



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2023 Technology

Section B and Section C

Ordinary Level

Monday 26 June Afternoon 2:00 - 4:00

160 marks

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.

THESE QUESTIONS ARE TO BE ANSWERED IN THE ANSWERBOOK ATTACHED TO **SECTION A**.

Do not hand this up.

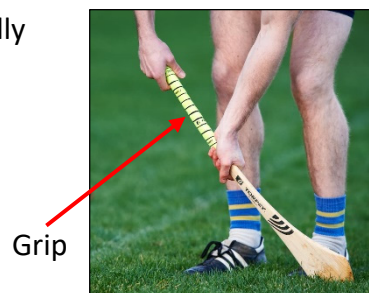
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Section B - Core – Answer Question 2 **AND** Question 3

Question 2 – Answer 2(a) **and** 2(b)

2(a) Torpey Hurleys aim to create products which are environmentally friendly and *biodegradable*, where possible.

- (i) Explain what is meant by the term biodegradable.
- (ii) Describe **two** properties which would be important for the material used as the grip on the hurley shown.



2(b) Ash is a native hardwood traditionally used for making hurleys. Recently, Ireland's ash trees have been exposed to an invasive disease which has impacted the availability of ash timber. To combat this, Torpey Hurleys are manufacturing hurleys using bamboo.



- (i) Describe what is meant by a native hardwood and name **one** other native hardwood.
- (ii) Suggest **two** reasons why it is more environmentally friendly to use bamboo instead of ash to manufacture hurleys.
- (iii) Outline **two** ways Torpey Hurleys could enhance the sales of their bamboo hurleys.

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

2(c) The majority of GAA ticket sales are processed online and in most cases, tickets cannot be purchased at the grounds.

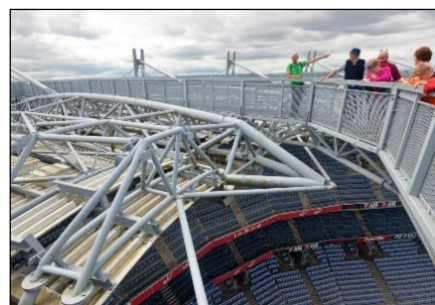
- (i) Give **two** benefits of purchasing match tickets online.
- (ii) Briefly outline **two** precautions that should be taken when purchasing match tickets online.



OR

2(d) The Skyline Tour (rooftop walkway) is Dublin's highest open-viewing platform and offers breathtaking panoramic views of the city.

- (i) Describe, using annotated sketches, a method used to strengthen the frame structure of the roof.
- (ii) Suggest **one** safety feature which could be included in the design of the rooftop walkway.



Question 3 - Answer 3(a) and 3(b)

3(a) The image shows the logo for the Leinster Model Flying Club. It is one of the longest running model flying clubs in Ireland.



- (i) Give **two** advantages of having a logo for a club.
- (ii) Suggest a software package that could be used to design the logo.

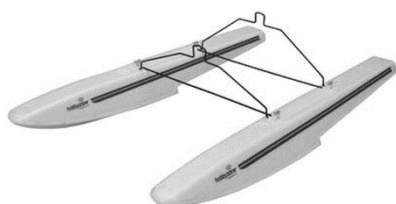
3(b) The image shows a Hobbyzone Carbon Cub plane and controller. It contains a 2200 mAh, 11 V lithium battery and is charged using a USB power source.



- (i) Describe what is meant by a 2200 mAh battery and by a USB power source when referring to the specifications of the model plane.
- (ii) Calculate the power delivered when the motor draws 2200 mA from the 11 V battery. **Note:** $P = V \times I$
- (iii) Describe, using a simple circuit diagram, the difference between batteries connected in *series* and batteries connected in *parallel*.

Answer 3(c) or 3(d)

3(c) Floats, like those shown in the image below, can be attached to the model aeroplane for taking off and landing on water.

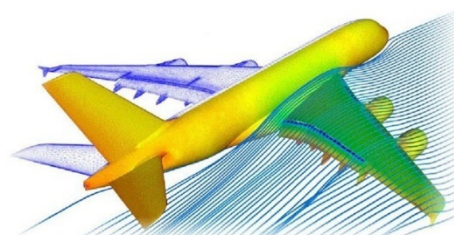


- (i) Suggest a suitable material for the manufacture of the floats. Justify your selection.
- (ii) Describe, using notes and sketches, how the floats could be attached to the main body of the aeroplane.

OR

3(d) *Aerodynamics* is a key consideration when designing an aeroplane.

- (i) Describe what is meant by the term aerodynamics when designing an aeroplane.
- (ii) Large design and build projects use planning tools such as Gantt charts.
Give **two** reasons for the use of planning tools in large projects.



