



Leaving Certificate Examination, 2018

Technology

Ordinary Level

Friday, 22 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 optional questions 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 graphic shows two heavy-duty wheelbarrows, both constructed to be durable. The pan, which is a very important element of any wheelbarrow, is made from heavy-gauge high density polyethylene (HDPE).

- (i) Outline **two** advantages of making the pan from plastic.
- (ii) Suggest **one** benefit of having two wheels at the front of a wheelbarrow.



2(b) The hardwood handle of the wheelbarrow has a company name and logo applied.

- (i) Give **two** reasons why a company applies a logo to its products.
- (ii) Suggest **two** considerations a company might have when designing its logo.
- (iii) Using notes and annotated sketches, briefly describe how a student might apply a logo to a piece of hardwood.



Answer 2(c) or 2(d)

2(c) The wheelbarrow is primarily assembled using *semi-permanent* joints.



- (i) Explain what is meant by semi-permanent when referring to jointing methods.
- (ii) Name **two** semi-permanent joints commonly used in manufacturing technology projects.

OR

2(d) The wheelbarrow manufacturer states that their wheelbarrow handles are made from *sustainable* hardwoods.

- (i) Briefly outline why hardwoods may be a more environmentally friendly choice than using plastics to manufacture the handles.
- (ii) Suggest **two** other ways students can be mindful of the environment when manufacturing a project.



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

3(a) A desk lamp, such as the one shown, is to be manufactured with a *plastic* base and a *metal* pole.

- (i) Name a suitable plastic for the base and a suitable metal for the pole.
- (ii) Describe, using annotated sketches, a suitable method for producing the plastic base.



3(b) The image shows a *variable resistor* commonly used in electronic circuits. This component will be used in the lighting circuit for the desk lamp at **3(a)** above.



- (i) Explain the purpose of the variable resistor in the circuit for the desk lamp.
- (ii) Draw a labelled diagram of a suitable circuit for the desk lamp to include a switch, variable resistor, bulb and power supply.
- (iii) An LED light bulb in a circuit has a power rating of 3 Watts. Calculate the current that the light bulb will draw from a 12 V supply.

Answer 3(c) or 3(d)

3(c) The diagram shows a *multimeter*. A digital multimeter (DMM) is a test tool used to measure electrical quantities.

- (i) Give **two** specific uses of a digital multimeter in electronics.
- (ii) Using notes and annotated sketches, describe how the value of a resistor could be measured using a digital multimeter.



OR

3(d) The graphic shows a *prototype* desk lamp manufactured by a lighting company.

- (i) Briefly explain what is meant by a prototype.
- (ii) Outline **two** benefits for a manufacturer who develops a prototype prior to large-scale production.

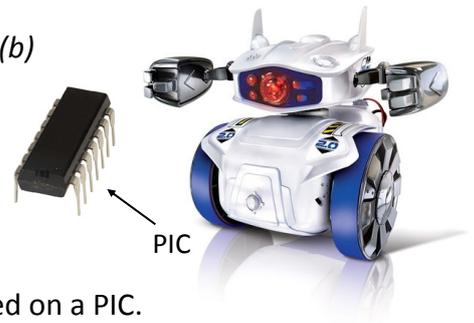


Section C - Options *Answer any two of the five optional questions.*

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

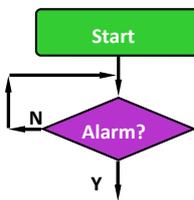
1(a) Many toys use a PIC (Peripheral Interface Controller) in their operation.

- (i) Outline **two** advantages of using a PIC in toys.
- (ii) Explain, using a simple sketch, how pin 1 can be identified on a PIC.



1(b) Thieves often target shops at night time, when staff have gone home. A student is designing a flowchart for an alarm system that activates if an intruder is detected.

- (i) Complete a flowchart for the alarm system, using the following sequence:



- when the alarm is triggered by an intruder an automated phone call is made to the local Garda station
- after a further three seconds, the alarm siren sounds and at the same time, the shop lights turn on
- the siren and lights remain on until the shop owner resets the alarm.

- (ii) Show how the flowchart could be modified so that the local Garda station receives a text message when the alarm has been *reset* by the shop owner.
- (iii) For this alarm system, suggest a suitable sensor to detect the presence of a thief.

Answer 1(c) or 1(d)

1(c) Pneumatic systems are widely used in factories, in production lines and in processing plants. Pneumatics can be used to perform many tasks such as moving, holding or shaping objects.

