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Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2011

BIOLOGY - ORDINARY LEVEL

THURSDAY, 16 JUNE - MORNING, 9.30 to 12.30

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

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

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

It is recommended that 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 this examination paper with your answer book at the end of the examination.

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

1. Use your knowledge of nutrition to answer the following questions:

(i) Carbohydrates always contain the elements carbon, hydrogen and

(ii) Lipids are made up of fatty acids and

(iii) Name a fat-soluble vitamin.

(iv) Name a structural carbohydrate found in plants.

(v) Name **one** good source of protein in the human diet.

2. (i) What is meant by *pollution*?

(ii) Name **one** human activity that causes pollution.

(iii) State **two** problems associated with waste disposal in Ireland.

Problem 1. _____

Problem 2. _____

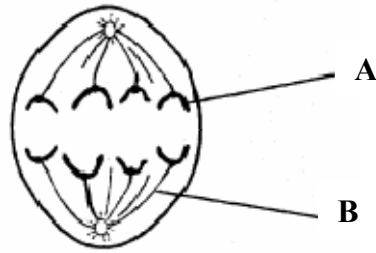
(iv) List **two** ways of minimising waste.

1. _____

2. _____

(v) Give **one** example of the use of microorganisms in waste management.

3. The diagram shows a cell undergoing cell division.



(a) Genes are found on structure A. Name structure A.

(b) What is the function of structure B?

(c) Tissues grow by cell division. Name the type of cell division by which tissues grow.

(d) Organs are found in both plants and animals. What is meant by the term *organ*?

(e) Name **one** organ found in plants.

4. Indicate whether each of the following statements is true (T) or false (F) by drawing a circle around T or F in each case.

Example: The liver produces bile

T

F

(a) The semicircular canals in the ear are involved in balance.

T

F

(b) The growth response of a plant to light is called phototropism.

T

F

(c) Tendons attach bone to bone.

T

F

(d) A motor neuron carries impulses to the brain.

T

F

(e) *Rhizopus* is a member of the animal kingdom.

T

F

(f) Xylem transports water in plants.

T

F

(g) A potato is a modified stem.

T

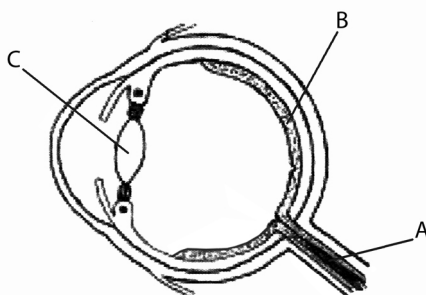
F

5. Choose each term from the following list and place it in **Column B** to match a description in **Column A**. The first one has been completed as an example.

Alcohol, Oxygen, Water, Mitochondria, Lactic acid, Large

Column A	Column B
The amount of energy released in aerobic respiration.	Large
(i) A substance required for aerobic respiration.	
(ii) A product of anaerobic respiration in muscles.	
(iii) A product of aerobic respiration.	
(iv) A product of anaerobic respiration in yeast.	
(v) The cell structures in which Stage 2 of aerobic respiration takes place.	

6. The diagram shows a vertical section through the human eye.



- (a) Name the parts labelled A, B, C.

A. _____

B. _____

C. _____

- (b) Name the coloured part of the eye.

- (c) What is the function of the pupil in the eye?

- (d) In which labelled part would you find the rods and cones?

- (e) What is the function of the cones?

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) Draw a labelled diagram of a single, reproducing, yeast cell.

(b) Answer the following questions in relation to your investigation into the growth of leaf yeast.

(i) From what plant did you obtain the yeast?

(ii) Name the nutrient medium on which you grew the yeast.

(iii) Outline the steps you followed to get the yeast cells onto the nutrient medium.

(iv) How long did it take for the yeast to become visible on the nutrient medium?

(v) How did you recognise the yeast?

(vi) Describe **one** aseptic technique you carried out during this investigation.

8. (a) (i) The scientific method involves making a hypothesis, carrying out experiments, recording results, and forming conclusions.
Why is it a good idea to repeat an experiment many times?

- (ii) Why is a control used when carrying out experiments?

- (b) For what purpose did you use each of the following in the course of your practical activities?

- (i) Fehling's solution **or** Benedict's solution.

