



**Pre-Leaving Certificate Examination, 2024**

# Technology

## Ordinary Level

**Section A - Core**

Duration: 2 hours

Name:
School:
Address:
Class:
Teacher:

Section	Mark
Section A	
Section B	
Section C	
Total	
Grade	

## Instructions

Write your details in the boxes on the front cover.

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

There are three sections in this examination. Attempt **all three** sections.

Questions for Sections B and C are supplied separately.

**Section A**      72 marks

Core – Short-answer questions.

Answer **any nine** questions in this section.

Each question carries 8 marks.

**Section B**      48 marks

Core – Long-answer questions.

Answer the **two** core questions presented

Each question in Section B carries 24 marks.

**Section C**      40 marks

Options – Long-answer questions.

Answer **one** of the five optional questions presented.

Each question in Section C carries 40 marks.

## Section A.

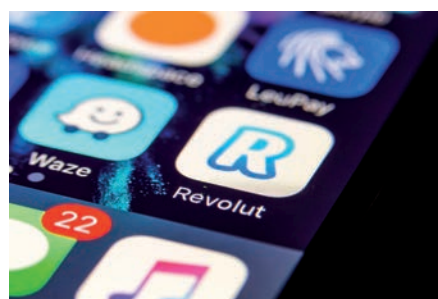
Answer **any nine** questions. All questions carry 8 marks.  
Write your answers in the spaces provided.

1. Health and safety is essential in a practical workshop. Four colour codes relating to safety are shown below. State what **each** colour represents:

Red:
Blue:
Green:
Yellow:



2. Revolut has made banking easier for people to manage their money. You can access your account, send and receive money quickly, split bills in restaurants and exchange currency at the click of a button. However, with all the benefits of banking online, it does have its pitfalls.



- (i) Briefly describe **two** ways computer hackers could misuse personal data that they access online.

1.
2.

- (ii) Authentication methods are essential in order to keep the threat of these hackers away. Name **two** authentication methods that you are familiar with:

1.
2.

3. Wireless charging is becoming an extremely popular accessory in people's homes. With this in mind, answer the following questions.



- (i) Identify **two** advantages to using wireless charging.

1.
2.

- (ii) Identify **two** disadvantages to using wireless charging.

1.
2.

4. 3D printing is an application of CAD/CAM and has become extremely popular in educational settings.

State **two** benefits of using a 3D printer to manufacture a product.



1.

2.

5. Green Party leader and Minister for Transport Eamon Ryan recently published a multibillion-euro all-island strategy, up to 2050, which he said would usher in a “new age of rail”. The All-Island Strategic Rail Review aims to transform Ireland’s rail system.

Outline **two** potential benefits of this proposed new age of rail strategy.



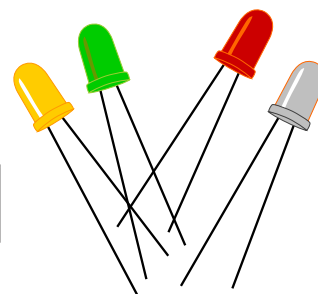
1.

2.

6. The image shows a number of LEDs.

(i) Explain what is meant by the abbreviation LED.

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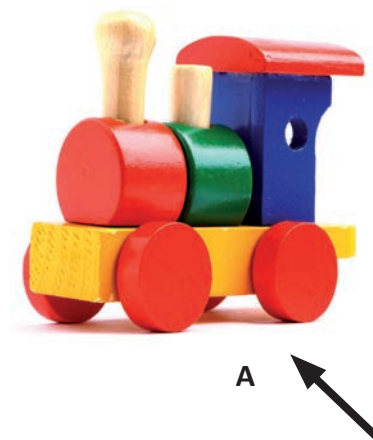


(ii) Identify **two** ways of determining the positive side of an LED.

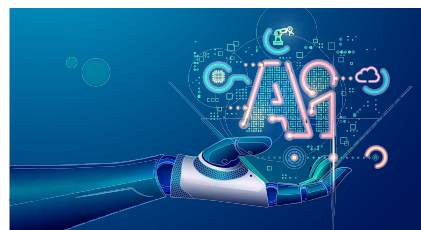
1.

2.

7. In the space provided, make a well-proportioned 2D sketch of the train shown when viewed from the direction of arrow **A**.



