



Leaving Certificate Examination, 2017

Technology

Ordinary Level

Friday, 23 June
Morning, 9:30 - 11:30

Section B - Core (48 marks)

Answer **both** questions.

Each question in Section B carries 24 marks.

Section C - Options (80 marks)

Answer **two** of the five options presented.

All questions in Section C carry 40 marks.

Instructions:

- (a) Answer these questions in the answerbook provided.
- (b) Write your examination number 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) The G2T is an example of a *wearable technology* which claims to be the first cooling and heating electric scarf.

- (i) Suggest **two** reasons why this device might be popular with consumers.
- (ii) Briefly outline **two** other wearable technologies which have become popular in recent times.



2(b) The plastic outer shell for the neck piece is mass produced in a variety of colours.

- (i) Name a suitable *plastic* that could be used to manufacture the outer shell shown.
- (ii) Give **two** properties of your chosen material that make it suitable for this part.
- (iii) A vacuum former is often used by students to manufacture moulded parts for projects.

Using notes and annotated sketches, briefly describe the process of *vacuum forming*.



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

2(c) Wearable devices are often charged and powered using a *USB* connection.

- (i) Explain what is meant by the abbreviation USB.
- (ii) In 2009 *Micro-USB* was specified by the European Commission as the standard format to be used by all mobile device manufacturers.

Give **two** advantages of using the same type of connection across multiple devices and manufacturers.



OR

2(d) Many products sold in Europe have a label displaying the *CE mark* as shown below.

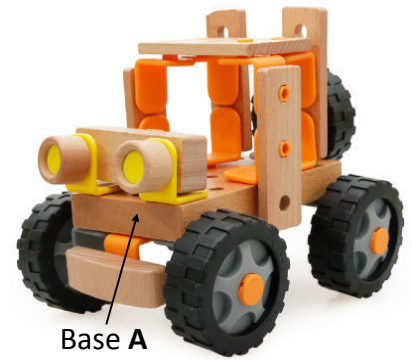
- (i) Briefly describe what the CE mark on a product represents.
- (ii) Describe **two** simple ways in which a student could evaluate a project to determine if it is fit for purpose.



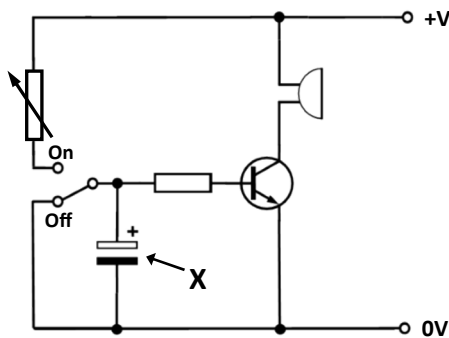
Question 3 - Answer 3(a) and 3(b)

3(a) The graphic shows a toy sports utility vehicle (SUV) that requires self-assembly after purchase.

- Name a suitable hardwood that could be used to manufacture base **A**.
- Outline **two** advantages for a manufacturer who sells a product that requires self-assembly by the end user.



3(b) An electronic circuit is to be incorporated into the toy to activate a buzzer.

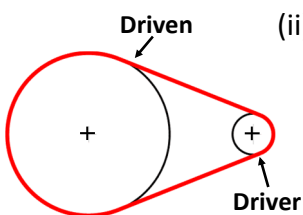
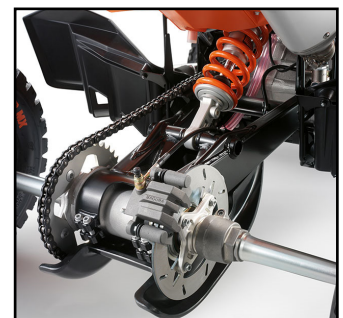


- Name component **X** in the circuit shown.
- Briefly describe how the circuit operates.
- Using notes and annotated sketches, describe how this circuit could be housed and accommodated in the design of the toy SUV shown at **3(a)** above.