- (i) Give **two** reasons why pneumatics are used in industry.
- (ii) Outline **two** specific safety precautions to be observed when using pneumatic systems.



OR

1(d) The graphics show a moving claw machine with a mechanical gripper for picking up soft toys in an amusement park game. The claw uses a *Cartesian system* of control.

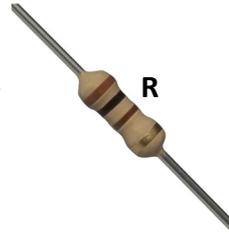
- (i) Explain what is meant by a Cartesian system, making reference to the *work envelope*.
- (ii) The claw used in this device is a mechanical gripper. Explain, using sketches, how a mechanical gripper can work.



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

2(a) A resistor (**R**) and the resistor colour and tolerance code tables are shown.

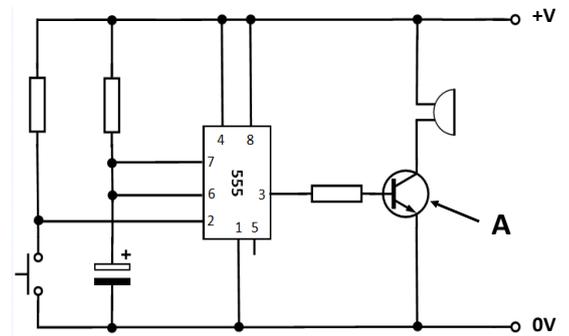
- (i) The colour band sequence of **R** is brown, black, brown and gold.
State the value of the resistor **R**.
- (ii) Calculate the *highest* possible value for this resistor **R** which has a gold tolerance band.



Colour code		Tolerance code	
0	Black	1%	Brown
1	Brown	2%	Red
2	Red	5%	Gold
3	Orange	10%	Silver
4	Yellow		
5	Green		
6	Blue		
7	Violet		
8	Grey		
9	White		

2(b) The graphic shows a 555 timer circuit which is configured in a monostable state. When the PTM switch is pressed a buzzer will sound for a period of time.

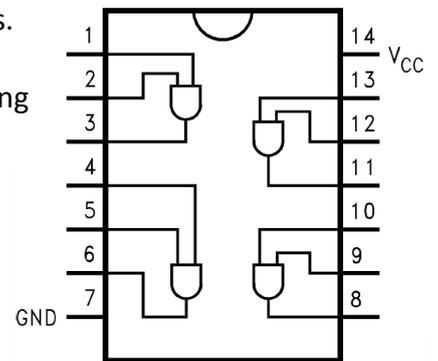
- (i) Using the *Formulae and Tables* booklet or otherwise, name component **A** in the circuit.
- (ii) Describe how the length of time for which the buzzer sounds can be adjusted in this circuit.
- (iii) Give **two** everyday applications for a timer circuit.



Answer 2(c) or 2(d)

2(c) The image shows an IC which incorporates four AND logic gates.

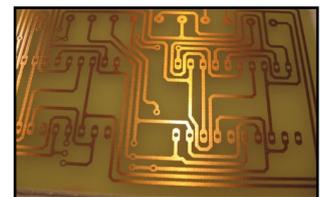
- (i) Explain what is meant by the abbreviation IC when referring to electronic components.
- (ii) State the pin numbers for the **outputs** of the chip shown.



OR

2(d) A student has produced a copper-clad printed circuit board (PCB) using CAD/CAM technology.

- (i) Briefly outline **two** advantages of producing PCBs in a classroom rather than purchasing factory-made PCBs.
- (ii) Give **two** safety precautions that should be observed when soldering PCBs.



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

3(a) Cloud storage services are widely used. Typically these services allow ‘apps’ to be *synced* across multiple devices and platforms. Some providers offer *15 GB* of free storage capacity for individuals and up to *1 TB* for a nominal price per user.

- (i) Briefly explain what is meant by 15 GB and 1 TB when referring to storage capacity.
- (ii) Give **two** benefits of syncing apps across multiple devices.



3(b) A graphic design company is having a ten-station *Local Area Network* (LAN) installed.

- (i) Describe what is meant by the term Local Area Network.
- (ii) Briefly outline **two** items of hardware and/or software needed to build a typical LAN.
- (iii) Using notes and annotated sketches, describe **two** suitable topologies (layouts and structures) for a LAN.