8. Artificial intelligence (A.I.) has recently become a major talking point in today's society.



- (i) Briefly outline **two** benefits to using A.I.

1.

2.

- (ii) Briefly outline **two** disadvantages of A.I.

1.

2.

9. The image across shows a mechanism which is commonly used in a technology room.



- (i) Name the mechanism shown.

- (ii) Outline **two** advantages associated with this type of mechanism.

1:	
2:	

10. The image opposite shows a resistor colour code table and a resistor **R**.



- (i) Calculate the value of the resistor shown if

R = Orange, Orange, Brown, Gold.

Value =
---------

- (ii) Using Ohm's law, calculate the current passing through **R** when connected to a 9v battery.

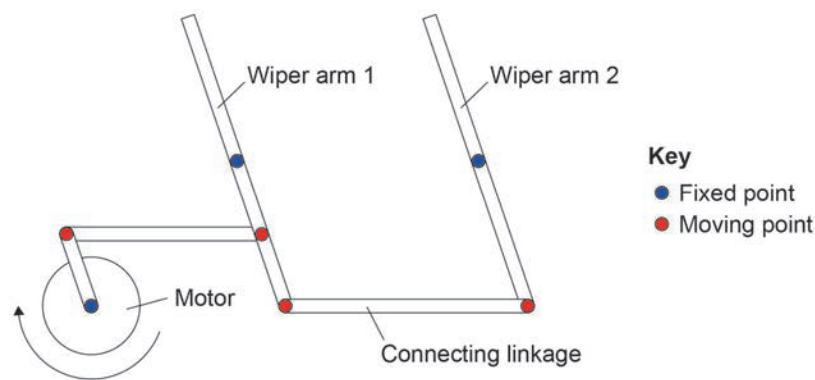
$$V = I \times R$$

Current (I) =
---------------

Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

Workings:

11. A simple diagram of a mechanism for a car windscreen wiper is shown below.



(i) State the type of motion in Wiper arm 1.

(ii) Explain the function of the connecting linkage between Wiper 1 and Wiper 2.

12. Use **two** graphic techniques to enhance the graphic representation of the wireless headphones shown.





B 4 2 F C

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**Pre-Leaving Certificate Examination, 2024**

# Technology

## Ordinary Level

**Section B and Section C (160 marks)**

Duration: 2 hours

### Instructions

- Section B**    48 marks  
Core - Long-answer questions.  
Answer the **two** core questions presented.  
Each question in Section B carries 24 marks.
- Section C**    40 marks  
Options - Long-answer questions.  
Answer **one** of the five optional questions presented.  
Each question in Section C carries 40 marks.

- (a) Answer these questions in the answerbook provided.
- (b) Write all your details on the answerbook.
- (c) Draw all sketches in pencil.
- (d) Hand up the answerbook at the end of the examination.

## Section B - Core - Answer Question 2 AND Question 3.

### Question 2 – Answer 2(a) **and** 2(b)

- 2(a)** In July 2022, Minister for Transport Eamon Ryan secured agreement from Cabinet to move forward with the transformative MetroLink rail project, which aims to be ready by 2030. Ireland remains one of only a small number of countries in Europe without a metro in its biggest city or a rail connection to its main international airport.



- (i) Outline **two** ways in which the MetroLink rail project will improve transportation for commuters.
- (ii) State **one** advantage and **one** disadvantage of the MetroLink rail project.

- 2(b)** The image across shows a shelter and ticket machine at a Metrolink station in the UK.



- (i) Suggest a suitable material for the manufacture of the shelter. Give **one** reason for selecting this material.
- (ii) Lighting is required around the shelter. Draw a simple circuit that includes three LEDs, an SPST switch and a power source to light up the shelter.
- (iii) A ticket machine is shown in the image. Outline **one** advantage and **one** disadvantage of a ticket machine.

### Answer 2(c) **or** 2(d)

- 2(c)** The image across shows the inside of a MetroLink train.



- (i) Name a suitable material to manufacture the hand rails from **and** justify your answer.
- (ii) In the image, you can see a hanging strap which passengers can hold on to. Leather, which is known as a natural material, could be used to manufacture the strap. Explain the difference between a synthetic and a natural material.

**OR**

- 2(d)** GPS technology plays an important role in the rail network.