Answer 3(c) or 3(d)

3(c) The graphic shows the chain and sprocket drive system for an all-terrain vehicle (ATV).

- Suggest **two** reasons why chain and sprocket systems are commonly used to drive modes of transport such as ATVs and motorbikes.



- The *ratio* between the driver sprocket and the driven sprocket was found to be 6:1.
Briefly describe what is meant by a gear ratio and explain how it is determined.

OR

3(d) A batch of faulty ATVs were returned to a manufacturer due to a problem with the suspension system.

- Suggest **one** strategy or problem solving tool a manufacturer could use to help identify and clarify the problem.
- Tubular (hollow) metal is used to make part of the frame of the suspension system.



Give **two** reasons why manufacturers use tubular materials in the manufacture of parts.

Section C - Options - Answer *any two* of the Options

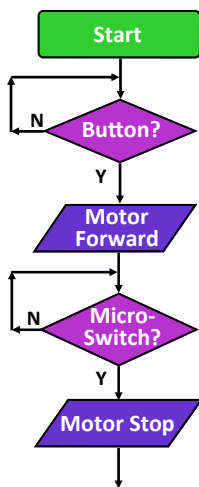
Option 1 - Applied Control Systems - Answer 1(a) and 1(b)

1(a) PICs (Peripheral Interface Controllers) are commonly used in Leaving Certificate Technology projects.

- Outline **two** advantages of using a PIC in a technology project.
- Students regularly encounter problems when programming PIC chips.
Briefly describe **two** common mistakes which can be made when writing a PIC program.



1(b) A student is designing a flowchart to control an electric gate, similar to the one shown in the image.



- Complete the flowchart shown to operate the gate in the following sequence:
 - when a button is pressed the motor activates and the gate begins to open
 - the motor stops when the gate makes contact with a micro-switch
 - after 20 seconds the motor reverses and the gate begins to close
 - the motor stops when the gate makes contact with another micro-switch.
- Show how your flowchart could be modified to allow the gate to open and close continuously.
- Suggest a suitable sensor which could be included in an automatic gate project.

Answer 1(c) or 1(d)

1(c) The image shows a pneumatic tool which is commonly used in a manufacturing workshop.

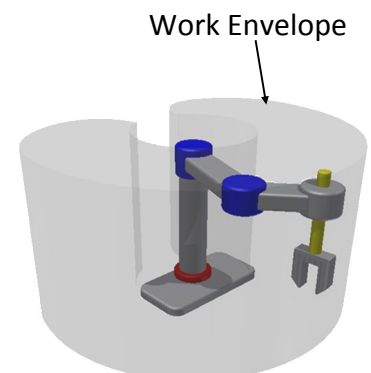


- Give **one** advantage and **one** disadvantage of using pneumatic tools in a workshop.
- Sketch the pneumatic symbol for a *single acting actuator*.

OR

1(d) The image shows a robotic arm and its *work envelope*.

- Explain what is meant by the term work envelope.
- The robotic arm shown uses a *servo motor* to rotate.
State **two** advantages of using servo motors in robotics.



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

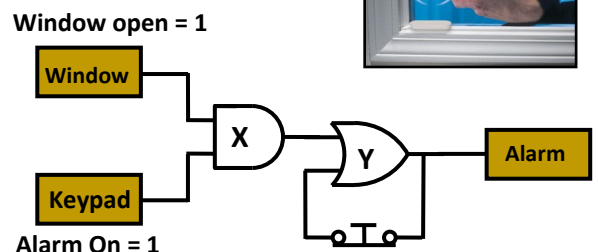
- 2(a)** The graphic shows an outdoor security light which is activated when an individual comes into range of its motion sensor.



- (i) Describe **one** other application where a motion sensor is commonly used.
- (ii) *Range, sensitivity* and *time* are settings that commonly vary on motion sensors.
Briefly outline the role of **any two** of these settings in the control of a motion sensor.

