



*Leaving Certificate Examination, 2012*

# *Technology*

## *Ordinary Level*

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

### *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:***

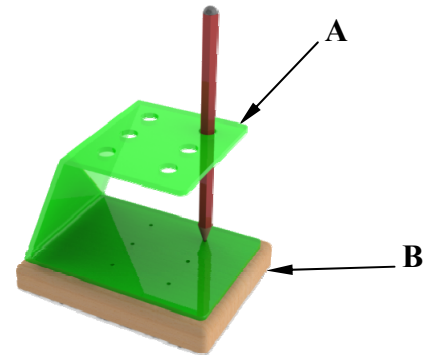
- (a) Answer these questions in the answerbook provided.*
- (b) Write your examination number on the answerbook.*
- (c) Draw all sketches in pencil.*
- (d) Hand up the answerbook at the end of the examination.*

## 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*.

- (i) Suggest a suitable thermoplastic **and** a suitable hardwood for the making of this project.
- (ii) 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.



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

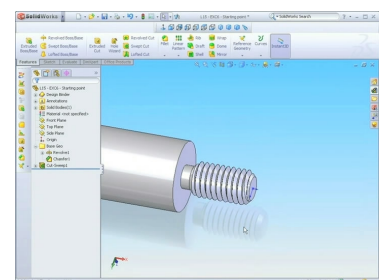
Task/Duration						
Mark out base						
Manufacture base						
Mark out holder						
Manufacture holder						
Project assembly						

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

**OR**

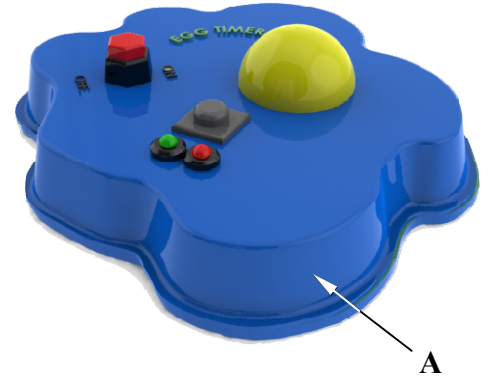
2(d) Students can use CAD software programs such as SolidWorks when designing and manufacturing projects.

- (i) Outline **two** benefits of using such software programs when undertaking project work.
- (ii) 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.



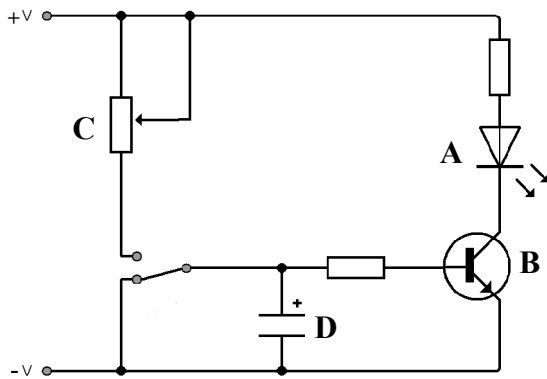
**Question 3 - Answer 3(a) and 3(b)**

**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).



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

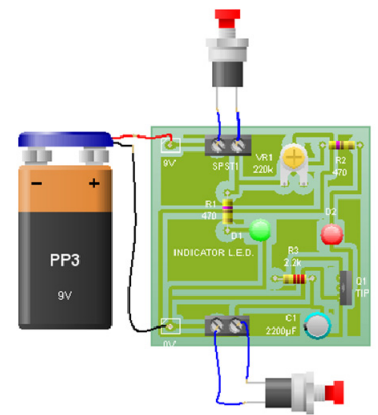
**3(b)** The diagram shows a timer circuit for the above project.



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

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

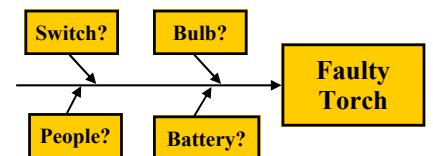
**3(c)** The graphic shows a simulated printed circuit board (PCB) similar to the above timer circuit.



- (i) Name a software program that could be used in school to produce simulated circuit diagrams.
- (ii) 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.



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

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

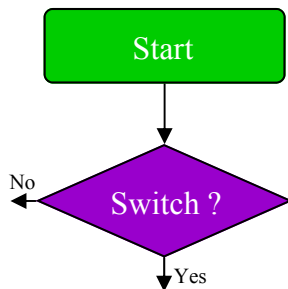
## Option 1 - Applied Control Systems - Answer 1(a) and 1(b)

- 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.



