



Leaving Certificate Examination, 2011

Technology

Ordinary Level

Friday, 24 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)

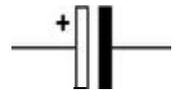
- 2(a) The image shows a Faraday Induction Torch. Electricity is produced by shaking the torch, which in turn passes a powerful magnet back and forth through a coil of copper wire.



- (i) Choose a suitable material for the manufacture of the **body** of the torch.
- (ii) Outline **two** properties of this material that make it suitable for the body of the torch.

2(b)

- (i) Shown is the symbol for a component that could be used to store electrical charge in this torch. Using the formulae and tables booklet or otherwise, name this component.
- (ii) Make a pictorial sketch of this component, labelling the *anode* and *cathode*.
- (iii) Typically, a torch uses *DC* electricity while a house light uses *AC* electricity. Explain using notes and/or simple circuit diagrams the difference between AC and DC when referring to electricity.



Answer 2(c) or 2(d)

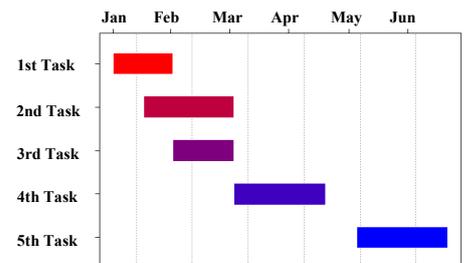
2(c)

- (i) Projects can have many objectives such as:
- satisfying the brief
 - staying within budget
 - meeting deadlines.

Describe any **two** of the objectives outlined above.

- (ii) Gantt charts are a popular technique for representing the stages and activities in a project.

Outline **two** advantages of using Gantt charts when undertaking project work.



OR

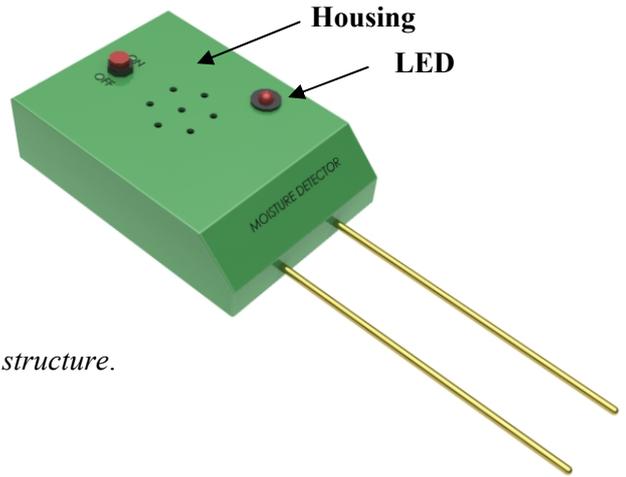
- 2(d) Wind generators are used to generate electricity from the *kinetic energy* of the wind. This is a *renewable energy* source.



- (i) Explain **each** of the terms:
- kinetic energy
 - renewable energy.
- (ii) Wind generators at sea produce significant quantities of electricity. State **one** advantage and **one** disadvantage of wind generators **at sea**.

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

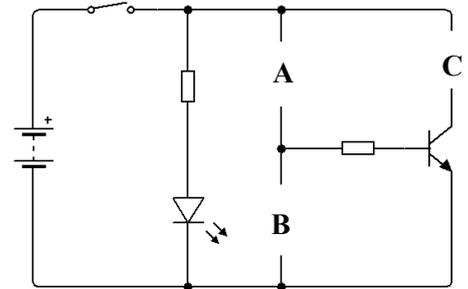
3(a) The image shows an electronic moisture sensor. The sensor sounds a buzzer when dry conditions are detected.



- (i) Describe, using notes and annotated sketches, a suitable method of manufacturing the housing for the circuit.
- (ii) The completed housing is an example of a *shell structure*. Explain the term shell structure.

3(b)

- (i) Draw a well-proportioned freehand sketch of the surface development of the green housing indicating **all** fold lines.
- (ii) The moisture sensor uses a light emitting diode (LED) as a 'power on' indicator. Give **two** advantages of using a LED for this purpose.
- (iii) Shown is the incomplete circuit diagram for the electronic moisture sensor. Redraw the given circuit diagram to include the missing components at **A**, **B** and **C**.



Answer 3(c) or 3(d)

3(c)

- (i) Text is used to enhance the housing of the moisture sensor. Describe how this could be achieved.
- (ii) Graphics and logos are often added to commercial products. Outline **two** reasons for the addition of such graphics.



OR

3(d)

- (i) Construct a Work Breakdown Structure (WBS) for the tasks associated with the manufacture of the electronic moisture sensor.



