



Leaving Certificate Examination, 2012

Technology

Ordinary Level

Friday, 22 June
Afternoon, 2:00 - 4:00

There are **three** Sections in this paper. Attempt **all three** Sections.

Section A: Core - Short-answer questions.

Section B: Core - Long-answer questions.

Section C: Options - Long-answer questions.

Section A - Core (72 marks)

Instructions:

- (a) Answer **any nine** questions in the spaces provided.
All questions in Section A carry 8 marks.
- (b) Draw all sketches in pencil.
- (c) Hand up this booklet at the end of the examination.
- (d) Write your examination number in the box provided
and on all other pages used.

Examination Number:

Centre Number

Section	Mark
Section A	
Section B	
Section C	
Total	
Grade	

Section A. Answer **any nine** questions. All questions carry 8 marks.

1. *Steve Jobs* (co-founder of Apple) has been described as a modern day *Thomas Edison*.

(i) Give **two** innovations attributed to Steve Jobs.

1. _____

2. _____

(ii) Name **one** invention by Thomas Edison.



2. *Smart cards* are commonly used in everyday life.

(i) Give **one** use of smart cards.

(ii) List **two** advantages of using smart cards.

1. _____

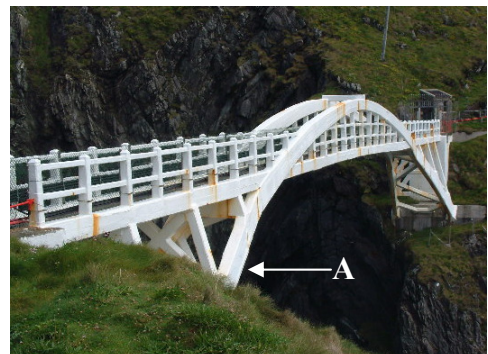
2. _____



3. The Mizen Bridge is built using *reinforced* concrete.

(i) Name a suitable material used to reinforce concrete.

(ii) Name a force acting on element A of the bridge.



4.

- (i) The graphic shows an LDR sensor used in electronics.
Write out in full the words represented by LDR.

LDR: _____

- (ii) An LDR is a *non-polarised* electronic component.
Explain what is meant by the term non-polarised.



5.

Name **one** energy conversion that takes place
in a rechargeable battery.

The use of *rechargeable* instead of *disposable* batteries is better
for the environment.

Outline **two** environmental benefits of using rechargeable batteries.

1. _____

2. _____



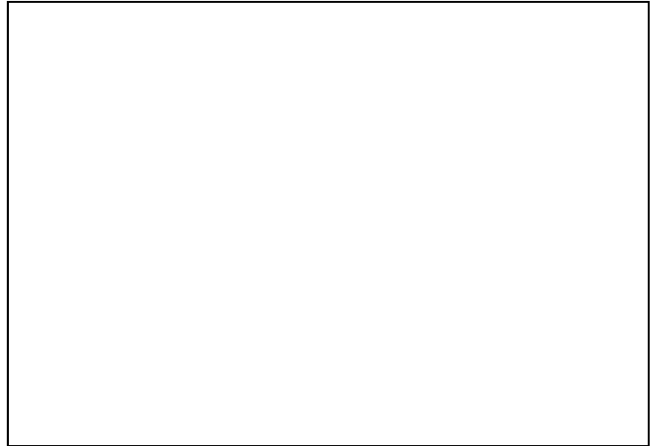
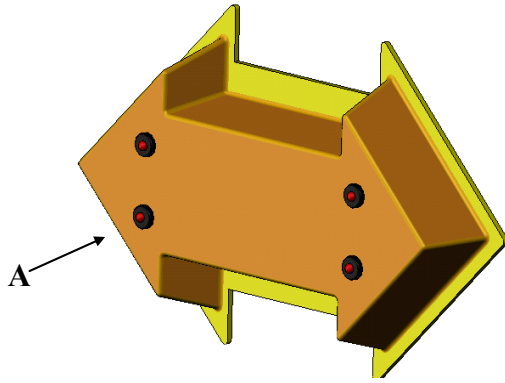
6.

The pen shown is *ergonomically* designed.

Explain what is meant by the term ergonomics.



7.



In the box provided, make a well proportioned 2D sketch of the hazard warning light when viewed in the direction of arrow A.

8.