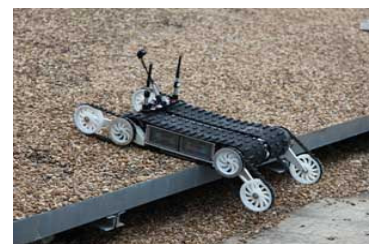
- (iii) A battery powered LED is used as a light source inside a wardrobe. When a switch is activated the LED turns on for 20 seconds and then turns off automatically.

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.

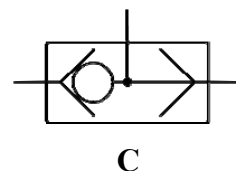
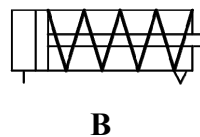
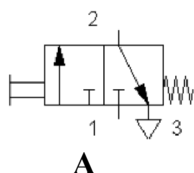
- (i) Outline **two** advantages of the use of robots in these situations.
- (ii) The graphic shows the *Quince* robot which is designed to assist in gathering data from environmental disaster zones.  
Suggest **two** possible devices that could be incorporated into the *Quince* robot, to enable the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



OR

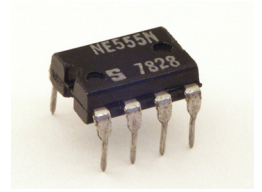
1(d) Pneumatics in Technology deals with the use of pressurised air to produce mechanical motion.

- (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)

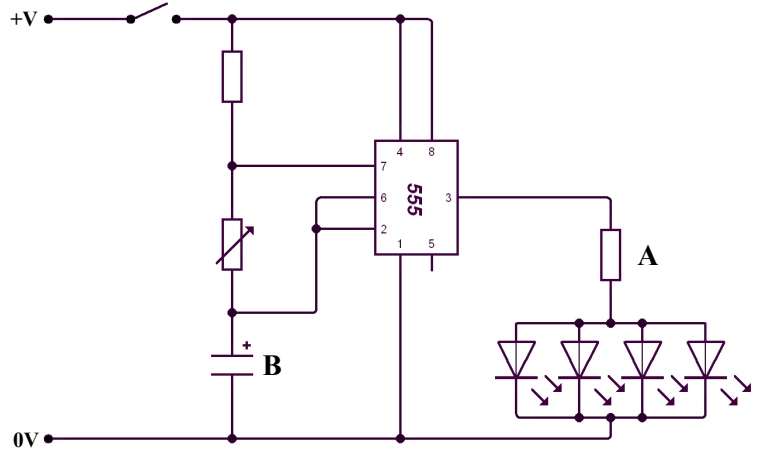
2(a) The 555 IC shown can be configured in two states when building circuits. These states are *monostable* and *astable*.



- (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.



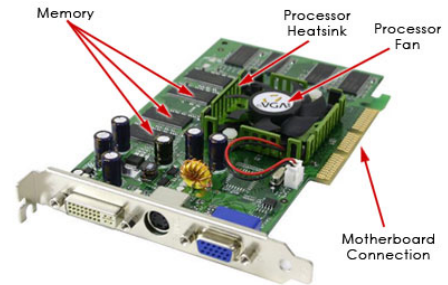
### Option 3 - Information and Communications Technology - Answer 3(a) and 3(b)

- 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.



- (i) Explain the difference between ferrous and non-ferrous metals.
- (ii) 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.

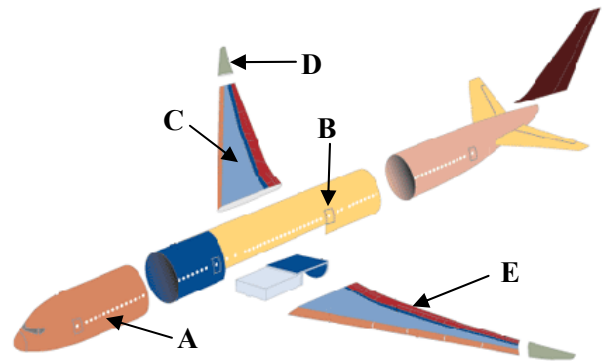


- (i) Explain the term ‘composite material’.
- (ii) Give **two** examples of composite materials.
- (iii) Give **two** advantages of using composite materials instead of aluminium in the construction of airplanes.

**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.

- (i) Outline **two** reasons why various sections might be manufactured in different plants around the world.
- (ii) *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*.

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



Back of headrest



**Blank Page**

**Blank Page**

**Blank Page**

**Blank Page**