2020.M43

2020L025G1EL

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2020

Biology

Sections A and B and Answerbook

Ordinary Level

Three hours

400 marks

Examination Number

Day and Month of Birth

For example, 3rd February is entered as 0302

Centre Stamp

Instructions

Write your Examination Number and your Day and Month of Birth in the boxes on the front cover.

Write your answers to all parts of the examination into this answerbook. This answerbook 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 sketches, graphs and diagrams only.

There are three sections to this examination. Questions for Section **C** are supplied separately but your answers must be written in this answerbook.

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.
Section **B**	Answer any **two** questions from this section. Each question carries 30 marks.
Section **C**	Answer any **four** questions from this section. Each question carries 60 marks.

Section A

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

1. A student eats a meal containing fish and potatoes.
Use your knowledge of nutrition to answer the following questions about this meal.

(a) State a reason why the body needs food.

(b) Name the main source of protein in this meal.

(c) Name the main source of carbohydrate in this meal.

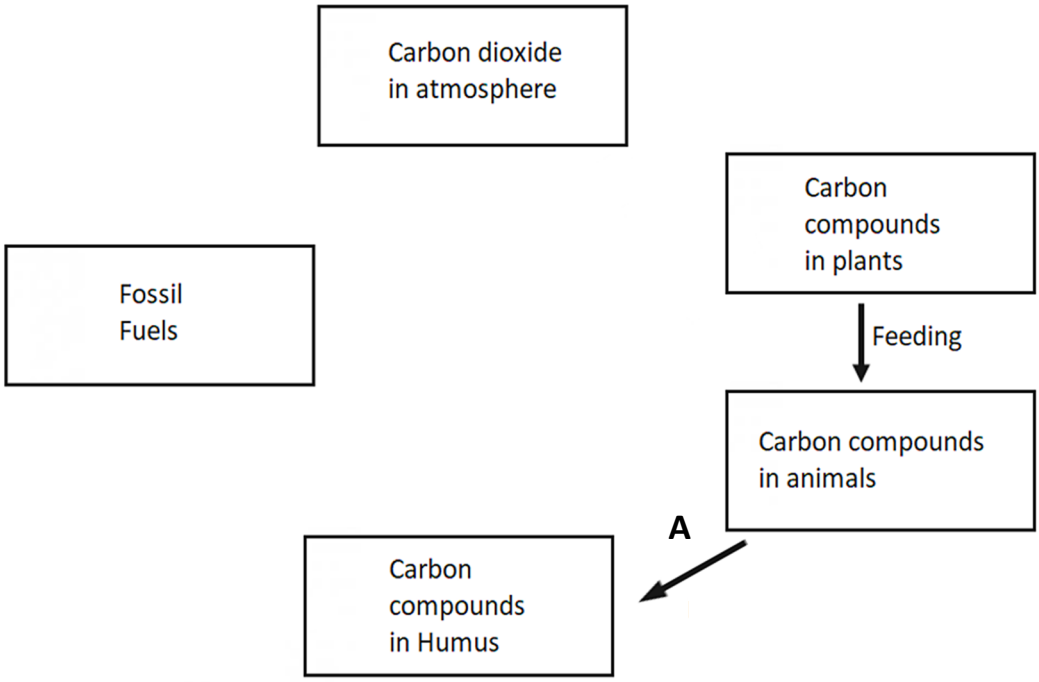
(d) Name the **three** chemical elements found in all carbohydrates.

(e) Suggest **one** function of fibre if it was added to this meal.

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

Example: Members of the plant kingdom are autotrophic.		**T**	**F**
(a)	Amoeba is in the kingdom Protista.	T	F
(b)	Fungi have cell walls.	T	F
(c)	Members of Monera have no nuclei.	T	F
(d)	All members of the animal kingdom are saprophytes.	T	F
(e)	Members of the plant kingdom have cellulose cell walls.	T	F
(f)	All fungi are parasites.	T	F
(g)	Viruses are not members of any kingdom.	T	F

3. The diagram shows part of the carbon cycle with **several arrows missing from the diagram**. Answer the questions that follow by inserting arrows on the diagram as appropriate.



(a) Draw **one** arrow labelled R on the diagram to represent respiration.

(b) Draw **one** arrow labelled P on the diagram to represent photosynthesis.

(c) Draw **one** arrow labelled B on the diagram to represent burning.

(d) Name a carbon compound plants use to store food.

(e) Name the process shown by arrow A.