Purpose. _____

- (ii) Anaerobic jar.

Purpose. _____

- (iii) Cover slip.

Purpose. _____

- (iv) Buffer solution.

Purpose. _____

- (v) Methylene blue.

Purpose. _____

- (vi) Sodium alginate.

Purpose. _____

- (vii) IAA.

Purpose. _____

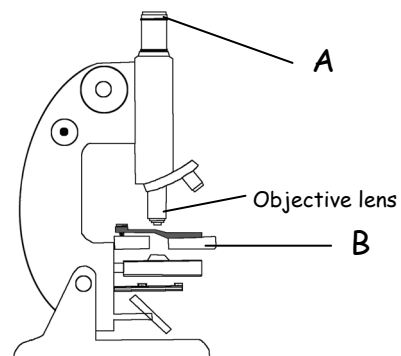
- (viii) Freezer-cold alcohol.

Purpose. _____

9. (a) Name the parts of the light microscope labelled A and B.

A. _____

B. _____



(b) Answer the following questions in relation to obtaining and staining a sample of plant cells and viewing them under the microscope.

(i) From what plant did you obtain the cells?

(ii) How did you obtain a thin piece of a sample of the cells **and** prepare it for examination?

(iii) What stain did you use on the cells?

(iv) Describe how you applied the stain.

(v) The objective lenses on a microscope are usually labelled 40X, 10X, and 4X. Which objective lens should you begin with when using the microscope?

(vi) Give **one** cell structure that you observed that indicated that the cells were plant cells.

Section C
Answer any four questions.
Write your answers in the answer book.

10. (a) Explain the following terms that are used in genetics:
- (i) Allele
 - (ii) Heterozygous
 - (iii) Phenotype. (9)
- (b) In humans, brown eye (B) is dominant to blue eye (b). Two parents, one heterozygous for eye colour and the other with blue eyes, start a family.
- (i) What is the genotype of the blue-eyed parent?
 - (ii) What are the possible gametes that **each** parent can produce?
 - (iii) Using a Punnett square or another method work out the possible genotypes **and** phenotypes of their children. (24)
- (c) (i) Explain, in terms of what happens to body cells, what is meant by the term *cancer*.
- (ii) Give **two** possible causes of cancer.
- (iii) Some people choose to be screened to determine their risk of getting a particular type of cancer.
 What is meant by genetic screening?
- (iv) Blood samples taken from a crime scene were put through a process called DNA profiling. During the process cells were broken down to release the DNA, which was then cut into fragments. The fragments were then separated.
1. What was used to cut the DNA?
 2. On what basis were the DNA fragments separated?
 3. Give an application of DNA profiling other than solving crime.
- (v) The following are the results of the DNA profiling process. Using these results, identify which suspect, **A**, **B** or **C** committed the crime.

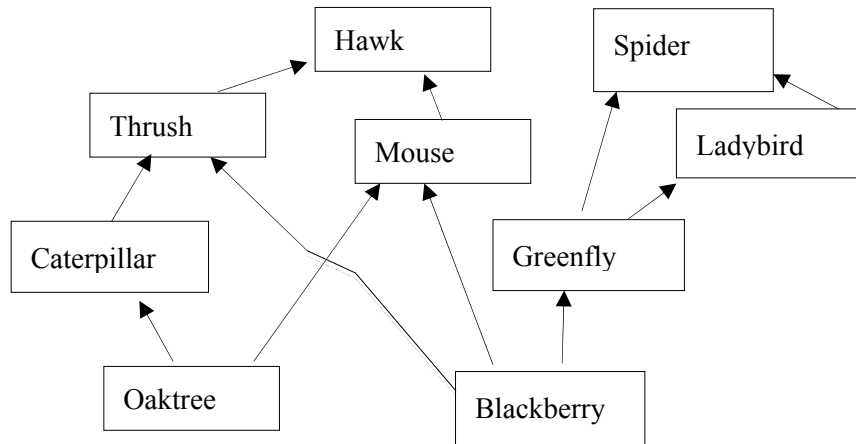
<u>Crime Scene</u>	<u>Victim</u>	<u>Suspect A</u>	<u>Suspect B</u>	<u>Suspect C</u>
██████████				
_____			_____	
		=====		=====
██████████			██████████	
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██████████			██████████	

(27)

11. (a) (i) What is the main source of energy in an ecosystem?
 (ii) Explain the following terms used in ecology:
 1. Biosphere
 2. Habitat.

