



Coimisiún na Scrúduithe Stáit

State Examinations Commission

Leaving Certificate Applied, 2015

Vocational Specialism - Technology

(240 Marks)

Wednesday 10 June, Afternoon 2:00 to 4:00

General Directions:

- Write your examination number in this box:
- There are two sections in this paper.
Section 1– Answer **all three** questions. - 90 marks

Q1. - Short answer questions

Q2. - Graphical Communication

Q3. - Health and Safety

Section 2– Five questions, answer **any three** - 150 marks

Q1. - Introducing Technology

Q2. - Design and Manufacture

Q3. - Water Technology

Q4. - Electrical Understanding and Basic Electronics

Q5. - Tools and Equipment

- Write your answers in the spaces provided and include sketches (in pencil) where appropriate.

1.	Total of end of page totals	
2.	Aggregate total of all disallowed question(s)	
3.	Total mark awarded (1 minus 2)	
4.	Bonus mark for answering through Irish (if applicable)	
5.	Total mark awarded if Irish Bonus (3 plus 4)	
	<u>Note:</u> The mark in row 3 (or row 5 if Irish bonus is awarded) must equal the mark in the Total Mark box on the script.	

Centre Stamp

Section	No.	Mark
Section 1	1	
	2	
	3	
Section 2	1	
	2	
	3	
	4	
	5	
Total		

Question 1

Compulsory

1. Answer **any Ten** of the following fifteen short questions.

- (a) Aluminium alloys are often used in the manufacture of car wheels. Give a reason for using aluminium alloy and explain the term alloy.

Reason _____

Alloy _____



Alloy Wheel

- (b) The Maglite designed by Anthony Maglica and patented in 1979 has stood the test of time and is still a popular choice of torch. Suggest **two** good design features of this torch.

Feature 1 _____

Feature 2 _____



Maglite

- (c) A new product called the Tag Ring is soon to come on the market. It uses GPS to track the wearer of the ring. Explain the term GPS and suggest **one** use for the ring.

GPS _____

Use _____



GPS 'Tag Ring'

- (d) Name the type of shaft shown and suggest an appropriate use.

Name _____

Use _____



- (e) A bridge in the form of a Pratt Truss is shown.
Name the structural feature that gives this bridge rigidity and suggest another use for this type of truss.

Structural Feature _____

Other use _____



Pratt Truss

- (f) Complete the table by naming the quantity measured by the unit in each case.

Unit	Joule	Kilowatt-hour (kWh)	Newton	Volt
Quantity	Energy			

- (g) A wooden chopping board is cut from a flat rectangular piece of wood. List **four** stages in its manufacture.

1 _____

2 _____

3 _____

4 _____



Chopping Board

- (h) Headphones have become a fashion accessory. Suggest **two** recent improvements to the design of modern headphones.

1 _____

2 _____



- (i) Outline **two** uses for a stop valve in a domestic plumbing system.

1 _____

2 _____



Stop Valve

- (j) Name **two** fittings needed to connect the sink shown to the water supply and waste water systems.

Fitting 1 _____

Fitting 2 _____



- (k) The Information Superhighway (Internet) consists of a global network of computers. Suggest **two** ways in which this superhighway has improved in recent times.

1 _____

2 _____



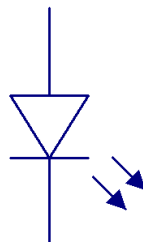
- (l) Calculate the cost of running a 0.5 kW paper shredder for half an hour when a unit of electricity costs 21 cent (€0.21).

Solution

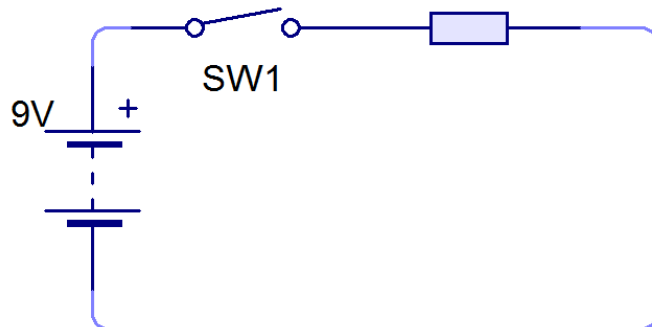


Paper Shredder

- (m) A simple circuit used to power 3 LEDs is shown without the LEDs in place. Using the symbol for a LED, add the three LEDs into the diagram. The three LEDs must be connected in parallel.



LED Symbol



LED Circuit

- (n) List **two** things that you can do personally to reduce your Carbon Footprint.