Answer 3(c) or 3(d)

3(c) The image shows a *graphics card* which enables computers to produce images and graphics more quickly.



- (i) Name **two** software programs that would benefit from using a good quality graphics card.
- (ii) Describe the function of the *fan* shown on the graphics card.

OR

3(d) Computer systems are frequently used to manage data in schools. Information gathered on student enrolment and attendance can be inputted to software programs to improve the efficiency of school management.

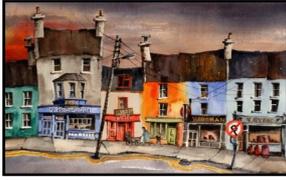


- (i) Suggest **two** ways in which school management should safeguard the personal or attendance data of students.
- (ii) People can *intentionally* or *unintentionally* cause damage to computer systems.

Suggest **one** intentional and **one** unintentional way in which a person could damage a computer system.

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

- 4(a) Manufacturers use different production processes to make products. The production process used often depends on the quantity of items to be made.



An oil painting



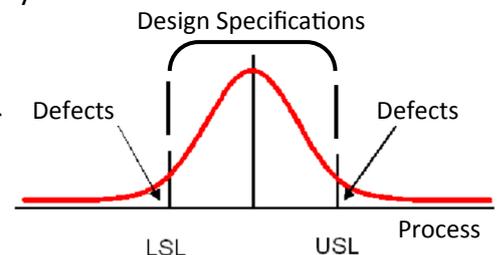
A sports club hat



Drinks bottles

- (i) Name a suitable production process for any **two** of the items above.
- (ii) Suggest **two** factors a manufacturer must consider when choosing the most appropriate production process to use for a new product.

- 4(b) The graphic shows the results of a *process capability* survey. It represents data about the quality of a process used to make a product.



- (i) Give **two** reasons why a manufacturer would gather statistical data in relation to a production process.
- (ii) With reference to the graphic, briefly outline the consequences for a manufacturer when a process is outside the design specifications.
- (iii) Process capability can be *greater than, equal to, or less than 1*. Briefly outline what a process capability greater than 1 indicates.

Answer 4(c) or 4(d)

- 4(c) The quantity of waste generated from packaging used by online retailers to send goods to customers in Ireland is rising by more than 25% every year. A recent report from Repak has found that over 7,000 tonnes of waste per year are being generated by online shopping.



- (i) Describe how retailers can improve their corporate responsibility in relation to the environment.
- (ii) Suggest **two** ways in which a manufacturer can prolong the production run of a product which is nearing the end of its life cycle.

OR

- 4(d) The human resources (HR) department of a manufacturing company has many roles. These roles may include recruiting employees, determining benefits and compensation, suggesting employee training and development strategies, and dealing with employee relations.



- (i) Discuss the importance of recruiting the best available people to work for a company.
- (ii) Give **two** benefits for a company which regularly upskills its employees.

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

5(a) A safety helmet, hall table, cooking pot and sports sock are shown in the images.



- (i) Name a specific material suitable for the manufacture of **each** item shown above.
- (ii) Briefly describe how the handle could be joined to the cooking pot.

5(b) The images show a modern folding bicycle. The frame of the bicycle is manufactured using aircraft grade aluminium *alloy*.



- (i) Explain what is meant by the term alloy when referring to metals. Suggest an alternative material for the manufacture of the frame.
- (ii) Give **two** properties of an aluminium alloy which make it a suitable material for the construction of the bicycle frame.
- (iii) Using notes and annotated sketches, suggest a suitable means of allowing the frame of the bike to fold.



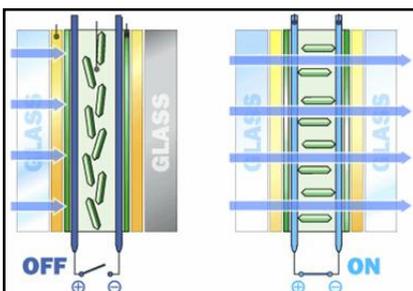
Answer 5(c) or 5(d)

5(c) CNC machines are used in the manufacture of the bicycle.

- (i) Explain what is meant by the abbreviation CNC.
- (ii) Outline **two** reasons why CNC machines are used in the manufacture of products.

OR

5(d) Electrochromic glass is a modern *smart material*. It changes its colour and transparency when a small electrical current is passed through it.



- (i) Describe what is meant by the term smart material.
- (ii) Suggest **two** uses of electrochromic glass in everyday life.

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