During the London riots of 2010, it was reported that inaccurate and inflammatory accounts of the events were posted on *Social Media* sites and that this may have led to further disturbances.

Name **two** Social Media sites.

1. _____

2. _____



9.

Shown is the logo of the *Enviromental Protection Agency* (EPA).
Outline the function of the EPA.



- 10.** List **four** items of work that should be included in a *Work Breakdown Structure* (WBS) for the building of a house.

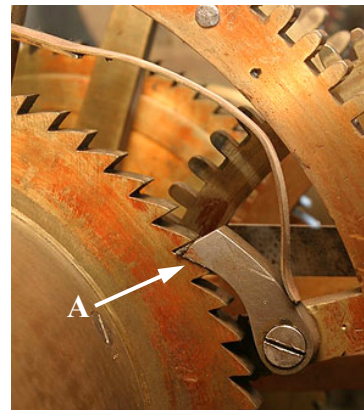
1. _____
2. _____
3. _____
4. _____



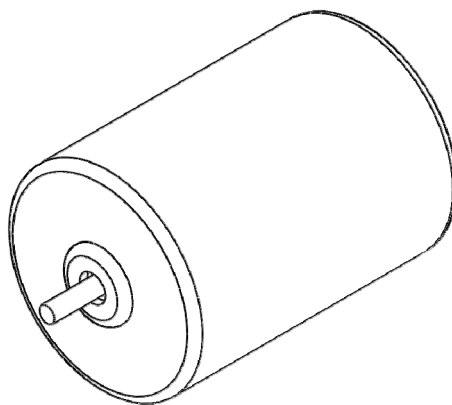
- 11.** Name the gear arrangement shown at **A**.

A: _____

Give **one** everyday application of this gear arrangement.



- 12.** Use **two** graphic techniques to enhance the graphic representation of the motor shown.



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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:

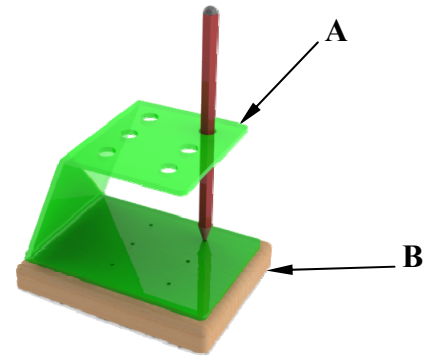
- (a) *Answer these questions in the answerbook provided.*
- (b) *Write your examination number on the answerbook.*
- (c) *Draw all sketches in pencil.*
- (d) *Hand up the answerbook at the end of the examination.*

Section B - Core *Answer Question 2 and Question 3.*

Question 2 - Answer 2(a) and 2(b)

2(a) The 3D graphic shows a pencil holder designed by a student.
The pencil holder is made from a *thermoplastic* and a *hardwood*.

- Suggest a suitable thermoplastic **and** a suitable hardwood for the making of this project.
- Using simple annotated sketches, describe a suitable method of joining the plastic part (A) to the wooden base (B).



2(b) The top edge of the wooden base has been rounded as shown.



- Describe how this rounded edge could be produced.
Give **two** Health and Safety considerations that should be observed when carrying out this process.
- The hardwood base requires a surface finish to be applied.
Name **two** appropriate surface finishes which could be used.
- Describe how the base should be prepared **before** the surface finish is applied.



Answer 2(c) or 2(d)

2(c) Gantt charts are used to represent the phases and activities in the management of a project.
Shown is a simple Gantt chart for the manufacture of the pencil holder at **2(a)** above.

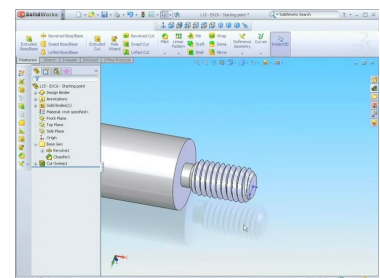
Task/Duration						
Mark out base	■					
Manufacture base		■				
Mark out holder			■			
Manufacture holder				■	■	
Project assembly						■

- List **two** advantages of using Gantt charts.
- From the Gantt chart shown, suggest an appropriate time period to complete the pencil holder project.

OR

2(d) Students can use CAD software programs such as SolidWorks when designing and manufacturing projects.