- 1 _____

 2 _____

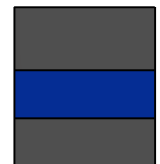


- (o) Name the three orthographic projections of the building shown opposite.

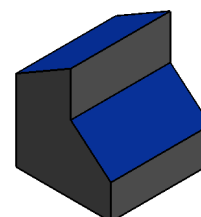
A	
B	
C	



A



B



C

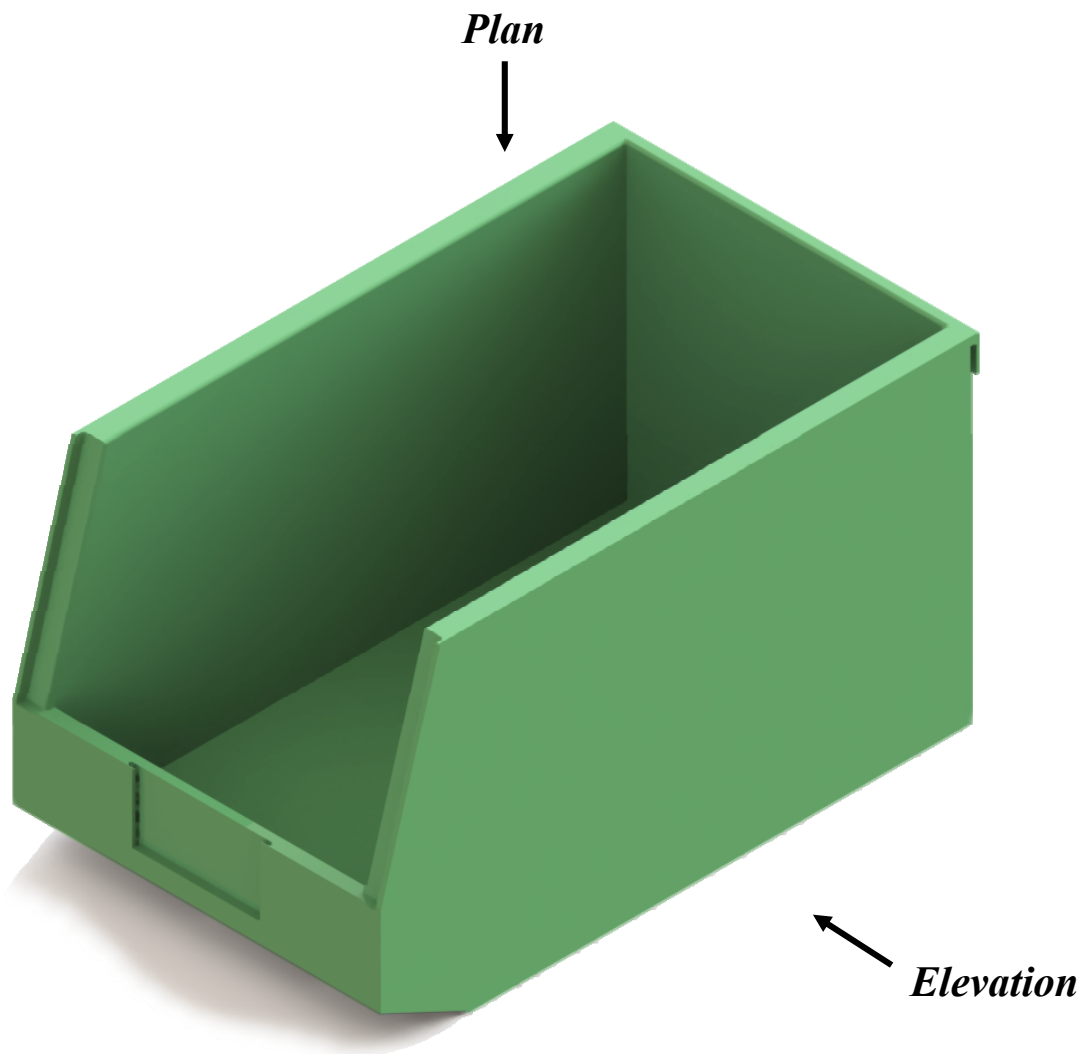
Section 1 - continued **Question 2**

Compulsory

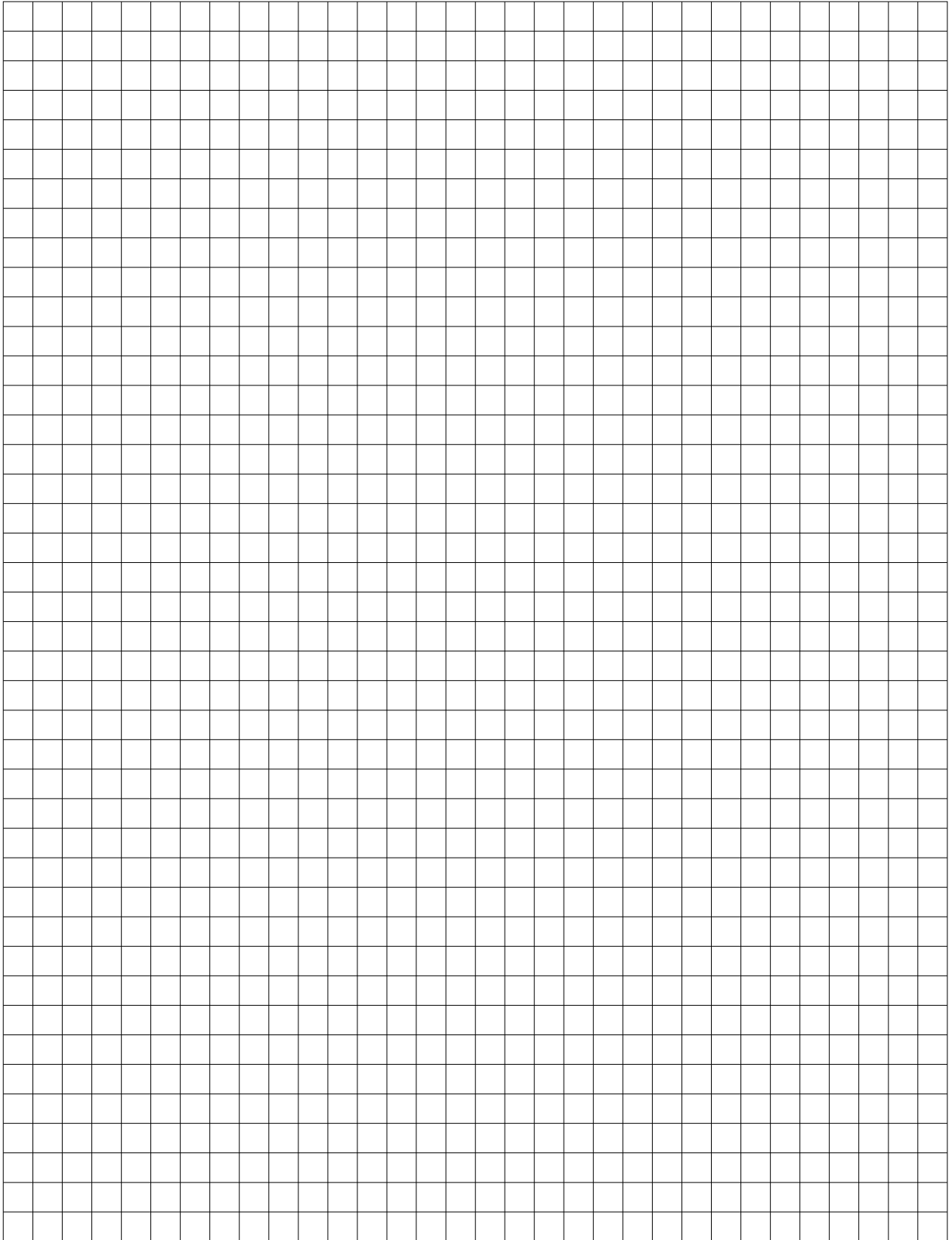
(30 marks)

2. Graphical Communication