(f) Name a group of organisms which carry out the process labelled A.

(g) Suggest **one** way of reducing high levels of carbon dioxide in the atmosphere.

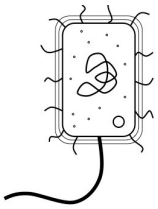
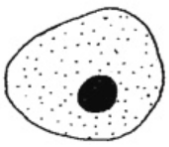
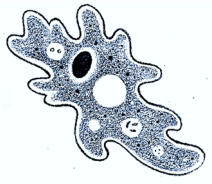
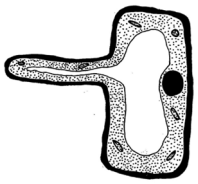
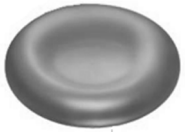
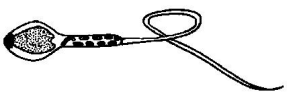
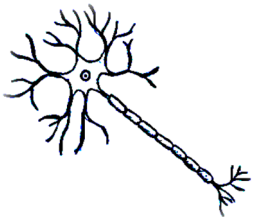
4. Choose **each** term from the following list and place it in Column B to match a description in Column A. The first one has been completed as an example.

Substrate **Waterbath** ~~**Protein**~~ **Reusable** **Amylase** **Product**

Column A	Column B
Enzymes are made of this	**Protein**
(a) An advantage of immobilised enzymes	
(b) How you would keep the temperature constant	
(c) The material an enzyme works on	
(d) This is formed at the end of an enzyme reaction	
(e) Converts starch into maltose	

5. A selection of different cells is shown below. Select the cell name from the following list and insert it into the appropriate box underneath each image. The first one has been completed as an example.

~~**Bacteria cell**~~	**Root hair**	**Amoeba**	**Cheek cell**	**Xylem vessel**	**Sperm cell**	**Red blood cell**	**Neuron**

			
Bacteria cell	(a)	(b)	(c)
			
(d)	(e)	(f)	(g)

6. The diagram shows the label found on blood stored for transfusion in a hospital.

(a) Name the liquid part of blood.

(b) State **one** function of this liquid.

(c) What may be removed from blood to prevent it clotting during storage?

(d) The diagram shows blood group AB. Name **two** other blood groups.

(e) Name the blood cells that transport oxygen in the body.

(f) Name the blood cells that produce antibodies to fight infection.

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) (i) Give a reason why living cells need water.

(ii) State a function of a selectively permeable membrane.

(b) Answer the following questions in relation to an investigation you carried out to demonstrate osmosis.

(i) Name **one** piece of apparatus and **one** solution you used during your investigation.

(ii) What control was used?

(iii) What did you use as a selectively permeable membrane?

(iv) What information did you record at the start of the investigation?

(v) What did you observe during the investigation that showed osmosis had occurred?

(vi) What did you conclude from your observations about the direction of water movement during osmosis?

(vii) Name a simple food preservation technique linked to osmosis.

8. (a) (i) What is a qualitative survey?

(ii) Complete the statement below by placing the missing word in the answer box.

"Flora is to plants as……..is to animals".

(b) A student carried out a quantitative survey to estimate the % cover of a number of plants in an Irish ecosystem close to her school.

(i) Name an ecosystem she may have studied.

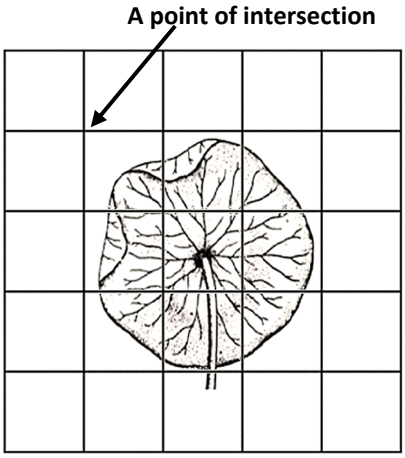
(ii) Name a plant or producer found in the ecosystem named in (i) above.

(iii) Name an instrument the student may have used to select an area for study.

(iv) How did the student avoid bias in the investigation?

The diagram shows a plant found in one of the sample areas. A hit is recorded if a point of intersection is directly above the plant.

(v) How many hits would the student record for this plant?



(vi) Calculate the % cover for the plant in this sample area.

(vii) What step could the student do next to improve the reliability of the survey?

9. (a) (i) Name a growth response of a plant to a stimulus.

(ii) Give **one** example where this growth response is important to a germinating seed.

