2026.M43

2026L025G2EL

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2026

Biology

Section C

Ordinary Level

Tuesday 9 June Afternoon 2:00 - 5:00

240 marks

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Section C

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

11. (a) **(i)** Match the words *animal* **and** *plant* to the following terms: **Flora**; **Fauna**.

(ii) Which **one** of the following describes the term *biotic*? **Living**; **Non-living**.

(9)

(b) Read the article below and answer the questions that follow:

Killarney National Park is an ecosystem containing many habitats. An invasive plant called rhododendron is non-indigenous (not native) and has been slowly taking over. Rhododendron is a flowering shrub introduced from Asia in the 1800s and thrives in the mild, wet climate and acidic soils of the national park. One rhododendron plant can produce a million seeds. Animals in the park do not eat its leaves allowing it to grow unchecked. This dense coverage of leaves smothers all growth below, preventing other plants from growing. This affects the biodiversity of the soil.

Adapted from *Progress in decades-long battle to clear rhododendron in Killarney park*, www.rte.ie/news 18 April 2025

(i) Match the terms *habitat* **and** *ecosystem* to the following descriptions:

A: Organisms and their environment and how they interact with each other.

B: Where an organism lives.

Answer the following questions based on information provided in the article.

(ii) Name any **two** abiotic factors mentioned in the article above.

(iii) What do you understand by the term *invasive*?

(iv) State **two** ways in which rhododendron can spread quickly throughout its habitat.

(v) What effect does the dense coverage of rhododendron leaves have on the habitat?

(vi) Ecologists in the park are clearing rhododendron.
Suggest **one** benefit this will have on the ecosystem. **(27)**

(c) **(i)** Why is nutrient recycling important in nature?

(ii) The carbon cycle is a part of nutrient recycling.

1. Name **two** ways in which carbon dioxide (CO_2) is released into the atmosphere during the carbon cycle.

2. Name **one** other nutrient cycle you have studied.

(iii) Name **one** type of micro-organism involved in nutrient recycling.

(iv) Waste disposal is a problem for society.
State **two** problems associated with waste disposal.

(v) Give **one** way in which waste can be minimised. **(24)**

12. **(a)** **(i)** Match the terms *genotype* **and** *phenotype* to the following sentences:

A: **Physical makeup of an organism**

B: **Genetic makeup of an organism.**

(ii) Which **one** of the following sentences (**X** or **Y**) describes the term *homozygous*?

X: **Having two different alleles that control a characteristic**

Y: **Having two identical alleles that control a characteristic.** **(9)**

(b) The images show a red rose, a pink rose and a white rose.

The allele for red flower (**R**) is incompletely dominant to the allele for white flower (**r**).
The genotype of a red rose is **RR**.
Pink roses are heterozygous.

(i) Write down the genotype of a rose with pink flowers.

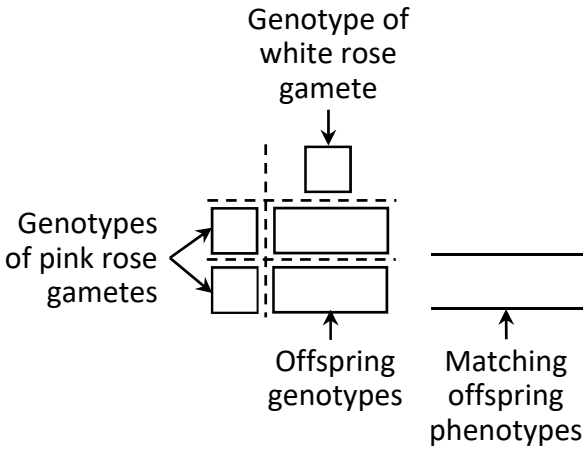
A rose with pink flowers was crossed with a rose with white flowers.

(ii) **Copy the Punnett square shown on the right into your answerbook and** complete it to show the following:

1. Genotypes of the gametes.

2. Genotypes of the possible offspring.

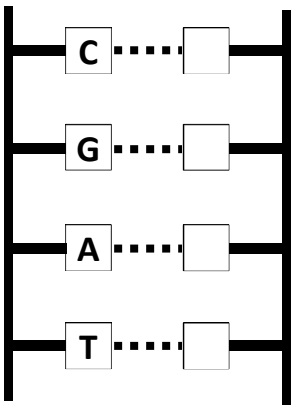
3. Matching phenotypes of the possible offspring.



