present in the wood in June?

During which months does the wren's breeding season occur?

Why do you think that breeding takes place during the months that you have mentioned above?

Suggest two reasons why the number of wrens declines in the autumn.

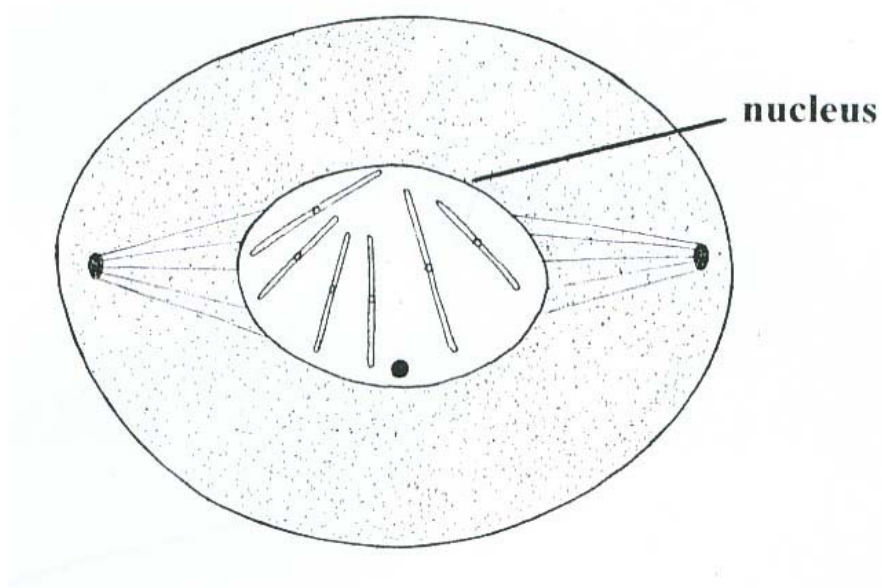
1.

2.

5. (a) Name a fat-soluble vitamin
- State a good source of this vitamin in the human diet.....
- What disease can you get if this vitamin is absent from your diet?
-

- (b) Name two minerals required by the human body
1.
 2.
- In the case of one of these minerals, state its function in the body.
- Name of mineral
- Function

6. The diagram shows a body cell of an animal at an early stage of mitosis.



What is the diploid number of the animal in which this cell is found?

When the cell division is completed how many new cells will there be?

If this cell were to divide by **meiosis** how many chromosomes would there be in each of the new cells?

State a function of mitosis in each of the following:

1. Single-celled organisms

.....
.....

2. Multicellular organisms

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.....

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) What is an enzyme?

What name is given to the substance that an enzyme acts on?

(b) Answer the following questions about an experiment that you carried out to investigate the effect of temperature on the rate of action of an enzyme.

Name an enzyme that you used

Name the substance that this enzyme acted on

Draw a labelled diagram of the apparatus that you used.

How did you vary the temperature?

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.....

How did you measure the rate of the enzyme's action?

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8. (a) Name an ecosystem that you have studied.....
Name **three** plants that are normally present in this ecosystem
1. 2. 3.

(b) Answer the following in relation to **one** of the plants you have named in (a).
Describe how you carried out a survey to find out how many plants of this species were present in your study area.

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How did you present the results of the survey?

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Suggest **one** possible error that may affect the results of the survey

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9. (a) What is meant by the germination of a seed?

State three environmental factors that are necessary for germination

1.

2.

3.

(b) Answer the following in relation to an experiment that you carried out to investigate the effect of these factors on germination.

What seeds did you use?

Draw a labelled diagram of the apparatus that you used.

Describe how you carried out the experiment

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State the results of your experiment

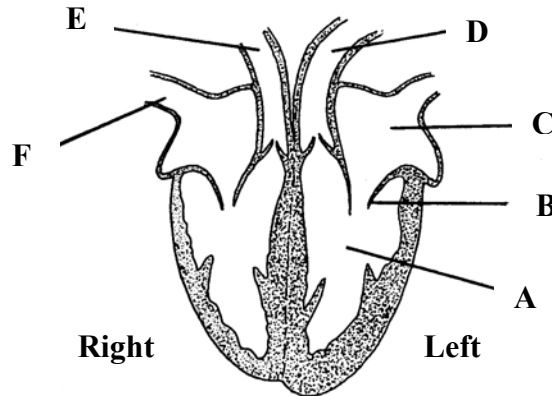
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Section C

Answer any **four** questions

Write your answers in your answer book.

10. (a) (i) What is the average resting rate of the human heart in beats per minute?
 (ii) State **one** factor that decreases heart rate and **one** factor that increases it. (9)
- (b) The diagram shows a vertical section through the human heart.