(b) A student carried out an investigation into the effect of IAA growth regulator on plant tissue and recorded the following.

		Average stem length after 1 week	**Average root length after 1 week**
Petri dish A	5 seeds + IAA solution	15 mm	2 mm
Petri dish B	5 seeds + water	10 mm	8 mm

(i) Identify which dish was the control.

(ii) Suggest a type of seed suitable for this investigation.

(iii) Describe how the IAA solution was applied to the plant tissue.

(iv) Describe how the growth of the plant tissue was measured.

(v) Why was the same number of seeds used in each dish?

(vi) Which part of the plant was stimulated by IAA?

(vii) Which part of the plant was inhibited by IAA?

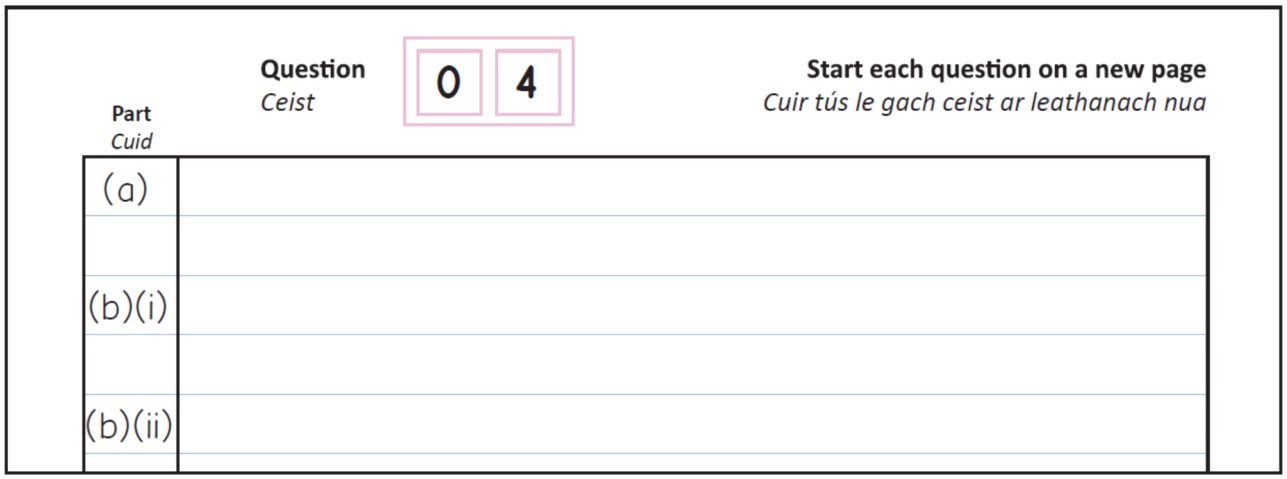
(viii) Name another plant growth regulator.

Answerbook for Section C

Instructions

Questions for Section **C** are supplied separately.

Start each question on a new page. Write the question number in the box at the top of each page. Use the left-hand column to label each part, as shown below.



Four pages of graph paper are provided at the back of this answerbook. On pages with graph paper, the box for the question number is at the bottom of the page.

You do not need to use all of the pages in this answerbook. If you run out of space in this answerbook, you may ask the superintendent for more paper or graph paper.