(iii) If this cross produced 10 new plants, how many plants would you expect there to be of each colour?

(27)

(c) The diagram shows a DNA molecule.
The four bases, **C** (cytosine), **G** (guanine), **A** (adenine) and **T** (thymine) are shown on one strand.



(i) **Copy out the diagram into your answerbook and** complete the blank spaces to show the correct complementary base pairs in the DNA molecule.

(ii) Protein synthesis is a process by which cells make protein. Transcription is the first step.

1. Where in a cell does transcription take place?

2. Name the type of RNA that is produced during transcription.

(iii) Give **one** structural difference between DNA **and** RNA.

(iv) DNA profiling is an important biological technique.
Give **one** application (or use) of DNA profiling. **(24)**

13. **(a)** **(i)** Which of the sentences (**A** or **B**) describes the term *metabolism*?

A: Sum of all chemical reactions in an organism

B: Getting rid of undigested material.

(ii) In photosynthesis, small molecules are built up into larger molecules using energy. Which term, *catabolic* **or** *anabolic*, describes this type of reaction?

(iii) Light energy is required for photosynthesis. Name the source of light energy. **(9)**

(b) The word equation for photosynthesis is represented below:

Carbon dioxide + A $\xrightarrow[\text{Chlorophyll}]{\text{Light energy}}$ **B + Oxygen**

(i) Match compounds **A and B** to the following words: **Glucose**; **Water**.

(ii) The incomplete chemical formula shown on the right represents a molecule of glucose.
The numbers in the formula are missing.
Copy the formula into your answerbook and complete it by writing the correct numbers in **each** box.

$C\square H\square O\square$

(iii) Chlorophyll is the green pigment necessary for photosynthesis.
Name the plant cell organelle in which it is found.

(iv) Give **one** source of the carbon dioxide that is used in photosynthesis.

(v) Give **one** fate for the oxygen gas that is produced during photosynthesis.

(vi) Electrons and protons are also released during photosynthesis. State what happens to **either** the electrons **or** the protons after they are released.

(vii) Using your knowledge of photosynthesis, give **two** ways in which crop growth in greenhouses can be increased. **(27)**

(c) Respiration can be either anaerobic or aerobic.
Aerobic respiration is a two-stage process.

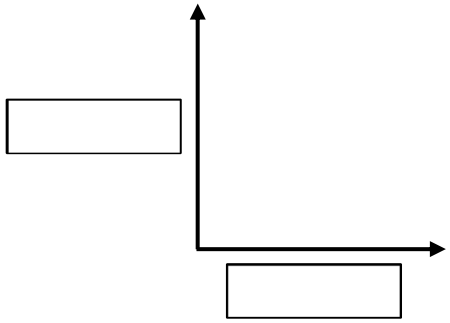
(i) Which stage (1. or 2.) releases the most energy?

(ii) Which stage (1. or 2.) does not require oxygen?

(iii) Fermentation is a type of respiration.
To which type of respiration (aerobic **or** anaerobic) does it belong?

(iv) Enzymes are required for respiration to occur.
Name any **two** factors that affect the rate of enzyme action.

(v) **Copy the axes shown into your answerbook**. Label the axes **and** sketch a graph to show how **either one** of the factors you named in (c) (iv) above affects the rate of enzyme action. **(24)**



14. **(a)** **(i)** Explain in detail the term '*balanced*' *diet*.

(ii) Give the role of peristalsis in the human digestive system. **(9)**

(b) Answer the following questions in relation to your knowledge of human digestion.

(i) What is meant by the term *digestion*?

(ii) Why must food be digested?

(iii) The two types of digestion are chemical and physical.