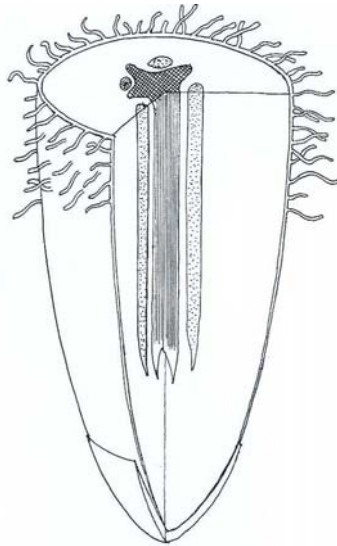
- (i) Name the parts A, B, C, D, E and F.
 (ii) To where does E carry blood?
 (iii) What is the function of B?
 (iv) Name the artery that supplies the heart muscle with blood. (27)
- (c) (i) Name the liquid part of blood.
 (ii) Name **two** substances that are dissolved in the liquid part of blood.
 (iii) State **one** function of the liquid part of blood.
 (iv) Blood contains red cells and white cells. State **one** function for **each** of these.
 (v) Name two common blood-grouping systems. (24)
11. (a) (i) What is meant by the term DNA profiling?
 (ii) State **two** uses of DNA profiling. (9)
- (b) In humans an individual's sex is determined by genes located on pairs of chromosomes called sex chromosomes. The male pair is shown as XY and the female pair as XX. Show that there is an equal chance of a child being male or female by copying and completing the Punnett square in your answer book. Give the gametes of each parent and the genotypes of the offspring. (24)

$\begin{matrix} X & Y \\ X & \\ Y & \end{matrix}$		

- (c) (i) What is meant by the term evolution?
 (ii) Describe the process of natural selection.
 (iii) Give an account of the evidence for evolution from a **named** source. (27)

OVER→

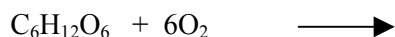
12. (a) (i) What is a tissue?
(ii) Name **two** vascular tissues found in flowering plants. (9)
- (b) The diagram shows part of a root of a young plant.



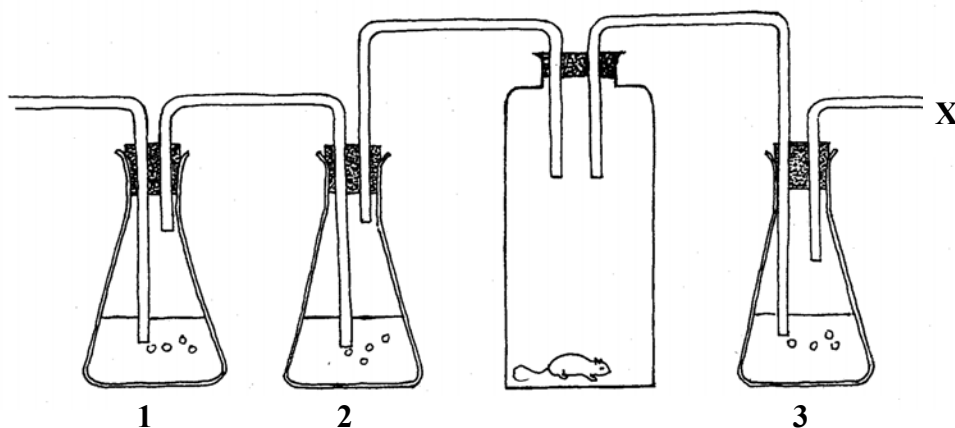
- (i) Make an outline copy of the diagram in your answer book and place the letters A, B, C on it to show the location of each of the following;
A = dermal tissue
B = ground tissue
C = vascular tissue
- (ii) State **three** functions of a root.
- (iii) From what part of the embryo plant within the seed does the root develop?
- (iv) Where would you find a meristem in a root? (24)
- (c) Flowering plants are classified as monocotyledons or dicotyledons.
- (i) What is a cotyledon?
(ii) Name a monocotyledon.
(iii) Name a dicotyledon.
(iv) Copy the following table into your answer book and distinguish between monocotyledons and dicotyledons by completing the empty boxes. (27)

	Monocotyledon	Dicotyledon
Distribution of veins in leaf		
Leaf shape		
Distribution of vascular tissue in stem		

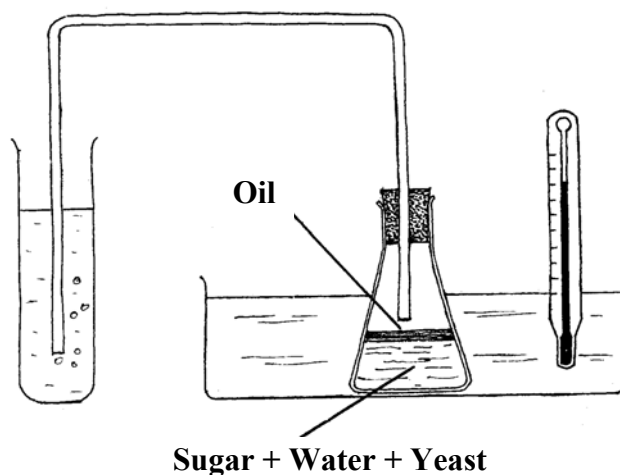
13. (a) (i) Complete the following equation, which is a summary of **aerobic** respiration.