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

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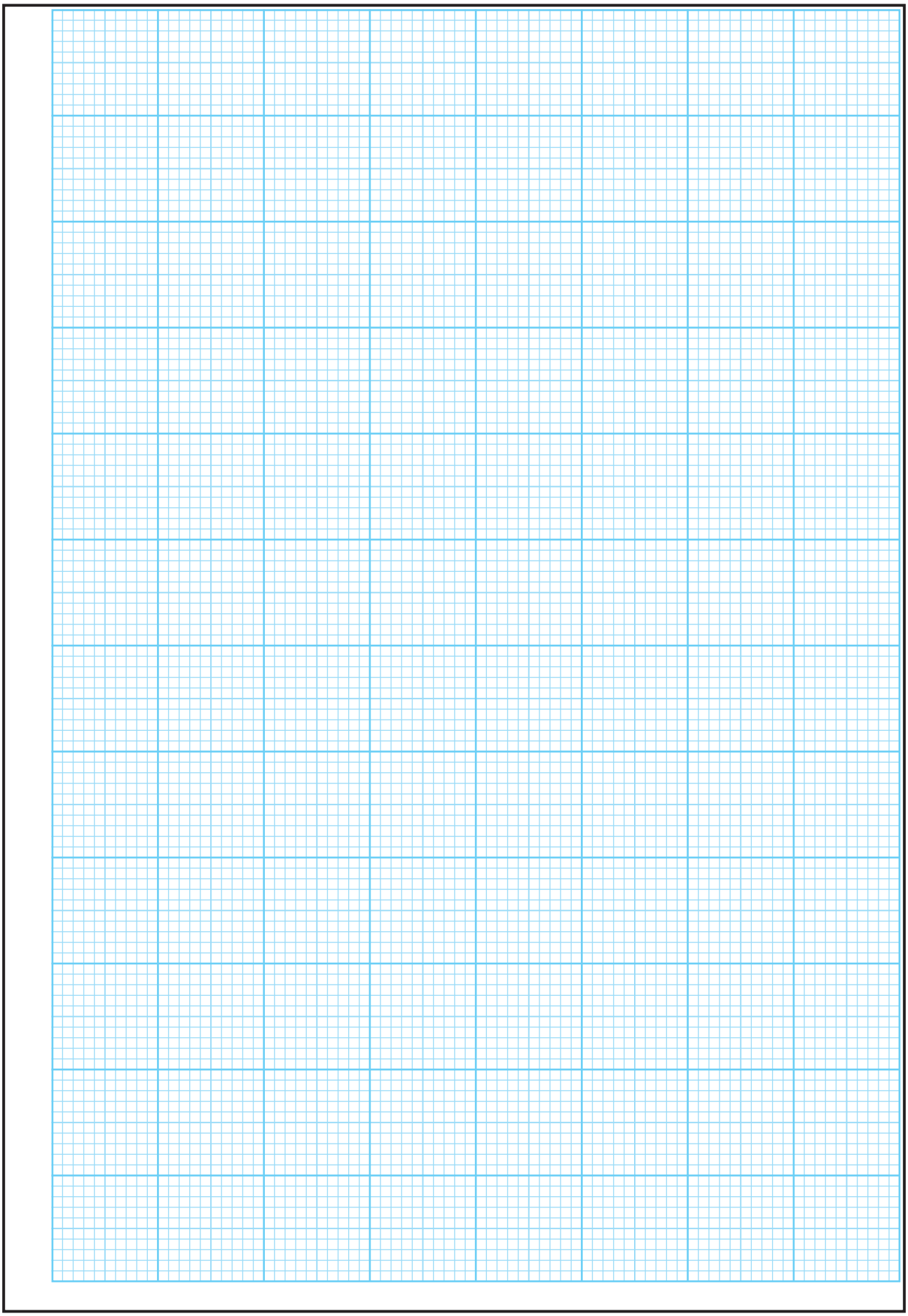