1. Which term (chemical **or** physical) is used to describe the type of digestion in which enzymes are involved?

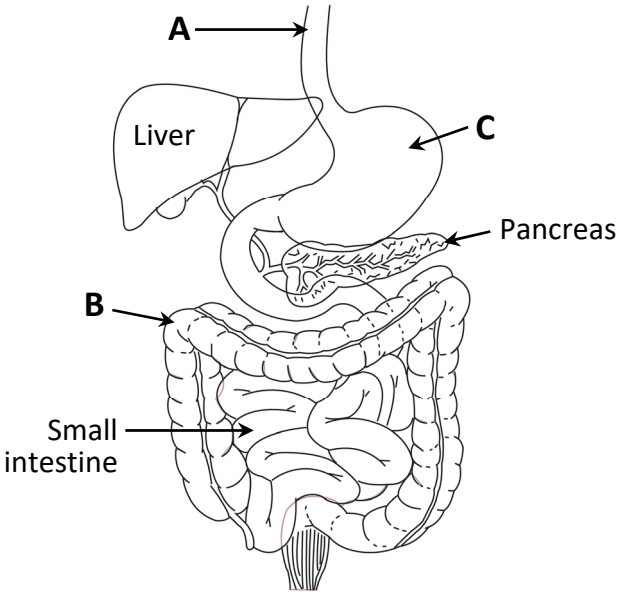
2. Which term (chemical **or** physical) is used to describe the type of digestion in which teeth are involved?

(iv) The diagram shows the human digestive system.

1. Which labelled part (**A** or **B** or **C**) of the human digestive system produces acid?

2. Which **one** of the following sequences represents the direction of movement of food through the alimentary canal?

- **A → B → C**
- **B → A → C**
- **A → C → B**



(v) The pancreas and liver are associated glands of the human digestive system.

1. Name any **one** enzyme produced by the pancreas.

2. Give **two** functions of the liver. **(27)**

(c) Answer the following questions based on the small and large intestines.

(i) What is the **main** function of the small intestine?

(ii) The small intestine has many villi. Draw a labelled diagram of a villus.

(iii) Which **one** of the following veins links the small intestine to the liver?
Hepatic vein; **Hepatic portal vein**; **Renal vein**

(iv) Give a function of the large intestine.

(v) State any **one** benefit of having a diet high in fibre.

(vi) Symbiotic bacteria are present in the human digestive system.
Give **one** function of these symbiotic bacteria. **(24)**

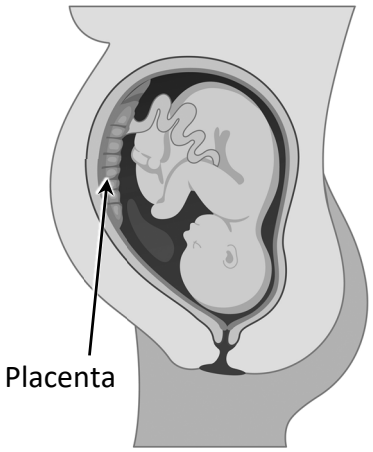
15. Answer the following questions based on your knowledge of human reproduction.

(a) In relation to females and/or males, give any **three** methods of contraception. **(9)**

(b) **(i)** **In your answerbook**, match **each** location (**Fallopian tube**; **endometrium**; **ovary**) in the female reproductive tract to **each** of the events listed below:

1. Ovulation
2. Fertilisation
3. Implantation

The diagram shows a developing foetus in the uterus (womb).



(ii) The placenta is shown in the diagram.
Give **one** function of the placenta.

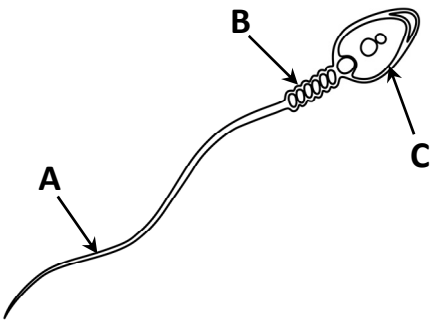
(iii) There are three stages to the birth process:
Labour; **Birth**; **Afterbirth**.
Match **each** stage named above to the following **three** descriptions:

1. The passage of the foetus out of the uterus.
2. The passage of the placenta out of the uterus.
3. Rhythmical contractions of the uterus.

(iv) Milk production occurs after the birth process.
Which **one** of the following hormones is responsible for milk production?
Prolactin; **Insulin**

(v) Give **one** biological benefit of breastfeeding. **(27)**

(c) The diagram shows the human male gamete, a sperm cell.