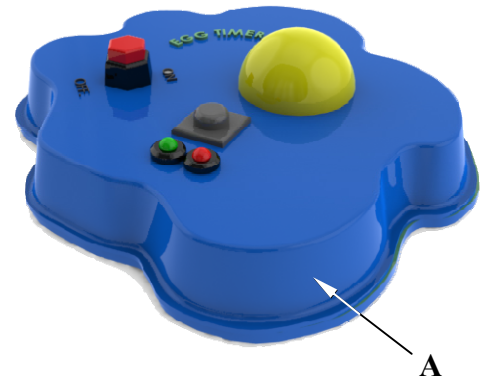
- Outline **two** benefits of using such software programs when undertaking project work.
- When a student completes a project it is desirable to include a digital image of that project in the design portfolio.
Describe how this can be achieved.



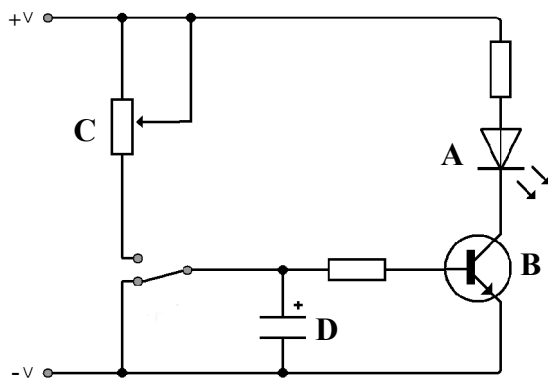
Question 3 - Answer 3(a) and 3(b)

3(a) The graphic shows a design for an egg timer.
Part **A** of the project is produced by vacuum forming a sheet of High Impact Polystyrene (HIPS).

- Suggest a suitable material for the mould used to vacuum form part **A**.
- Describe using notes and annotated sketches how the mould could be produced.



3(b) The diagram shows a timer circuit for the above project.

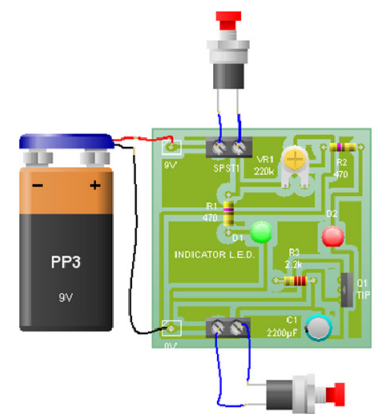


- Using the formulae and tables booklet or otherwise, name component **A**.
- Redraw transistor **B** in your answerbook and label the collector, base and emitter.
- Describe why potentiometer **C** is used in conjunction with capacitor **D** in this circuit.

Answer 3(c) or 3(d)

3(c) The graphic shows a simulated printed circuit board (PCB) similar to the above timer circuit.

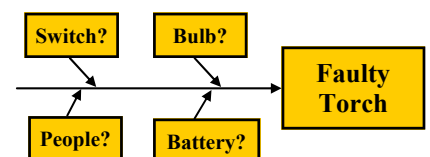
- Name a software program that could be used in school to produce simulated circuit diagrams.
- Outline **two** advantages of using circuit simulation software when designing a circuit.



OR

3(d) *Cause and Effect Diagrams* are used to identify the causes of quality related problems in products.

- Describe how *human error* could cause problems in the quality of a manufactured product.
- Suggest **two** potential consequences for a company which manufactures a batch of faulty products.



Section C - Options - Answer any two of the Options

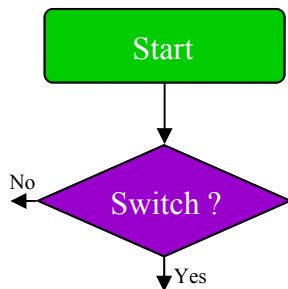
Option 1 - Applied Control Systems - Answer 1(a) and 1(b)

- 1(a) (i) PICs can be *programmed* to carry out a range of tasks.
Explain the terms 'PIC' and 'programmed'.
- (ii) Give **two** examples of electronic devices that are controlled using PIC technology.

1(b) The graphic shows an 18-pin PIC chip.



- (i) Explain, using a simple diagram, how pin number 1 can be identified on this chip.
- (ii) This chip can use *Analogue* and *Digital* inputs.
Give **one** analogue input and **one** digital input that could be used with a PIC.