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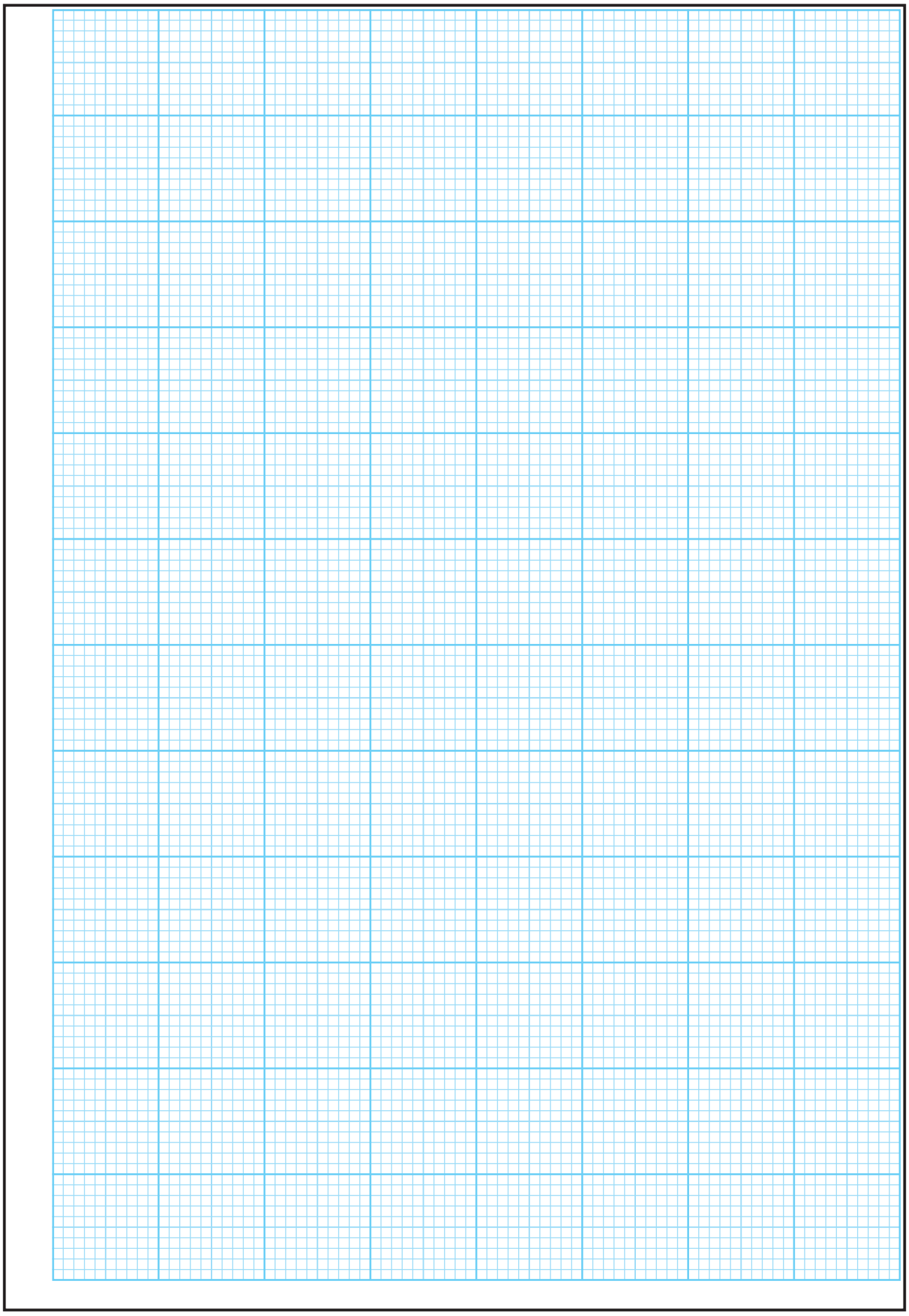

Question

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Leaving Certificate – Ordinary Level

Biology Sections A and B and Answerbook

Three hours

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2020

Biology

Section C
Ordinary Level

240 marks

Do not hand this question paper up

Section C

Answer **any four** questions.
Write your answer in the answerbook containing Sections **A** and **B**.

10. (a) Explain the following terms used in ecology:

(i) *Competition*
(ii) *Producer*
(iii) *Niche.*

(9)

(b) Read the following article and answer the questions that follow it.

In the countryside foxes mostly feed on small mammals such as rabbits found in hedges and tall grass. In recent years foxes can often be found in urban areas because of the easy availability of food, such as thrown away takeaway meals and increasing amounts of household wastes.
Although foxes can live until they are 10, they rarely survive that long and are either killed on the road, hunted or die from disease. Extinct wolves were once foxes' natural predators; however, foxes now have a new predator since the reintroduction of the white-tailed eagle.

(*Based on an article in RTE.ie Sunday 25th February 2018*)

(i) Why are foxes often found in towns and cities?
(ii) Why are most foxes younger than 10 years old?
(iii) Name a producer from the article above.
(iv) Name a primary consumer from the article above.
(v) Draw a food chain that includes **four** organisms from the article above.
(vi) State an adaptation a fox has that increases its chance of survival.
(vii) Mention **two** ways households could minimise the amount of waste produced.

(27)

(c) A group of students collected information on the animals found in an ecosystem close to their school. During the survey the students used the following pieces of equipment:

1. Pooter **2**. Pitfall Trap **3**. Sweep Net

(i) Draw a diagram of each piece of equipment and describe how each was used to Collect organisms for examination.
(ii) What did the students use to identify the animals they found?
(iii) State any **one** abiotic factor that could influence the number of animals in the ecosystem. **(24)**

11. (a) (i) Explain the terms *haploid* **and** *diploid.*

(ii) Name the type of cell division that halves the chromosome number. **(9)**

(b) (i) Chromosomes contain DNA. Name another substance found in chromosomes.

(ii) Sections of DNA are called genes. What is the function of a gene?

(iii) Describe the shape of a DNA molecule.

(iv) Name the base that combines with adenine in DNA.

(v) Name the base that combines with guanine in DNA.