- (i) Explain the abbreviation GPS.
- (ii) Outline **two** important applications of GPS technology in trains.

### Question 3 – Answer 3(a) and 3(b)

- 3(a)** The 2024 Leaving Certificate Ordinary Level Brief in Technology required you to design and manufacture a working model of a toy, system, or educational resource that could be used to support playful learning in a context of your choice.

The image shows an educational toy for children.



- (i) Name a specific type of wood to manufacture the base from.
- (ii) Identify, through sketches and annotations, how you connect the wooden pegs to your base.

- 3(b)** The various shapes were manufactured on a CAM machine.

- (i) Name a suitable CAM machine to manufacture the shapes on.
- (ii) The educational toy does not include any electronic or mechanical feature as outlined in the brief by the State Examinations Commission.

With the aid of annotations and sketches, modify the existing design to include an electronic or mechanical feature to further enhance the educational toy.

- (iii) Explain how to get a high-quality finish on the shapes if they are manufactured from wood.

### Answer 3(c) or 3(d)

- 3(c)** Three physical images and three symbols of electronic components are shown below.

- (i) Match the electronic symbol with the physical image of the component. In your answer book, just write and draw the correct symbol beside the letter:



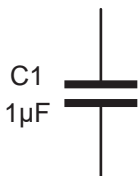
**A.**



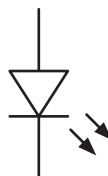
**B.**



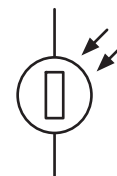
**C.**



**Figure 1**



**Figure 2**



**Figure 3**

- (ii) Identify the functions of the **three** components shown.

- 3(d)** Products sold in Europe have a label displaying the CE as shown across.

- (i) Explain what the CE mark on a product represents.
- (ii) Describe **two** criteria that will be used in the evaluation process to determine if your Leaving Certificate Technology project will be successful on completion.



## Section C - Options – Answer *any one* of the five optional questions.

### Option 1 – Applied Control Systems – Answer 1(a) and 1(b)

**1(a)** Philips Hue is a line of colour-changing LED lamps and white bulbs which can be controlled wirelessly.



- (i) Suggest **two** advantages of using wirelessly controlled bulbs in your home.
- (ii) Name **two** other devices that operate wirelessly in your home.

**1(b)** An automatic dog feeder is shown across. The automatic dog feeder is controlled by using a programmable PIC.



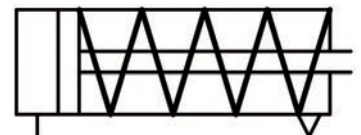
- (i) Complete the flowchart to operate the dog feeder in the following sequence:
  - The system is powered on.
  - Buzzer comes on if the hopper is empty.
  - If food tray is less than half full, it is refilled every 6 hours.
  - Motor turns on for 5 seconds.
  - Close hopper.
- (ii) Outline **one** potential problem if the buzzer is sounding for long periods.
- (iii) Suggest a suitable motor to rotate the hopper door. Justify your selection.

Answer 1(c) **or** 1(d)

**1(c)** (i) The image shown is a mini air compressor used for a variety of applications. Name **two** advantages associated with this type of air compressor.



- (ii) The image across shows a single acting pneumatic cylinder and the symbol for the cylinder. Describe the basic function of this type of cylinder.



OR

**1(d)** The image across shows a PIC which can be used to control electronic toys like the one shown.



- (i) With the aid of a diagram, explain how pin number 1 is clearly identified on the PIC microcontroller shown.
- (ii) PICs can control different types of inputs and outputs. Suggest **two** outputs which would be suitable in the use of the baby toy shown.

## Option 2 – Electronics and Control – Answer 2(a) and 2(b)

**2(a)** In the images across, you will see a multimeter, which is commonly used in a technology room.

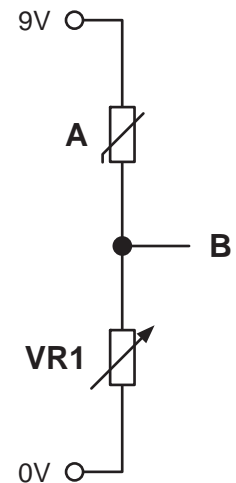


- (i) Outline **two** uses of a multimeter.
- (ii) Describe the purpose of testing continuity in a circuit using a multimeter.