- (ii) Health and Safety is an important aspect of project work. Identify **one** specific hazard associated with:
 - drilling the housing
 - threading the probes.

Section C - Options - Answer any two of the Options

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

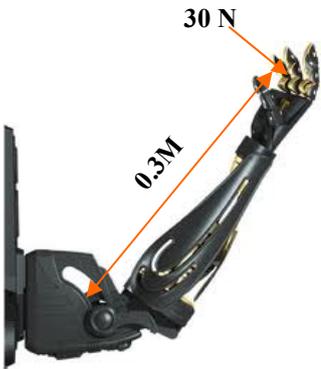
1(a)

- (i) *Robotics* is a rapidly developing technology in the 21st century. What is meant by the term *robotics*?
- (ii) The graphic shows *Fluke*, a diving robot designed for deep sea exploration. Give **two** examples of how *robotics* are used in deep seas.



1(b)

- (i) Explain any **two** of the following terms associated with *robotics*:
 - mechanical gripper
 - rotary joint
 - work envelope.

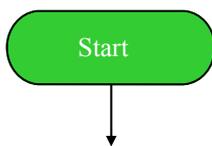


- (ii) The humanoid arm shown requires various *degrees of freedom* to function properly. Identify any **two** degrees of freedom. In **each** case outline the importance of the degree of freedom identified, to the overall functionality of the arm.
- (iii) Calculate the moment acting about the elbow of this robotic arm if a load of 30N is acting on the hand.

Answer 1(c) or 1(d)

1(c)

- (i) Peripheral Interface Controllers (PICs) can be purchased with many different pin arrangements. Outline **two** possible benefits of purchasing an 18-pin PIC rather than an 8-pin PIC.
- (ii) A red LED is to be used to indicate that a fire alarm is on standby. Draw a flowchart to give the following outputs:

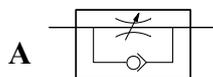


- turn on the LED for 3 seconds
- turn off the LED for 2 seconds
- repeat this process continuously.

OR

1(d) The image shows a dentists' drill which is *pneumatically* powered.

- (i) Suggest **two** reasons why pneumatic drills are used by dentists.
- (ii) Identify the pneumatic component **A** below. Outline **one** benefit of using this component in a pneumatically powered dentists' drill.



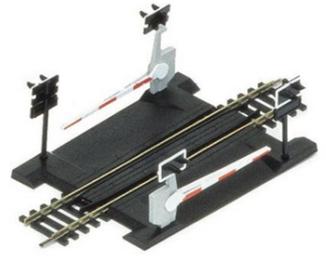
Option 2 - Electronics and Control - Answer 2(a) and 2(b)

2(a) A student has designed a model railroad level crossing.

(i) Limit switches could be used to stop the barrier when it reaches its horizontal and vertical limits.

Make a labelled sketch of a typical limit switch.

(ii) Identify the *polarised* component A in the circuit at 2(b) below. What is meant by the term polarised?



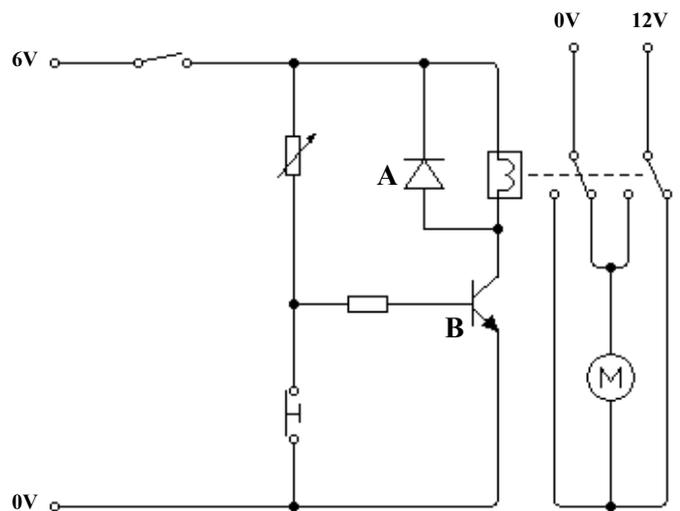
2(b) The student uses a circuit incorporating a transistor and a relay switch to control the model.

(i) What is the function of the transistor B in the circuit?

Explain why the student might use the transistor B in the circuit.

(ii) Explain briefly why the student used a relay switch.

(iii) Redraw the motor section of the circuit to incorporate an alarm buzzer which activates while the barrier is in motion.



Answer 2(c) or 2(d)

2(c) The image shows an IC - the 555 DIL timer.



(i) Explain terms IC and DIL.