- 2(b)** The digital logic circuit shown below describes the conditions required to activate an alarm when an intruder attempts to gain access to a house.

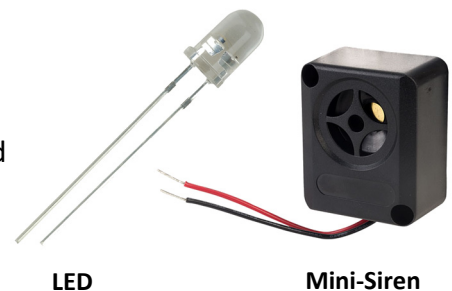
- (i) Explain the difference between a *digital* signal and an *analogue* signal.
- (ii) Name the logic gates labelled **X** and **Y**.
- (iii) Briefly outline how the push-to-break switch operates in conjunction with logic gate **Y** to reset the alarm.



Answer 2(c) or 2(d)

- 2(c)** The graphics show an LED and a Piezo mini-siren. Both are examples of *polarised* electronic components.

- (i) Explain what is meant by the term polarised.
- (ii) Describe how a student would ensure that the LED and the Piezo mini-siren are correctly polarised when included in a circuit.



OR

- 2(d)** The mini-siren shown in **2(c)** above is suitable for use in a domestic alarm system.

- (i) If the mini-siren has an operating voltage of 9 Volts and draws a maximum current of 0.1 Amps, calculate the power used in the mini-siren.

Note: $Power = Current(I) \times Voltage(V)$

- (ii) Draw a simple circuit to show how the voltage drop across the mini-siren could be measured using a voltmeter.

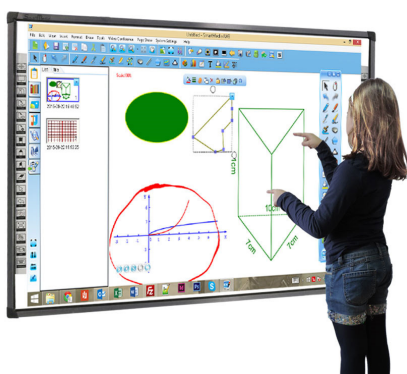
Option 3 - Information and Communications Technology - Answer 3(a) and 3(b)

3(a) It is now globally recognised that the long term use of ICT equipment can pose serious health issues for users.

- (i) Suggest **two** health problems that can arise for people using ICT equipment over long periods of time.
- (ii) For **each** health problem identified above, outline **one** step that can be taken to overcome or minimise this problem.



3(b) The image shows an interactive whiteboard (IWB) used in many classrooms and workplaces.



- (i) Suggest **two** benefits of using interactive whiteboards for educational purposes.
- (ii) Explain what is meant by the term *resolution* when referring to the quality of a projected image.
- (iii) Some IWBs allow users to interact with the screen by using *infrared (IR)* technology.

Name **two** other applications of IR technology.

Answer 3(c) or 3(d)

3(c) Innovations in online banking have made it easier for people to manage their money. Customers can access their accounts by logging on to their bank's computer servers.

- (i) Describe **two** ways computer hackers could misuse personal data accessed online.
- (ii) Banks require customers to use various authentication methods to access their accounts online.

Describe **two** such authentication methods.



OR

3(d) Many people prefer to use an external *solid state drive* (SSD) as an alternative to using a *hard disk drive* (HDD) when backing up computer data.



- (i) Give **two** advantages of using an external solid state drive to backup and store data.
- (ii) It is important to store electronic data safely. Describe **one** other method that can be used for data storage.

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

4(a) A sandwich company wishes to expand its business by developing a new range of specialist sandwiches to complement existing products offered to customers.



- (i) Outline **two** reasons why market research is carried out before offering a new product to customers.
- (ii) Suggest **two** techniques a company could use to gather data about the demand for a new product.