(i) Match **each** of the parts labelled **A**, **B** and **C** to the following terms:

1. **Midpiece (neck)**
2. **Head**
3. **Tail**

(ii) Name the organ in the male reproductive system where sperm cells are produced.

(iii) Name the hormone responsible for sperm production.

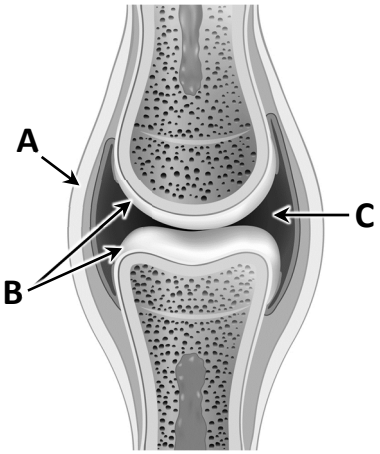
(iv) What is meant by the term *infertility*?

(v) Give **one** cause of infertility in males.

(vi) *In vitro* fertilisation is one method used to treat infertility.
What is meant by the term *in vitro* fertilisation? **(24)**

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

(a) The diagram shows a typical synovial joint.



(i) Match **each** of the parts labelled **A**, **B** and **C** to the following terms:

1. **Ligament**
2. **Synovial fluid**
3. **Cartilage**

(ii) Give **one** function of cartilage.

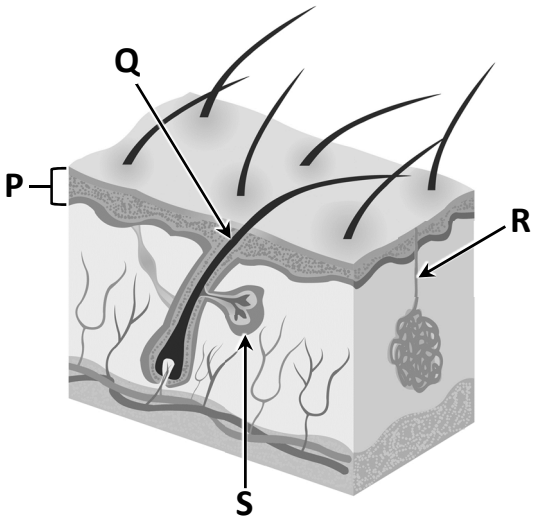
(iii) There are three main types of joint found in the human skeleton.
Give an example of a location for **each** of the following types of joint:

1. A synovial joint
2. An immovable joint
3. A slightly movable joint

(iv) Skeletal muscles generally work in pairs.
Which **one** of the following terms is used to describe these muscle pairs?
Antigen; **Antagonistic**

(v) Describe, using an example, how a muscle pair causes movement.

(b) The skin is a component of the general defence system, which prevents pathogens entering the body.



(i) The diagram shows the structure of the skin.
In your answerbook, match the labels **P**, **Q**, **R** and **S** with the following terms:

1. **Hair**
2. **Sebaceous gland**
3. **Epidermis**
4. **Sweat duct**

(ii) Give a function of the skin other than its role in the general defence system.

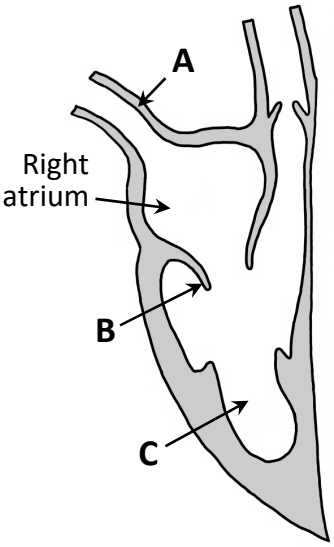
(iii) What is a *pathogen*?

(iv) If a pathogen enters the body, give **one** way the **specific** defence system can eliminate the pathogen.

(v) Immunity is the ability to resist infection and can be active or passive.
Which type of immunity (active **or** passive) provides long term protection?

(vi) Name **two** organs that are part of the specific defence system (immune system).

(c) The diagram shows the right side of the human heart.