- (a) A CAD solid model of a rack mountable storage box is shown below. In the space opposite draw a well proportioned Elevation and Plan of the storage box.
- (b) Estimate 4 dimensions and include them on your completed drawing.



Rack mountable storage box



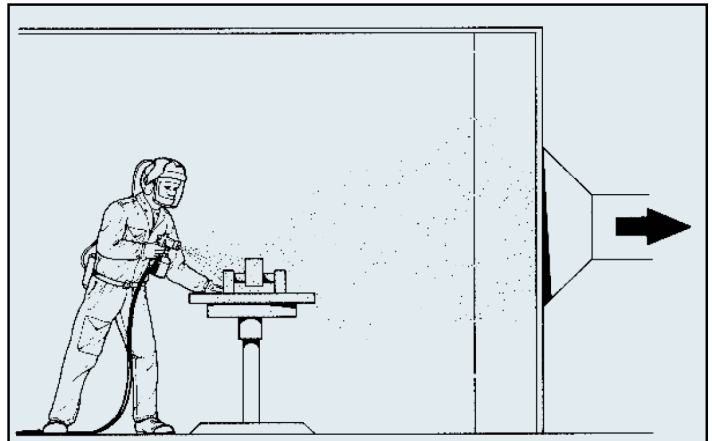
Estimate 4 dimensions and include them on your completed drawing.