- (iii) A battery powered LED is used as a light source inside a wardrobe. When a switch is activated the LED turns on for 20 seconds and then turns off automatically.

Copy the given flowchart into your answerbook and complete it to represent the information above.

Answer 1(c) or 1(d)

1(c) Following the Japanese earthquake and tsunami of 2011, robots were deployed to aid rescue workers.

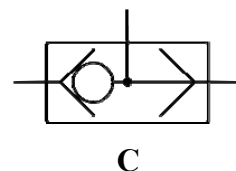
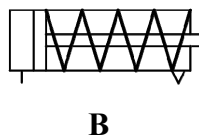
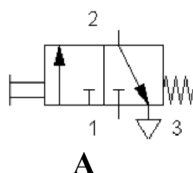
- (i) Outline **two** advantages of the use of robots in these situations.
- (ii) The graphic shows the *Quince* robot which is designed to assist in gathering data from environmental disaster zones.
Suggest **two** possible devices that could be incorporated into the *Quince* robot, to enable the collection of data.



OR

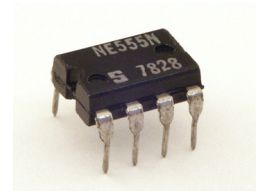
1(d) Pneumatics in Technology deals with the use of pressurised air to produce mechanical motion.

- (i) Give **one** everyday example of the use of pneumatics.
Outline the advantages of using pneumatics in the example you have given.
- (ii) Name the **three** pneumatic components A, B and C shown below:



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

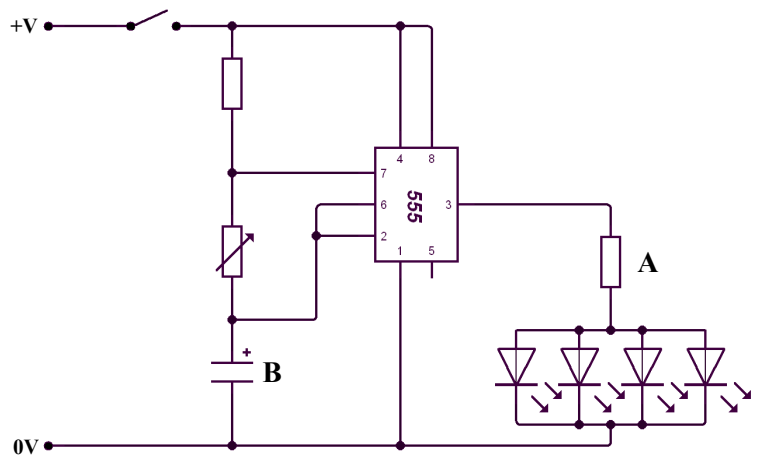
2(a) The 555 IC shown can be configured in two states when building circuits. These states are *monostable* and *astable*.



- (i) Outline the difference between monostable and astable.
- (ii) Give a simple use for each of the circuit states above.

2(b) The circuit diagram shows a 555 IC in the astable state.

- (i) Explain why LEDs are often used instead of bulbs in circuit building.
- (ii) Give the function of the resistor **A** in this circuit.
- (iii) Name the unit of capacitance. Explain why capacitor **B** is used in this circuit.



Answer 2(c) or 2(d)

2(c) Sensors are widely used in the operation of conveyor systems.



- (i) Suggest a suitable sensor that could be used to count the number of boxes moving along a conveyor belt. Give **two** reasons for your selection.
- (ii) A *seven segment display* is used to display the number of boxes which have been counted. Show, using a labelled sketch, the configuration on the seven segment display that would represent **five** boxes counted.

OR

2(d) The electronic circuit that controls a conveyor system uses logic gates to separate boxes into two categories, based on their weight and size.

- (i) Draw the symbol for an **AND** gate suitable for use in the conveyor system as outlined.
- (ii) In your answerbook, draw and complete the truth table for an **AND** gate.

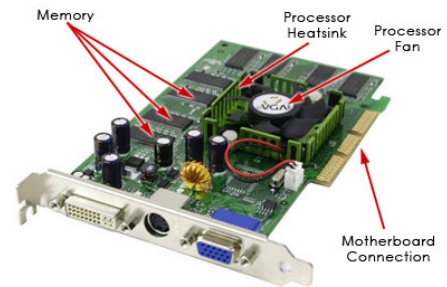
Option 3 - Information and Communications Technology - Answer 3(a) and 3(b)

- 3(a) (i) When describing computers, explain the difference between the terms *Hardware* and *Software*.
- (ii) Give **two** examples of each.