(ii) Using a simple sketch of a 555 timer, identify pin number 1 and pin number 6.

OR

2(d) Prototype boards are often used when producing PCBs.

(i) Give **two** reasons why prototype boards might be used in PCB production.

(ii) Give **two** reasons why sockets are used in PCB production for certain electronic components.



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

3(a) To enable computers to process *analogue* data this data needs to be *digitised*.

- (i) Explain the terms analogue and digital.
- (ii) Explain the difference between RAM and ROM.



3(b) Developments in computers, microprocessors and the Internet have led to modern types of crime.



- (i) “*Computer Hacking*” is one such crime. Explain the term computer hacking.
- (ii) Give **two** examples of other types of computer crime.
- (iii) Outline **three** ways in which computer users can protect themselves from computer crime.

Answer 3(c) or 3(d)

3(c) The manager of a small business must install a network so that different business departments can be linked.

A “*Star Network Topology*” is to be used for the network.

- (i) Explain, using a simple sketch, the term Star Network Topology.
- (ii) Outline **two** advantages of using a networked system.



OR

3(d)



- (i) A digital camera has many advantages over a traditional camera. Outline **two** such advantages.
- (ii) Using notes and/or sketches, describe the main differences between *vector* and *bitmap* format images.

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

4(a)

(i) The way products are manufactured often depends on the quantity required. Name **three** Manufacturing Systems.

(ii) Identify a suitable manufacturing system for:

- a daily newspaper
- an oil rig.

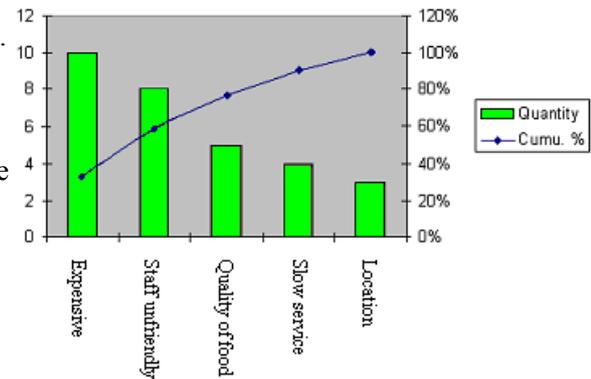


4(b) It was Vilfredo Pareto who concluded that 80% of the problems with any process are due to 20% of the causes. This is known as the 'Pareto Principle'.

(i) Discuss the impact the Pareto Principle might have on a company's quality management strategy.

(ii) The graph shows the reasons for poor reviews of a new restaurant. Identify the **two** most critical issues reported by the reviewers.

(iii) Outline **one** strategy the owner of the restaurant could undertake to improve the situation.



Answer 4(c) or 4(d)

4(c) *Capacity management* is essential if a supermarket chain like SuperValu wishes to meet the needs of its customers on a consistent basis.



(i) Outline what is meant by the term capacity management.

(ii) Outline **one** likely consequence of **each** of the following situations for a supermarket group such as SuperValu.

Their supermarkets were:

- overstocked with products
- understocked with products.

OR

4(d) Successful companies such as Toyota and BMW rely greatly on their reputation.

(i) Why is the *Continuous Improvement Process* important to these companies?

(ii) Explain the terms *Benchmarking* and *Reverse Engineering*.



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

5(a) An incomplete table of materials and products is shown below.

(i) Draw the table below into your answerbook and complete the missing information.

Product	Material Classification	Material
Kite	Fabric	
Jewellery		Gold
Kitchen Table	Hardwood	
Washing up Liquid Bottle		Polyethylene

(ii) In the case of each of any **two** products, outline a property of its associated material which makes it a suitable material for this product.

5(b) The 3D graphic shows a design for a modern chair.

- (i) Choose a material suitable for:
- the seat
 - the legs.
- (ii) Describe, using notes and sketches, a suitable method of producing the seat.
- (iii) Outline **two** reasons why this chair may be more suited to office use rather than domestic use.



Answer 5(c) or 5(d)

5(c)

- (i) Describe using notes and annotated sketches a suitable method of joining the seat to the legs.
- (ii) Suggest a suitable finish for the legs. Outline **two** reasons why this finish would be suitable for an office environment.

OR

5(d)



- (i) Artificial hip joints need to be made from materials that are *hard wearing*, *non-corrosive* and *fracture resistant*.
With a focus on functionality, describe why it is important to manufacture artificial hip joints with these properties in mind.
- (ii) Recently *DePuy* recalled one of their hip-replacement products due to long term complications for patients.

Outline **two** health and safety issues that can affect human beings through selecting inappropriate materials for hip replacements.



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