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

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

1(a) A home automation system allows many aspects of home living to be monitored and/or controlled.

- (i) Suggest **two** areas of home living that could benefit from the use of automated systems.
- (ii) Briefly describe **one** disadvantage of using automated systems in everyday life.

1(b) The image shows a rotating novelty light for a child's bedroom. The light is controlled using a PIC (Peripheral Interface Controller).

- (i) Complete the flowchart to operate the novelty light in the following sequence:
 - The light bulb turns on when the button is pressed
 - After two seconds the novelty light rotates
 - After thirty seconds the novelty light stops rotating and the light bulb turns off.

(ii) Suggest a modification to the flowchart that allows for music to be played as the novelty light rotates.

(iii) The novelty light above is powered using a *low voltage DC* power supply. Explain the term low voltage DC.



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

1(c) The image shows a PIC which can be used to control devices such as the novelty light in **1(b)** above.



- (i) Give **two** advantages of using a PIC to control devices.
- (ii) Using an annotated sketch, show how pin number one of a PIC is identified.

OR

1(d) Pneumatics is the use of pressurised air as a source of energy to do work.

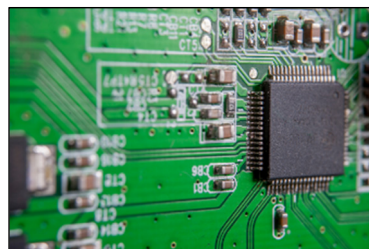
- (i) Describe **two** practical examples of where pneumatic power is used in everyday life.
- (ii) Describe **one** advantage and **one** disadvantage of using pneumatic power.



Option 2 - Electronics and Control - Answer 2(a) and 2(b)

2(a) The image shows a *PCB* which can be found in many household devices. It is populated with semiconductor components.

- (i) Explain what is meant by the abbreviation *PCB*.
- (ii) Outline the difference between an electrical conductor and an electrical insulator.



2(b) The image shows a *DPDT* switch, that is commonly used for forward and reverse control of a motor. The circuit symbol for the DPDT switch is also shown.

- (i) Explain what is meant by the abbreviation *DPDT*.
- (ii) Using the *DPDT* symbol shown, draw a circuit diagram for the forward and reverse control of a motor.
- (iii) Relays are often used in electronics. Describe a situation where a relay would typically be used in everyday life.



Answer 2(c) or 2(d)

2(c) The image shows an LED torch.



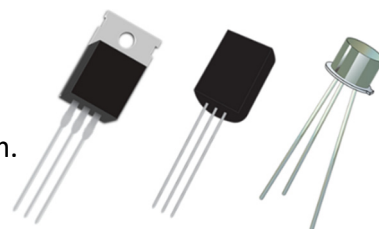
- (i) State **two** advantages of using an LED for the torch shown.
- (ii) The torch is powered by two 1.5 V batteries. The voltage drop (V_f) across the LED is 2 V and the maximum current (I_f) that the LED bulb can draw is 0.01 A. Calculate the minimum value of the resistor (R) required to protect the LED.

$$\text{Note: } R = \frac{V - V_f}{I_f}$$

OR

2(d) The invention of the transistor was an unprecedented development in the technological world and is now one of the basic building blocks of modern electronics.

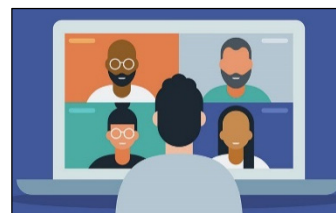
- (i) Briefly outline **two** functions of a transistor.
- (ii) Using the Formulae and Tables booklet or otherwise, draw the symbol for a transistor. Label the *base*, the *collector*, and the *emitter* on your diagram.



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

3(a) Video conferencing platforms have become an essential part of the Irish education system in recent years. Many schools use these platforms so that learning continues, and connections are maintained among students, parents, and educators.

- (i) Name **two** video conferencing platforms.
- (ii) Outline **one** advantage and **one** disadvantage of using video conferencing in education.



3(b) Network topography describes how computers can be connected together. The two most common methods are *star* topography and *ring* topography.



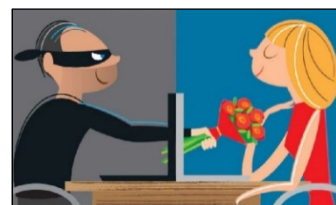
- (i) Using notes and annotated sketches, describe the difference between a star topography and a ring topography.
- (ii) Describe **two** advantages of networking a computer system.
- (iii) Outline **two** benefits of using a tablet device over a desktop computer in the workplace.