**2(b)** A portion of a sensing circuit is shown across.

- (i) State the physical property being sensed by component **A**.
- (ii) Component **A** forms one-half of a potential divider with **VR1**. Describe what is meant by a potential divider.
- (iii) Calculate the voltage at point **B** when the resistance of component **A** is  $62\text{k}\Omega$  and **VR1** is set to  $78\text{k}\Omega$ .

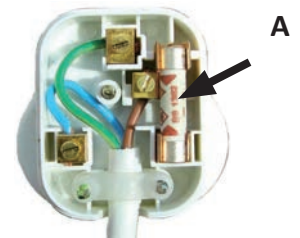
Use the formula  $V_{out} = \frac{R_2}{R_1 + R_2} \times V_{in}$



Answer 2(c) or 2(d)

**2(c)** The image shows the wiring of a 3-pin plug.

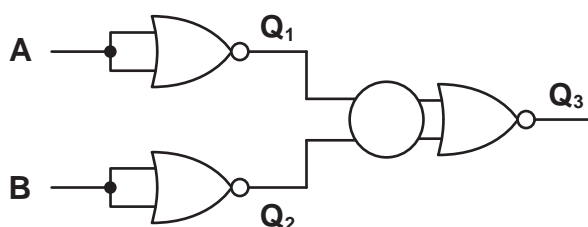
- (i) State the colour coding for the following wires: neutral, live.
- (ii) An arrow is pointing to the fuse at **A**. What is the purpose of a fuse?



OR

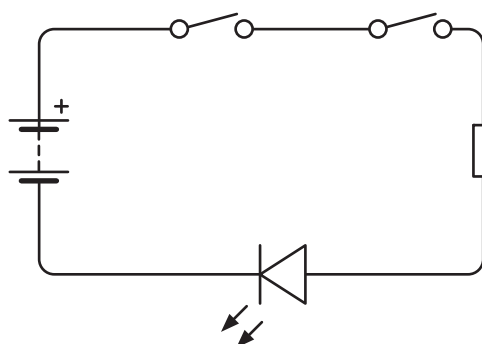
**2(d)** The graphic shows a combination of three logic gates.

- (i) Identify the logic states at points **Q1**, **Q2** and **Q3** by completing the table below.

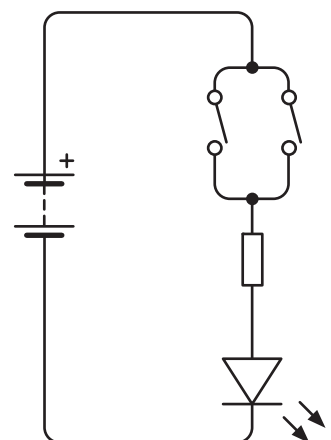


A	B	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>
0	0			
0	1			
1	0			
1	1			

- (ii) The circuits shown below represent layouts similar to two common logic gates. State the type of logic used to control each circuit.



**Circuit 1**



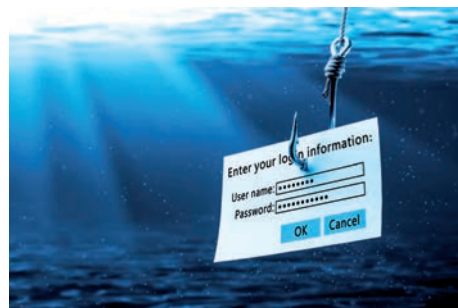
**Circuit 2**



### Option 3 – Information and Communications Technology – Answer 3(a) and 3(b)

**3(a)** Phishing is an attempt by someone trying to acquire private information like your passwords, usernames, and bank details by pretending to work for a reliable source.

- (i) Briefly outline **two** ways of minimising your chances of becoming a victim of phishing.
- (ii) State **two** issues with only using usernames and passwords in an authentication system.



**3(b)** Computer networks can be installed using wired or wireless technology.

- (i) State **one** wireless method used to connect devices on a Personal Area Network (PAN).
- (ii) Describe **two** differences between a Local Area Network (LAN) and a Wide Area Network (WAN).
- (iii) Give **three** advantages of using a wireless network instead of a wired network.



#### Answer 3(c) or 3(d)

**3(c)** A school stores student details on their computer network. School management is concerned about the security of the student information held on the network.