- (ii) Aerobic respiration is a two-stage process. The first stage takes place in the cytoplasm. Where does the second stage take place? (9)
- (b) The apparatus below may be used to demonstrate aerobic respiration. Air is drawn through the apparatus by attaching it to a vacuum pump at X. Sodium hydroxide is placed in flask 1 to remove carbon dioxide.



- (i) What is the purpose of removing carbon dioxide?
(ii) Limewater is put in flasks 2 and 3. Suggest a reason for putting it in each flask.
(iii) What is the purpose of a control in an experiment? Suggest a suitable control for **this** experiment.
(iv) If the animal in the apparatus were replaced by a plant, and the experiment carried out in daylight, would you expect a similar result? Explain your answer. (24)
- (c) The apparatus below may be used to demonstrate **anaerobic** respiration in yeast. The water was boiled and cooled before adding the yeast.



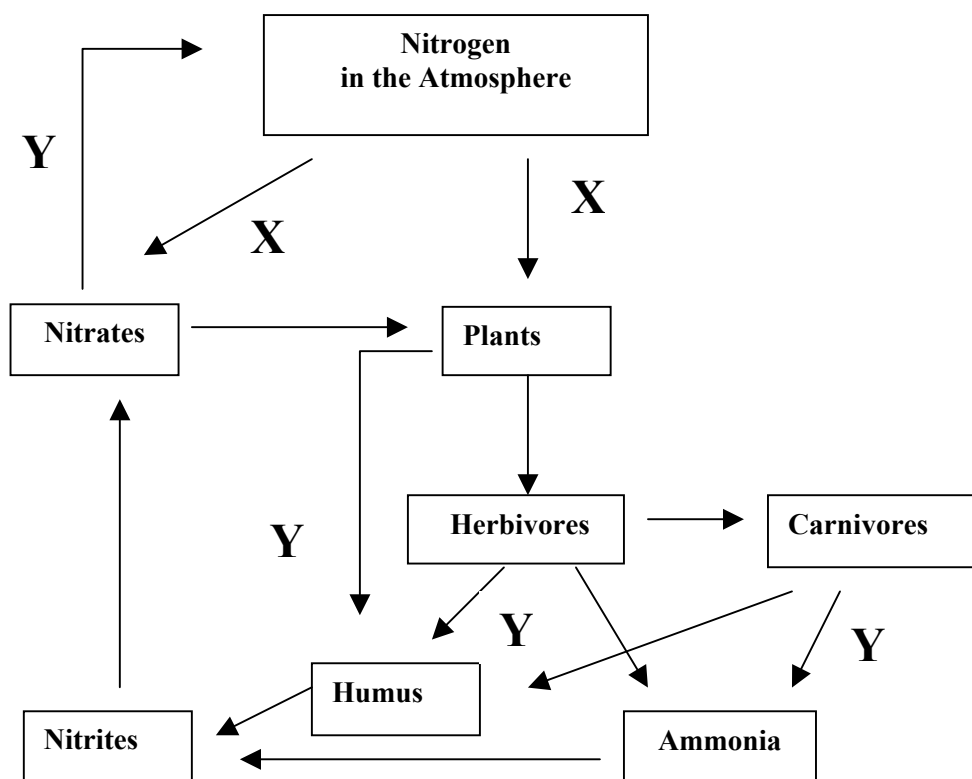
- (i) Why was the water boiled before adding the yeast?
(ii) Why do you think a layer of oil has been put on top of the water?
(iii) Would the same apparatus containing water and yeast but without sugar be a suitable control? Explain your answer.
(iv) Give **two** industrial uses of the anaerobic respiration of yeast. (27)

OVER→

14. Answer any two of (a), (b), (c).

(30, 30)

(a) Study the following word diagram and then answer the questions that follow.