Answer 3(c) **or** 3(d)

3(c) The internet has become one of the key drivers of social evolution. It has changed business, consumer habits, and even the way criminals operate online.

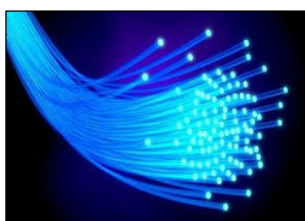
Cybercrimes carried out by criminals sometimes use *Cryptocurrency*.

- (i) Briefly outline **one** example of a cybercrime.
- (ii) Describe what you understand by the term *Cryptocurrency*.



OR

3(d) Fibre optic cables and copper cables can be used for transferring data.

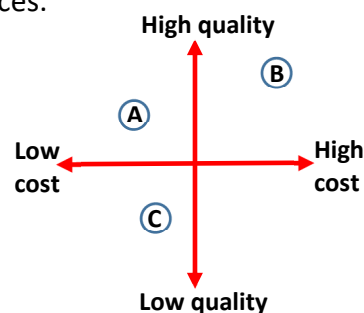


- (i) Outline **two** benefits of using fibre optic cable instead of copper cable for data transfer.
- (ii) Describe what is meant by the term *encryption* when referring to data storage.

Option 4 - Manufacturing Systems - Answer 4(a) and 4(b)

4(a) *Perceptual mapping* is a technique used by companies to visually display how customers or potential customers perceive different products or services.

- (i) Outline **two** reasons why a company might gather information about products using this technique.
- (ii) Using the diagram shown, briefly describe the characteristics of **any two** of the products labelled A, B, or C.



4(b) Expensive road bikes, like the one shown below, are often *Assembled-to-Order*.



- (i) Explain the manufacturing term *Assembled-to-Order*.
- (ii) Suggest **two** advantages of using this method of producing bicycles.
- (iii) Outline **one** other product that could be assembled-to-order and explain why this method is suitable for this product.

Answer 4(c) or 4(d)

4(c) *Testing* is often carried out on products like bicycles before they are sold.

- (i) Outline **two** reasons why tests are carried out on bicycles before they are sold to customers.
- (ii) *Cause and effect* diagrams can be used to problem-solve quality related issues. Briefly outline a fault (effect) that might be identified by the testing of a bicycle and suggest a potential cause.



OR

4(d) End of Life (EoL) is an important consideration for designers in the context of product manufacture.



- (i) Outline **two** ways a bicycle could be designed so that it can be easily recycled.
- (ii) Suggest **two** consequences for the environment of a poorly designed product at its end of life.

Option 5 – Materials Technology – Answer 5(a) and 5(b)

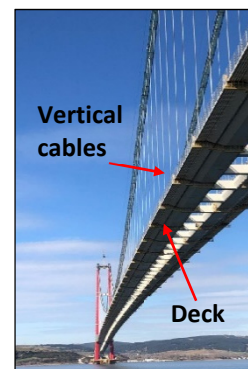
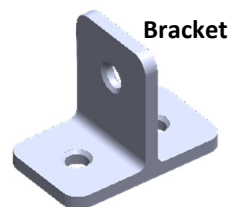
5(a) The Çanakkale bridge was opened in Turkey in 2022. It is the longest suspension bridge in the world with a main span of 2,023 metres. *Steel* was used to make the suspension cables of the bridge.

- (i) Suggest **two** reasons why steel is an appropriate material for the manufacture of the suspension cables of the bridge.
- (ii) Steel is an example of an *alloy*. Briefly describe what is meant by the term alloy when referring to materials.



5(b) *Permanent* and *semi-permanent* jointing methods were used in the construction of the bridge.

- (i) Briefly outline, with an example in **each** case, the difference between permanent and semi-permanent jointing methods.
- (ii) Using notes and annotated sketches, describe how a vertical suspending cable could be attached to the concrete deck using a bracket like that shown.



- (iii) Suggest **two** safety hazards workers could encounter during the construction of a large-scale project such as a suspension bridge.

Answer 5(c) or 5(d)

5(c) Steel, like that used in the bridge above, often undergoes surface treatments like *galvanising*.



- (i) Describe what is meant by the term galvanising.
- (ii) Materials used outdoors are subject to *environmental degradation*. Briefly outline **one** alternative method of protecting a named material of your choice from environmental degradation.

OR

5(d) At COP27, a discussion on the sustainability of *critical raw materials* took place. Materials such as *lithium*, *cobalt*, and *natural rubber* are critical for society, industry, and for the future of green energy technologies.

- (i) In the case of **any two** materials listed above, give **one** application of where each is used in everyday life.
- (ii) Suggest **two** reasons why the availability of some raw materials is becoming critical worldwide.



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Acknowledgements

Images

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