(vi) The stages involved in preparing a DNA profile are numbered below.
In your answer book, rewrite these stages (1-4), by numbering them in the correct order in which they occur;

1. The pattern of fragment distribution is analysed.
2. Fragments are separated on the basis of size.
3. Cells are broken down to release DNA.
4. DNA strands are cut into fragments.

(vii) Where in cells is most DNA located?

(viii) What is used to cut the DNA strand into fragments?

(ix) Suggest a reason for creating a genetic profile. **(27)**

(c) The cross between two dogs with different coat colours is displayed below.
Examine the cross and answer the questions that follow**, in your answer book.**

Parents	Black Dog	**X**	White Dog
Genotypes	Bb	**X**	bb
Gametes	(B), (b)	**X**	(b)

Gametes	b	**Offspring**
B		
b	bb (white)	

(i) Name the dominant allele in this cross.

(ii) Name the recessive allele in this cross.

(iii) How many alleles for coat colour may be found in a single gamete?

(iv) What word is used to describe identical alleles in a genotype?

(v) **In your answer book**, state the genotype **and** phenotype for the offspring missing from the shaded box above.

(vi) If the black dog is male, using **X** and **Y**, give the sex chromosomes of the black dog and the sex chromosomes of the white dog. **(24)**

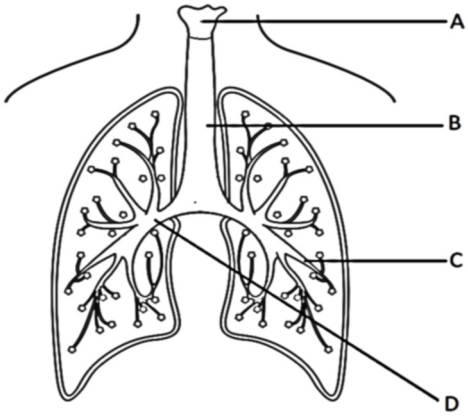
12. (a) (i) Oxygen enters the blood in the lungs by diffusion. What is diffusion?

(ii) Name the blood vessel that transports oxygenated blood from the lungs to the heart.

(iii) Name the chamber of the heart that receives oxygenated blood from the lungs.

(9)

(b) The diagram shows the human breathing system.



(i) Identify the structures labelled A, B C, D in the diagram.

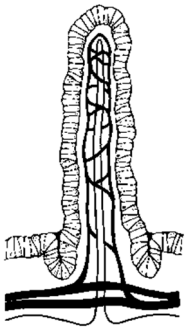
(ii) What prevents structure B from collapsing?

(iii) Name a muscle that contracts during inhalation.

(iv) Describe the change in air pressure inside the chest during inhalation.

(v) Inhalation is an active process and exhalation is a passive process.
Explain the terms *active* **and** *passive***.** **(27)**

(c) The human body absorbs material into the bloodstream for transport to body cells. The diagrams below show two structures involved in the exchange of materials in the human body.



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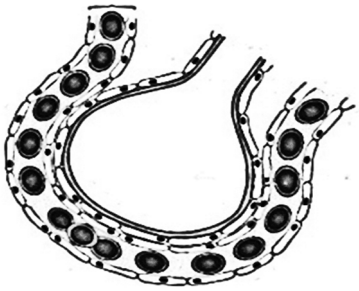


B

(i) Name each structure A and B.

(ii) State the exact location where each structure is found in the body.

(iii) State **two** features, common to both structures, which are an adaptation to efficient exchange of materials.

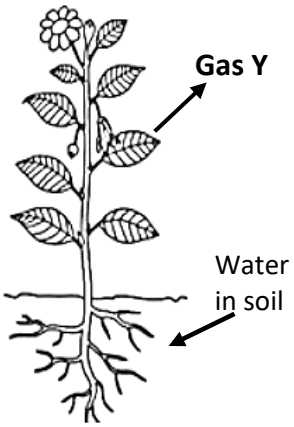
(iv) Name a disorder of the breathing system **and** describe a treatment for that disorder. **(24)**

13. (a) (i) What role does chlorophyll play in photosynthesis?

(ii) Where is chlorophyll located in a plant cell?

(iii) Name the carbohydrate produced during photosynthesis.

(9)



(b) (i) Name the basic source of energy for all organisms on earth.

(ii) Name **gas Y** released by leaves during photosynthesis.

(iii) Name the openings in leaves that allow gas exchange.