- (i) Give the term used to describe the events outlined in the diagram
- (ii) Give an example of an herbivore and of a carnivore found in an ecosystem you have studied (not domesticated or farm animals).
- (iii) Name an important group of biomolecules that plants make from nitrates.
- (iv) Y indicates the return of nitrogen to the environment. State **one** way in which this happens.
- (v) X indicates the change of nitrogen gas to nitrate and other useful compounds. What name is given to this process?
- (vi) Name a group of organisms that can carry out X.
- (vii) Farmers add nitrates as fertilizers to the soil. They are advised not to spread fertilizers if heavy rain is forecast. Why do you think they are given this warning?

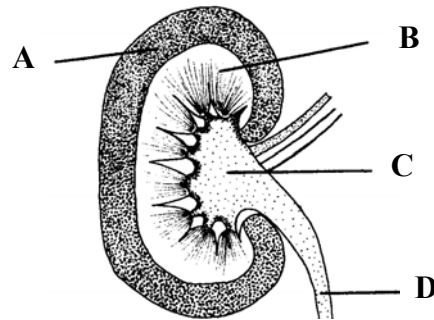
- (b) Answer the following questions in relation to the flow of energy through an ecosystem.
- (i) What is the source of energy for the earth's ecosystems?
 - (ii) Name the process that takes place in plants in which this energy is converted to a usable form.
 - (iii) What substance do plants possess that allows them to carry out this conversion?
 - (iv) Energy flows along food chains. In the food chain $A \rightarrow B \rightarrow C$ give an example of each from the organisms that you found in a **named** ecosystem.
 - (v) Is there more energy available for organism B or C? Explain your answer.
 - (vi) A food web can be thought of as a number of interlinked food chains. Using the named organisms A, B, C from (iv) above and **three** other named organisms, construct a food web that is found in the ecosystem you have studied.
- (c)
- (i) Explain what is meant by pollution.
 - (ii) Give an example of pollution and describe how this form of pollution can be controlled.
 - (iii) Human populations are producing waste materials in ever-increasing amounts. Many of these wastes are serious threats to the environment.
 1. Describe some of the problems associated with waste disposal.
 2. Give an outline account of **one** example of waste management.
 - (iv) Explain what is meant by conservation.
 - (v) Give a brief account of a conservation practice with which you are familiar.

OVER→

15. Answer **any two** of (a), (b), (c).

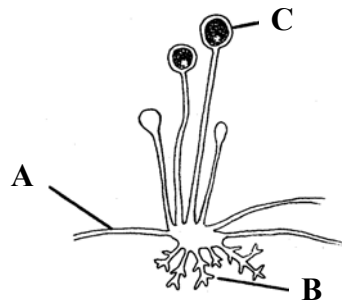
(30, 30)

(a) The diagram shows a vertical section through a human kidney.



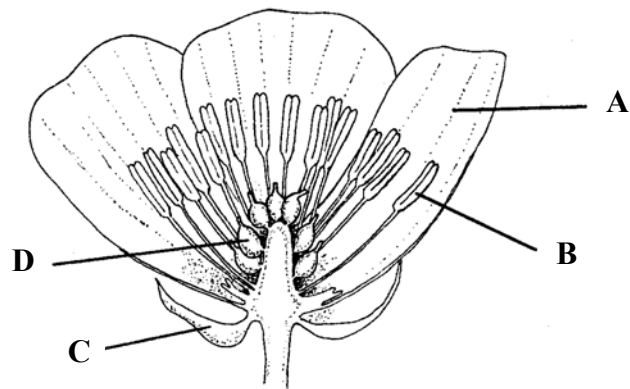
- (i) Name the parts A, B, C, D.
- (ii) To what structure does D link the kidney?
- (iii) Where does filtration occur in the kidney?
- (iv) Filtration ensures that cells and valuable substances are not lost from the body when urine is being formed. Name **two** of these substances or cells.
- (v) Suggest a treatment that may be used for a person whose kidneys are not carrying out their normal functions.
- (vi) Name an organ in the human body, other than the kidney, in which excretion takes place.

(b) The diagram shows part of *Rhizopus*.



- (i) To which kingdom does *Rhizopus* belong?
- (ii) Name the parts A, B, C.
- (iii) State a function of part B.
- (iv) What takes place in part C?
- (v) Name another member of the kingdom to which *Rhizopus* belongs, other than yeast, and explain how it is of benefit to humans.
- (vi) Name another member of the kingdom to which *Rhizopus* belongs, other than yeast, and explain how it is harmful to humans.

- (c) The diagram shows a section through a flower.



- (i) Name the parts A, B, C, D.
- (ii) State a function of the part labelled C.
- (iii) In which part of the flower is pollen produced?
- (iv) In which part of a flower does a seed form?
- (v) Name a part of a flower that may develop into a fruit.
- (vi) Some flowers have nectaries. How are these flowers pollinated? Explain your answer.