(i) Match the letters **A**, **B** and **C** from the diagram to the following structures:

1. **Tricuspid valve**
2. **Ventricle**
3. **Vena cava**

(ii) **Copy the diagram, without the labels**, **into your answerbook and** draw at least **two** arrows to indicate the direction of blood flow through the right-hand side of the heart.

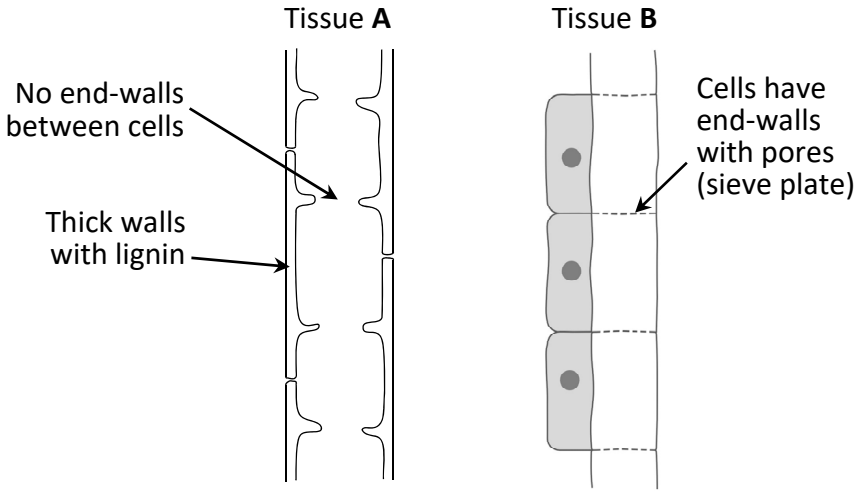
(iii) To which organ is the blood from part **C** transported to in order to gain oxygen?

(iv) Name the molecule found in red blood cells which is responsible for carrying oxygen around the body.

(v) State **two** ways in which the structure of arteries and veins differ.

(vi) Briefly describe the effect of **one** of the following factors on the human circulatory system: **smoking** *or* **diet** *or* **exercise**.

(d) The diagrams show two types of vascular tissue, phloem and xylem, found in plants.



(i) Based on information provided in the diagrams above, match the terms *phloem* **and** *xylem* to the tissues labelled **A and B**.

(ii) Which tissue, **A or B**, transports water and minerals?

(iii) Which tissue, **A or B**, transports food?

(iv) In which of the tissues, **A or B**, would you find companion cells?

(v) **Copy the diagram showing tissue A into your answerbook and** draw an arrow to indicate the direction of flow.

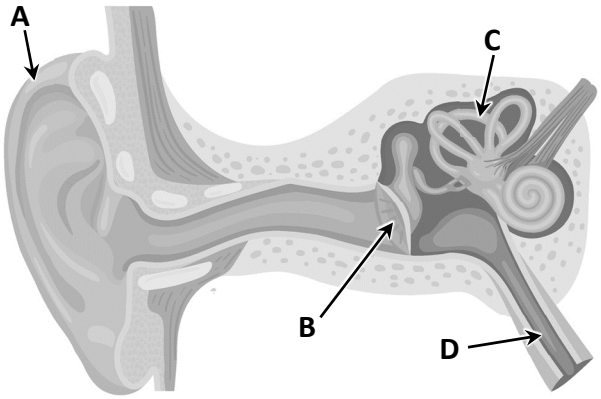
(vi) Name any **one** process that causes the movement of water through a plant.

(vii) Draw a **longitudinal** section of a stem **and** label the location of vascular tissue.

(viii) Name the structures found in the **stem** of a plant that allows gas exchange.

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

(a) The diagram shows the human ear.



(i) **In your answerbook**, match the labels **A**, **B**, **C** and **D** with the parts listed below:

1. **Pinna**
2. **Eustachian tube**
3. **Semi-circular canals**
4. **Eardrum**

(ii) **In your answerbook**, match **three** of the parts listed above to their functions below:

1. Balance
2. Equalisation of air pressure
3. Transfer of sound vibrations to the middle ear

(iii) Which **one** of the following nerves carries impulses from the ear to the brain? **Optic nerve** *or* **Auditory nerve**.