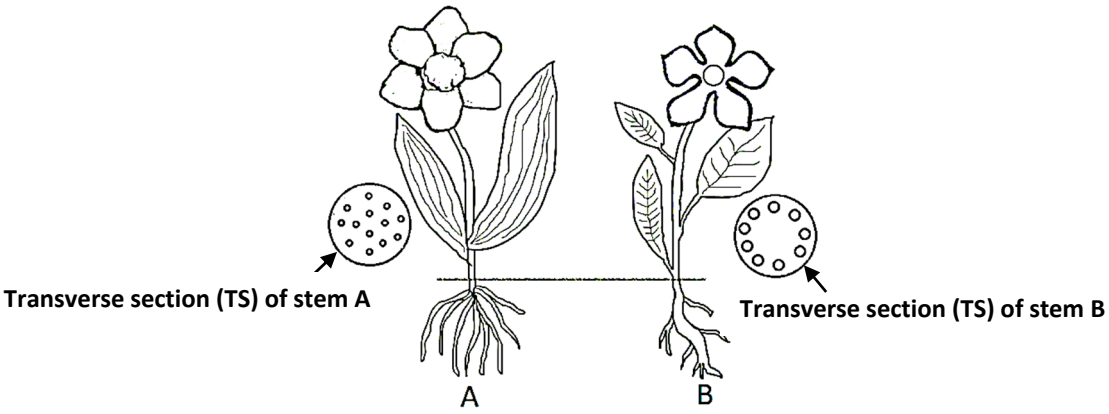
(iv) Describe how water travels from the soil to the leaf.

(v) When water reaches the site of photosynthesis in the leaf the water molecules is split into three products. Name these **three** products.

(vi) Name **one** method used by gardeners to increase the growth of crops in greenhouses.

(27)

(c) Flowering plants can be classified as either monocotyledonous (monocot) or dicotyledonous (dicot). Examine the two plants in the diagram and answer the questions that follow.



(i) Identify which plant is a monocotyledon, A or B.

(ii) State **one** feature that identifies a plant as a monocotyledon.

(iii) Identify which plant is a dicotyledon, A or B.

(iv) State **one** feature that identifies a plant as a dicotyledon.

(v) The roots of plants absorb water. State **one** other function of plant roots.

(vi) Plants contain the following three tissue types:

A. Dermal **B.** Ground **C.** Vascular

Match the correct plant tissue type with each of the following functions:

1. Transport **2.** Protection **3.** Food storage

(24)

14. Answer any **two** of (a), (b), (c). **(30, 30)**

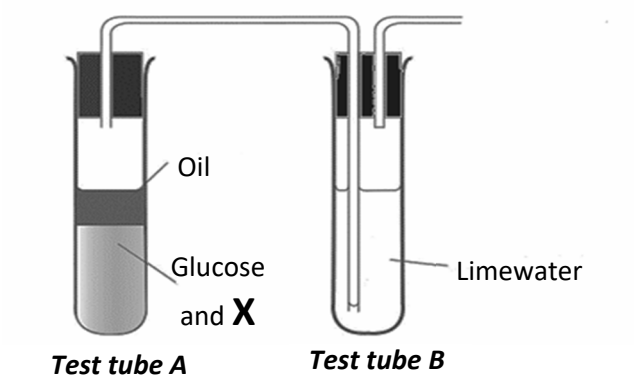
(a) A student is carrying out an experiment, using the equipment below, to investigate the products of anaerobic respiration (fermentation).

(i) Name an organism, represented by X in the diagram, involved in the fermentation process.

(ii) Name the product that is collected in test tube B.

(iii) What effect does this product have on the limewater in test tube B?

(iv) Name the other product which forms during fermentation and remains in test tube A.



(v) How do you know when fermentation has finished?

(vi) What test can be used to show that the product, named in (iv), is present in test tube A at the end.

(vii) What colour indicates a positive test for the product?

(viii) What substance is produced as a result of anaerobic respiration in human muscle?

(ix) What effect does this substance have on human muscle?

(x) Give **one** other example of modern-day bioprocessing.

(b) (i) What is added to a cell sample to make structures more visible when viewed with a microscope?

(ii) Identify the parts A, B, C, D in the diagram of a plant cell.

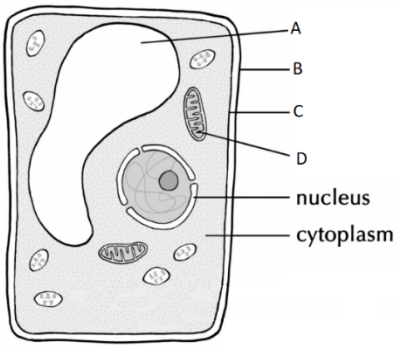
(iii) What is the function of the part labelled B?