(9)

- (b) The food web below was drawn by a group of students following their field work. Study the web and answer the questions.



- (i) Name **one** primary producer from the web.
 (ii) Name **one** herbivore **and one** carnivore from the web.
 (iii) Name **one** omnivore from the web.
 (iv) What would happen to the number of caterpillars if all the thrushes died?
 (v) What is meant by a *quantitative* survey of organisms in a habitat?
 (vi) Name **two** pieces of apparatus used to collect animals from an ecosystem.

(24)

- (c) Read the paragraph below and answer the questions that follow.

Shedding Daylight on Irish Bats.

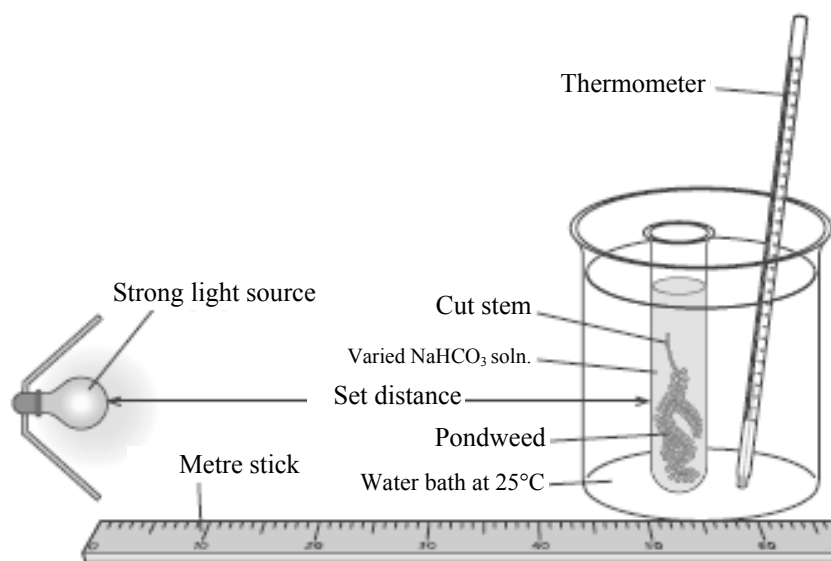
There are ten species of bat in Ireland. They live in our houses, churches and old buildings. The most common species of bat in Ireland is the Pipistrelle which is small enough to fit into a matchbox. The largest species is Leisler's bat. Bats are not blind. They use sound to navigate. Bats are the only flying mammals. They generally hunt at night for moths and other insects. In winter many bat species hibernate in underground sites and outhouses. Bats have only one baby per year and they can live for up to forty years. Barn owls may sometimes feed on bats, or they may fall prey to the domestic cat. According to Bat Conservation Ireland, bat populations are decreasing. This may be due to loss of hedgerows, pesticide use and the renovation of old buildings.

[Adapted from 'Science Spin' Issue 26, January 2008. By Anthony King.]

- (i) How many species of bat are found in Ireland?
 (ii) What is the name of the most common species found here?
 (iii) What do bats feed on?
 (iv) What is meant by the term *predator*?
 (v) Name a predator of Irish bats.
 (vi) Suggest **one** reason why many bats hibernate in winter.
 (vii) What is meant by the term *conservation*?
 (viii) Suggest **one** way to help bat conservation in Ireland.

(27)