- (i) Recommend **two** different security measures that the school could implement to make their network more secure.
- (ii) State **two** reasons why automatic software updates provide better security than manual software updates.



OR

**3(d)** Data in computers is typically stored in primary or secondary storage.

- (i) Describe **two** differences between primary and secondary storage in computers.
- (ii) The use of Solid State Drives (SSDs) rather than Hard Disk Drives (HDDs) has increased in recent years. Name **two** differences between SSDs and HDDs.



## Option 4 – Manufacturing Systems – Answer 4(a) and 4(b)

**4(a)** Consumers expect products to be manufactured to the highest of standards. In relation to cars, safety and performance is extremely important.

- (i) Briefly outline how cars can be safe and perform to the highest standards.
- (ii) Describe **two** financial consequences for a company who produces low-quality products.



**4(b)** A company is developing a new range of clothing and has decided to use the Deming Cycle, also known as the PDCA cycle, as part of a quality management strategy.

The four stages of the PDCA cycle are Plan, Do, Check and Act.

- (i) Describe any **two** stages of the cycle outlined above.
- (ii) Outline the key benefits for a manufacturer who uses the PDCA cycle.
- (iii) Products can be once-off, batch or mass produced. Select a suitable production process for the manufacturing of clothing and justify your selection.



Answer 4(c) or 4(d)

**4(c)** Companies such as Apple and Volkswagen are extremely successful and rely on their trusted reputation.

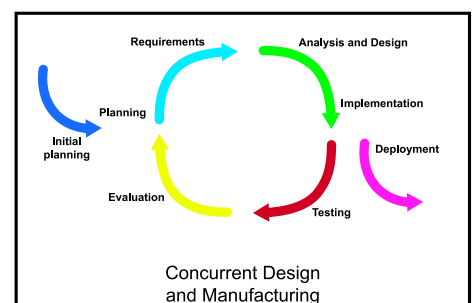
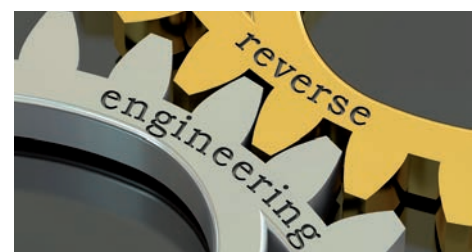
- (i) Explain briefly why the Continuous Improvement Process is important to these companies.
- (ii) Explain the term Reverse Engineering.



OR

**4(d)** Concurrent engineering requires bringing a cluster of professionals together to work as a team on the design and manufacture of a product.

- (i) Outline **two** benefits for a company by taking this approach.
- (ii) Companies often use benchmarking when designing new products. Briefly explain what is meant by the term benchmarking.





### Option 5 - Materials Technology - Answer 5(a) and 5(b)

**5(a)** The Irish government is planning to increase the roll-out of rapid-build houses, over and above the 700 modular homes they currently have built, so they can be used more broadly to deal with the housing crisis. Modular buildings are prefabricated and consist of repeated sections called modules. Modularity involves constructing sections away from the building site, then delivering them to the intended site. Installation of the prefabricated sections is completed on site. Prefabricated sections are sometimes placed using a crane.



- (i) Steel, wood and concrete are used in the manufacturing of modular homes. Explain briefly why these three materials would be used.
- (ii) Concrete is a composite material. Explain what a composite material is.

**5(b)** Using the image above, answer the following questions.

- (i) The windows and doors are manufactured from PVC. Explain why windows and doors are manufactured from PVC.
- (ii) Choose a suitable wood to manufacture the main frame of the house and justify your choice.
- (iii) Permanent and semi-permanent joining methods are used in the assembly of modular homes. Explain the difference between these joining methods and give **one** example of each.



*Answer 5(c) or 5(d)*

**5(c)** After a product reaches its end-of-life, there are several options available for its disposal

- (i) Outline why it is important to consider how a product is disposed of once it reaches its end-of-life.
- (ii) Briefly outline **two** options available when disposing of a product like a microwave, shown across.



**OR**

**5(d)** Electrochromic glass is a modern smart material that is used in offices to provide privacy. It changes its colour and transparency when a small electrical current is passed through it.

- (i) Explain what is meant by a smart material.
- (ii) Name **two** other smart materials that you have studied and give an application for each one.

\*you cannot use office glass in your answer.