(iv) What is the function of the part labelled D?

(v) What is a tissue?

(vi) What is tissue culture?

(vii) Describe **one** example of an application of tissue culture.



(c) *Rhizopus* is a harmful heterotrophic fungus.

(i) Where would you find *Rhizopus*?

(iii) What is meant by the term *heterotrophic*?

(iii) Draw a diagram to show the structure of *Rhizopus*. On your diagram include the following labels: **rhizoids, sporangiophores** and **sporangium.**

(iv) Label **M** on your diagram where mitosis occurs.

(v) Which form of reproduction results in the formation of a zygospore?

(vi) Name another harmful fungus.

(vii) Name a beneficial fungus **and** give an example of its economic importance.

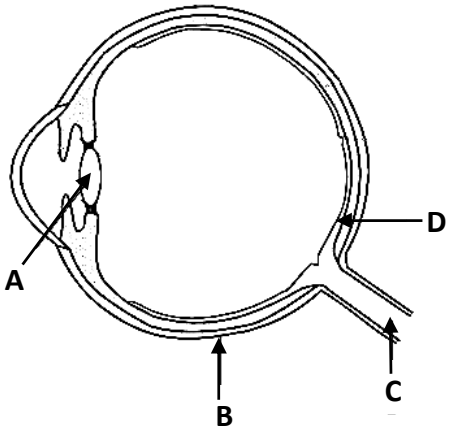
(viii) What can be used to treat fungal infections but is of no use against viral infections?

15. Answer any **two** of (a), (b), (c). **(30, 30)**

The diagram shows a section through the human eye.

(a) (i) **In your answer book**, state which letter represents each of the following parts:

1. Sclera
2. Lens
3. Optic Nerve
4. Retina.



(ii) Explain the role of the pupil in the eye.

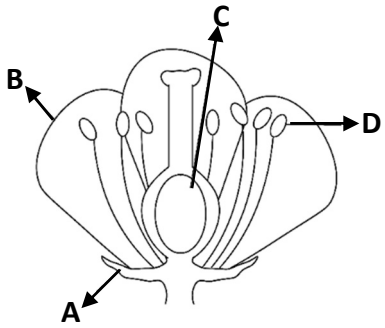
(iii) Name the two types of receptor cells located in the retina that respond to light.

(iv) Name a disorder of either the eye **or** the ear **and** give a corrective measure for the stated disorder.

(v) To which organ is the structure labelled C connected?

(b) (i) **In your answer book**, state which letter represents the parts of the flower that carry out the following functions:

1. Produces pollen
2. Attracts insects for pollination
3. Protects the flower as a bud
4. Produces eggs.

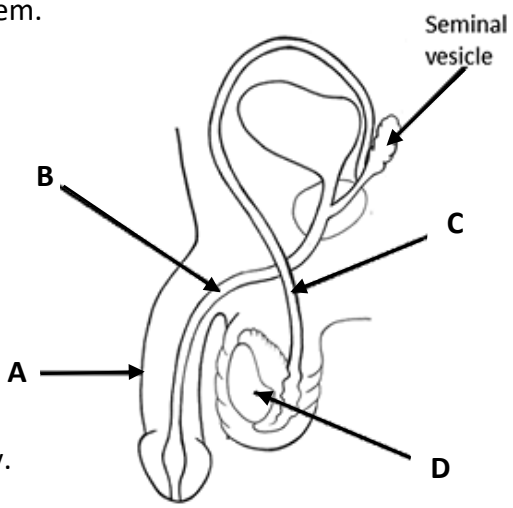


(ii) What is meant by pollination?

(iii) Name the method of pollination that occurs in the flower shown in the diagram **and** give a reason for your answer.

(iv) What is meant by dormancy **and** how does it give an advantage to the seed?

(c) The diagram shows the human male reproductive system.



(i) Name the parts labelled A, B, C, D.

(ii) In which labelled structure are sperm cells produced?

(iii) What is the function of part labelled C?

(iv) Give **one** function for the fluid produced by the seminal vesicle.

(v) Name the sex hormone produced by the structure labelled D.

(vi) Name **one** male secondary sexual characteristic.

(vii) Give **one** disorder which results in male infertility.

The Leaving Certificate – Ordinary Level

Biology

Do not hand this question paper up