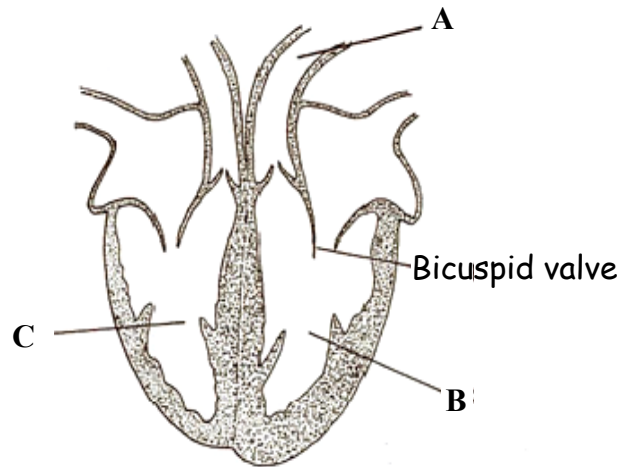
12. (a) (i) What is meant by the term *photosynthesis*?
 (ii) A gas from the air is needed for photosynthesis.
 Name this gas.
 (iii) Name the part of a plant cell in which photosynthesis takes place. (9)
- (b) (i) Write a balanced equation for photosynthesis.
 (ii) Plants contain the green pigment chlorophyll.
 What is the role of chlorophyll in photosynthesis?
 (iii) The apparatus shown below may be used to investigate the effect of an environmental factor on the rate of photosynthesis.
- Name any **two** environmental factors affecting photosynthesis that could be investigated using the apparatus shown.
 - How would you measure the rate of photosynthesis using the apparatus below?



(24)

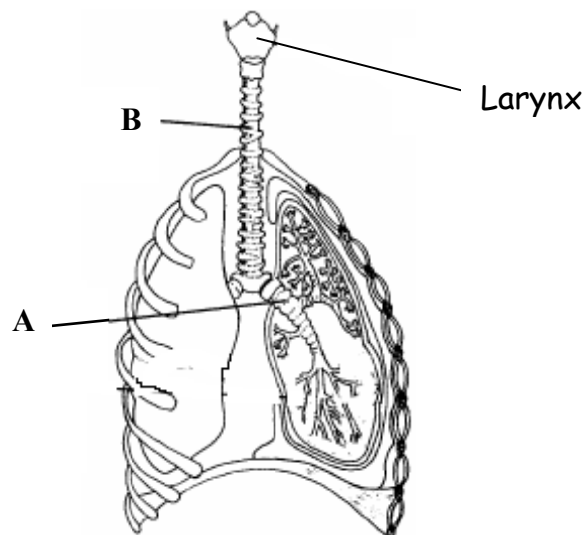
- (c) Enzymes are used in many processes in both plants and animals.
- What is an enzyme?
 - Name any **one** enzyme, **and** its substrate, **and** its product.
 - The rate of activity of enzymes can be affected by various factors.
 Name any **two** factors that can affect enzyme activity.
 - Enzymes are sometimes immobilised in industrial processes.
 What is meant by the term *immobilised* in relation to enzymes?
 - Give **one** advantage of using immobilised enzymes. (27)

13. (a) (i) Name the liquid part of the blood.
(ii) Different lifestyle factors have an effect on the health of our circulatory system. Name any **two** of these factors. (9)
- (b) The diagram shows a section through the human heart.



- (i) Name the blood vessel labelled A.
(ii) Does A carry blood towards or away from the heart?
(iii) Name the chamber of the heart labelled C.
(iv) Why is the wall of chamber B thicker than the wall of chamber C?
(v) Name the arteries that supply the heart wall with blood.
(vi) What is the role of valves in the heart?
(vii) The lymphatic system is another series of vessels carrying fluid in the body. Give any **two** functions of the lymphatic system. (24)

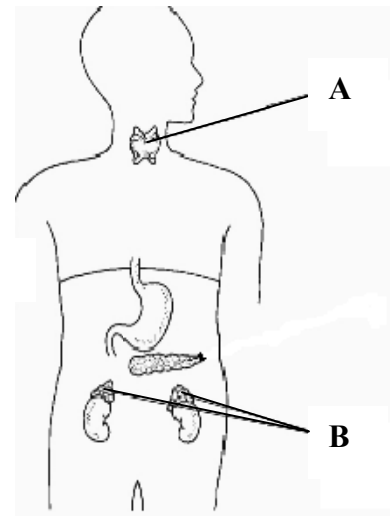
- (c) The diagram shows part of the human breathing system.