(iv) Name **one** disorder of the ear **or** the eye **and** give **one** possible treatment for the **named** disorder.

(b) **(i)** Which type of gland (**exocrine** *or* **endocrine**) is responsible for secreting hormones?

(ii) Explain in detail the term *hormone*.

(iii) **Copy the table below into your answerbook and** complete it using the words in the list. Some boxes have been completed as examples.

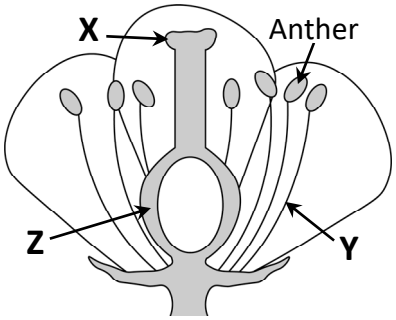
List: **Thyroxine**; **Adrenal**; **Pituitary**; **Adrenaline**.

Name of gland	Hormone	Function of hormone
	Growth hormone	Growth
		'Fight or flight' response
Thyroid		Controls the rate of metabolism

(iv) State **two** ways in which hormone action differs from nerve action.

(v) Give **one** example of the use of hormone supplements.

(c) The diagram shows a plant flower.



(i) **In your answerbook**, match the letters **X**, **Y** and **Z** to the following flower parts:
1. **Ovary**
2. **Filament**
3. **Stigma**

(ii) The anther produces pollen grains. Does the pollen grain contain the female **or** male gamete?

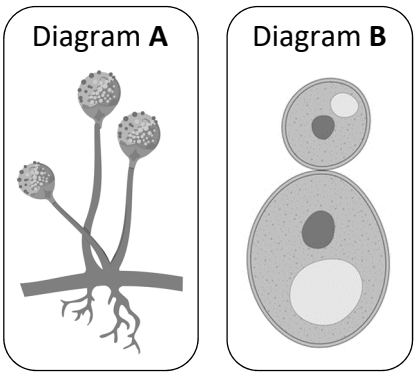
(iii) Explain the term *pollination*.

(iv) Name **two** methods by which plants can be pollinated.

(v) Following pollination, fertilisation and seed formation occur. Which part of the flower is responsible for seed production?

(vi) Seeds are dispersed, which means they are spread away from the parent plant. Give any **two** ways in which seeds can be dispersed.

(d) The diagrams on the right show two organisms you have studied.



(i) Match diagram **A and** diagram **B** to the following named organisms:
1. Yeast
2. *Rhizopus* (bread mould)

(ii) To which **one** of the following kingdoms do **both** of these organisms belong?
Monera; **Protista**; **Fungi**.

(iii) Yeast and *Rhizopus* can reproduce asexually. **Copy the following table into your answerbook and** complete it using the following terms:
spores; **budding**

Organism	Reproduces by….
Yeast	
Rhizopus	

(iv) Both yeast and *Rhizopus* are heterotrophic. Plants are autotrophic. Match the terms *heterotrophic* **and** *autotrophic* to the following descriptions:
1. **An organism that makes its own food.**
2. **An organism that obtains its food from other organisms.**

(v) *Rhizopus* can also reproduce sexually. Which **one** of the following sequences of terms (**A or B**) associated with sexual reproduction in *Rhizopus* is in the correct order?

A: Progametangium → gametangium → fertilisation

B: Gametangium → progametangium → fertilisation

(vi) Asepsis and sterility are important techniques used by scientists when growing micro-organisms in the laboratory. Match the terms *asepsis* **and** *sterility* to the following descriptions:
1. **The technique that ensures absence of all micro-organisms.**
2. **The technique that ensures absence of pathogens.**

Acknowledgements:

Images/diagrams/graphs/tables:

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Images in Q12 (b) on page 3:	dreamstime.com
Diagram of a Punnet square in Q12 (b) on page 3:	State Examinations Commission
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Texts:

Text on page 2:	Adapted from *Progress in decades-long battle to clear rhododendron in Killarney park*, www.rte.ie/news 18 April 2025

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Leaving Certificate – Ordinary Level

Biology Section C

Tuesday 9 June

Afternoon 2:00 - 5:00