- 3(b) In a computer the graphics card is a specialised circuit board.

- (i) Give **two** functions of a graphics card.
- (ii) Explain the term *pixel*.
- (iii) Explain how pixels influence the image quality on a computer screen.



Answer 3(c) or 3(d)

- 3(c) *Cloud computing* stores music, photographs and documents which can be accessed wirelessly from devices such as smartphones, laptops and netbooks.

- (i) Outline **three** advantages of cloud computing.
- (ii) Give **one** example of a phone *app* and outline how this app could enhance an aspect of our leisure time.



OR

- 3(d) Multi-national companies all over the world use *video conferencing*.

- (i) Give **one** advantage and **one** disadvantage of using video conferencing.
- (ii) Potential health risks can be associated with the regular use of computers.

Give **two** potential risks and suggest how these risks could be reduced.



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

- 4(a) The graphics show a laptop computer and a wedding cake.
These products have been produced as *Made-to-Order* and *Assemble-to-Order* items.



- (i) Identify which product was made-to-order.
- (ii) Explain the difference between *Made-to-Order* and *Assemble-to-Order*.

- 4(b) Coca-Cola has become a highly competitive global brand by *competing on cost* in relation to the range of soft drinks it sells.



- (i) Outline some of the key steps a manufacturer like Coca-Cola might undertake to 'compete on cost' with their market competitors.
- (ii) Other than *competing on cost*, outline **one** strategy Irish manufacturers could engage in to be more competitive in difficult economic times.
- (iii) Outline **one** element of *team work* that would be important in a task such as designing and producing the logo for the 2012 Olympics bottle shown.

Answer 4(c) or 4(d)

- 4(c) Many electronic products are designed with a short life-cycle.

- (i) Suggest **two** reasons why a product might have a short life-cycle.
- (ii) Outline **one** negative environmental impact of a product with a short life-cycle and describe how the impact of such a product could be reduced.



OR

- 4(d) (i) Outline **two** reasons why products should be tested before they are sold to consumers.
- (ii) Suggest **two** aspects of the hair dryer shown that could be tested to ensure that it meets the highest performance standards.



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

5(a) The pincers and the drinks-can shown have been made using a *ferrous* and a *non-ferrous* metal respectively.



- Explain the difference between ferrous and non-ferrous metals.
- Name a suitable metal for the manufacture of **each** item.

5(b) The new 787 Dreamliner jet, manufactured by Boeing, recently landed in Dublin as part of its world showcase tour. *Composite materials* are widely used in the manufacture of this highly efficient aircraft.

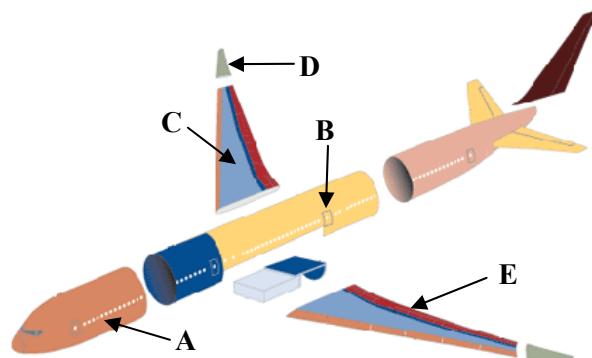


- Explain the term 'composite material'.
- Give **two** examples of composite materials.
- Give **two** advantages of using composite materials instead of aluminium in the construction of airplanes.

Answer 5(c) or 5(d)

5(c) Sections of this aircraft were manufactured in different parts of the world before being assembled in one location.

- Outline **two** reasons why various sections might be manufactured in different plants around the world.
- Permanent* and *semi-permanent* joints are used in the manufacture of this aircraft. Name **one** permanent and **one** semi-permanent joint that might be used in its assembly.



	Part	Made in
A	Forward fuselage	USA
B	Centre fuselage	Italy
C	Wing	Japan
D	Wing Tip	South Korea
E	Trailing Edge	Australia

OR

5(d) The back of the headrest shown has been *injection moulded*.

- Name a suitable plastic for use in an injection moulding machine.
- Describe, using notes and annotated sketches, the process of injection moulding.



Back of headrest

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