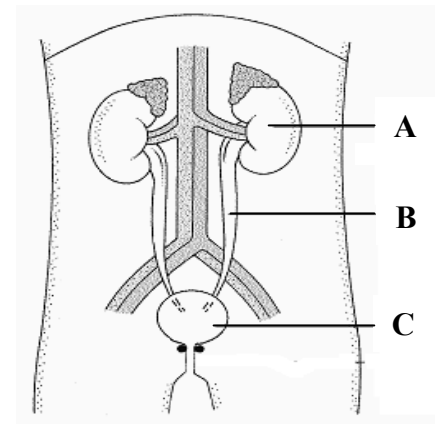
- (i) Name the parts labelled A and B.
(ii) In what structures in the lungs does gaseous exchange take place?
(iii) Give **one** feature of the structures referred to in (ii) that allows efficient exchange of gases.
(iv) What is the function of the larynx?
(v) Outline the steps involved in inhalation. (27)

- (a) (i) Draw a large labelled diagram of the human female reproductive system.
 (ii) Indicate clearly on your diagram where each of the following events takes place:
 1. Ovulation
 2. Fertilisation.
 (iii) What does the term *infertility* mean?
 (iv) *In vitro* fertilisation is a method used to treat infertility.
 What is meant by the term *in vitro* in relation to fertilisation?
 (v) Give **one** cause of infertility in women.
 (vi) As a result of fertility treatment, an embryo develops successfully from an *in vitro* fertilisation. What is the next step for the embryo?

- (b) (i) The diagram shows some parts of the human endocrine system.
 Name the glands labelled A and B.
 (ii) Name any **one** hormone produced by the body.
 (iii) Give a deficiency symptom of the hormone named in (ii) above.
 (iv) Give **one** example of the use of hormone supplements.
 (v) The central nervous system is made up of **two** main parts.
 Name **each** part.
 (vi) Name a disorder of the nervous system.
 Give **one** cause of the disorder **and** suggest a means of treating the disorder.



- (c) (i) Explain the term *excretion*.
 (ii) Name **two** substances excreted by the kidneys.
 (iii) The diagram shows the human urinary system.
 Name the parts labelled A, B, and C.
 (iv) Name the parts of the kidney in which **each** of the following takes place:
 1. Filtration
 2. Reabsorption.
 (v) Name **one** other excretory organ in the body.

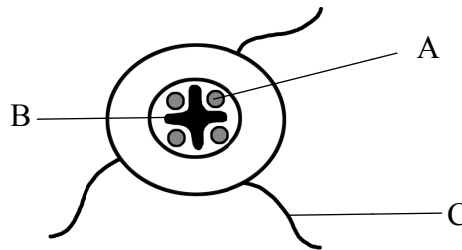


15. Answer any **two** of (a), (b), (c)

(30, 30)

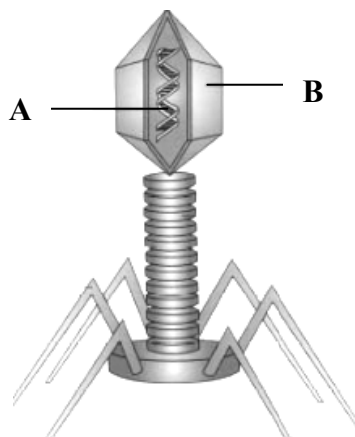
- (a) (i) Draw a large labelled diagram to show the internal structure of a flower.
(ii) Give **two** ways by which pollen is transferred from one flower to another.
(iii) After fertilisation, what part of the flower becomes the fruit?
(iv) Many seedless fruits, e.g. grapes, are available in shops today.
State **one** way of forming seedless fruits.
(v) Sometimes artificial methods are used to propagate (reproduce) plants.
Name any **two** methods of artificially propagating plants.

(b) The diagram shows a transverse section of a dicotyledonous (dicot) root.



- (i) Name the parts labelled A, B and C.
(ii) State **two** functions of a root.
(iii) From what part of a seed does the root develop?
(iv) Give **one** example of a root modified for food storage.
(v) Plants can be monocotyledonous or dicotyledonous.
Give any **one** difference between a monocotyledonous plant and a dicotyledonous plant.
(vi) Give **one** example of a monocotyledonous plant **and** one example of a dicotyledonous plant.

(c) The diagram shows the structure of a type of virus.



- (i) Name the parts labelled A and B.
(ii) State **two** harmful effects of viruses.
(iii) What is meant by the term *immunity*?
(iv) The skin is an important part of our immune system.
Outline **two** ways in which the skin provides immunity.
(v) To help the immune system, many people receive vaccinations during their lifetime.
What is meant by the term *vaccination*?
(vi) Antibiotics are usually not given to a person suffering from a viral infection.
Suggest a reason for this.

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