4(b) The graphics below show a sandwich that is *made-to-order* and a sandwich that is *pre-packed*.

- (i) In **each** case, give **two** reasons why a customer might purchase:
 - A *made-to-order* sandwich
 - A *pre-packed* sandwich.
- (ii) Outline **one** benefit for a sandwich company which adopts a *Just In Time (JIT)* approach when sourcing ingredients for their made-to-order sandwiches.
- (iii) Describe **one** way in which a sandwich company could reduce the environmental impact of their products.



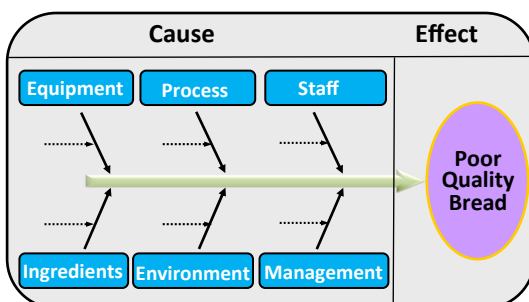
Made-to-order sandwich



Pre-packed sandwich

Answer 4(c) or 4(d)

4(c) Customers have complained that the quality of the sandwich bread is occasionally poor. To help resolve this issue, the sandwich company used a *cause and effect* diagram to identify possible causes of the problem.



- (i) Suggest how the **equipment** used and/or **staff** could be the primary cause for the poor quality of the sandwich bread.
- (ii) Outline **two** benefits for a business which uses cause and effect diagrams to resolve quality related issues.

OR

4(d) When setting up a new manufacturing business it is essential that suitable people are recruited if the business is to be successful.

- (i) Briefly describe **two** important roles of the managing director when setting up a manufacturing business.
- (ii) If a person were being interviewed for the role of deli-assistant in a sandwich shop, describe **two** essential qualities the person should have to fulfil this role successfully.

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

5(a) The image shows the 'Waaf' desk lamp by French designer Peter Stadelmann. The design of the desk lamp pays homage to man's best friend, the dog. The design consists of an oak-veneered plywood frame attached to a *non-ferrous* metal lamp shade.



- (i) Outline what is meant by the term non-ferrous.
- (ii) Name a suitable metal that could be used for the manufacture of the lamp shade and justify your selection.

5(b) The overall presentation and clever design make the desk lamp appealing to potential customers.

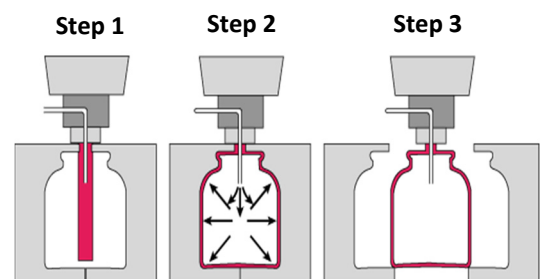


- (i) Suggest a suitable finish for the metal lamp shade and also a suitable finish for the wooden frame.
- (ii) Give **two** specific safety precautions that should be observed when applying finishes to materials.
- (iii) The parts of the wooden frame could be produced using CAD/CAM technology. Using notes and annotated sketches, explain what is meant by a CAD/CAM process.

Answer 5(c) or 5(d)

5(c) Plastic bottles can be manufactured using *blow moulding*. The main steps of a blow moulding process are shown in the graphics below.

- (i) Briefly describe the steps involved in blow moulding as outlined in the graphics.
- (ii) Outline **one** negative consequence for the environment caused by using plastics to manufacture products.



OR

5(d) The International Standards Organisation (ISO) is a body which ensures that finished products meet specific standards of quality.



- (i) Outline **two** benefits for a company that ensures its products meet specific ISO standards.
- (ii) Describe **two** aspects of the desk lamp shown at **5(a)** above which could be checked to see if the lamp is safe for purchase by consumers.

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