Compulsory

3. Health and Safety

- (a) (i) An illustration of a person spray painting an artefact on a swivel table is shown. An extraction fan is also shown to the right in the illustration. Outline good health and safety practices shown in this illustration.

Answer _____



- (ii) When using an extension cable to power electrical equipment, what precaution should be taken to prevent the cable itself from overheating?

Answer _____



- (iii) Some examples of PPE are shown here. What do the letters PPE stand for?

Answer _____



PPE

- (b) Shown is a person drilling two pieces of wood. Identify a health and safety risk illustrated in the given image.

Risk _____

Suggest a suitable safe method of drilling these two pieces of wood.

Safe Method _____



- (c) (i) Outline **three** situations in the workshop where there is a danger of a person coming into contact with sharp edges.

1 _____

2 _____

3 _____



- (ii) Outline **two** situations in the workshop where there is a danger of being exposed to harmful fumes.

1 _____

2 _____



Section 2 (150 marks)

Answer **ANY THREE** Questions from this section.

1. Introducing Technology

(50 marks)

- (a) An image of a cantilever chair is shown. In the space below make a 3D sketch of the chair and apply appropriate shading.

3D Sketch



Cantilever Chair

- (b) A nightlight candle holder made from walnut, brass and glass is shown. Give your opinion on the choice of the materials used for this design.

Walnut _____

Brass _____

Glass _____

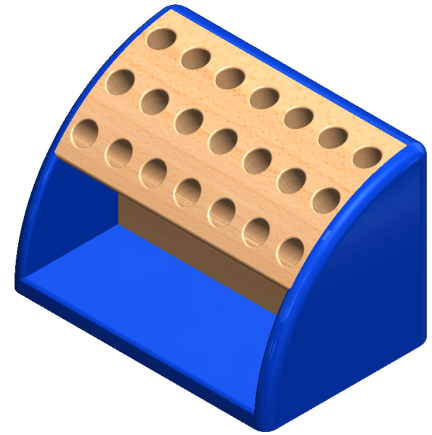


Nightlight Candle Holder

(c) A design for a desk tidy to hold up to 21 pens/pencils is shown. It is made from beech and ABS plastic.

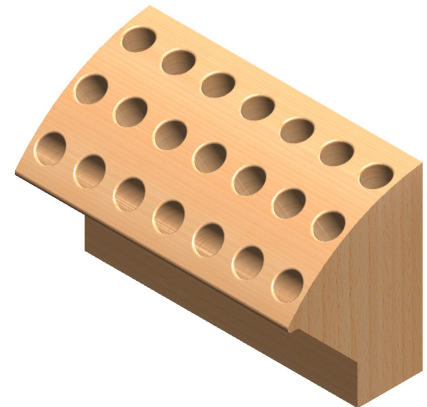
(i) The plastic body is injection moulded.
What does this mean?

Answer _____



(ii) The holes must be accurately drilled. How would you ensure that each line of holes is drilled at the correct angle?

Answer _____



(d) CAD-CAM plays a key role in industry.

(i) Explain the term CAD-CAM.

CAD-CAM _____

(ii) What role does a software like SolidWorks fulfil in CAD-CAM?

Answer _____



(iii) Explain the term 3D Printing.

Answer _____

2. Design and Manufacture

(50 marks)

- (a) A speaker unit for an iPod is shown. The front and back panels are made from ash and the middle sections from plastic.

- (i) Name a suitable plastic and give a reason for your choice.

Answer _____



Speaker Unit

- (ii) Name a suitable machine used to cut out the slots on the wooden front panel and describe the process of using this machine to form the slots.

Machine _____

Process _____

- (b) The unit is assembled using four aluminium rods with cap nuts at the back and front of the unit. The rods are threaded at each end.

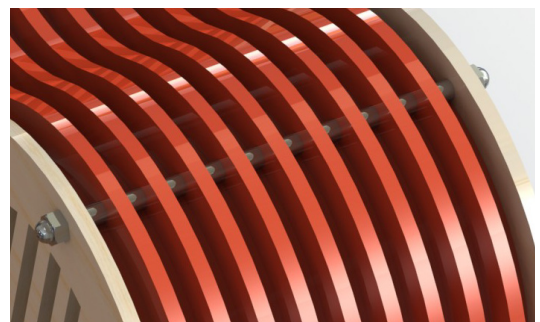
- (i) Name the tool used to thread the ends of the rods and briefly describe the process.

Name of tool _____

Process _____

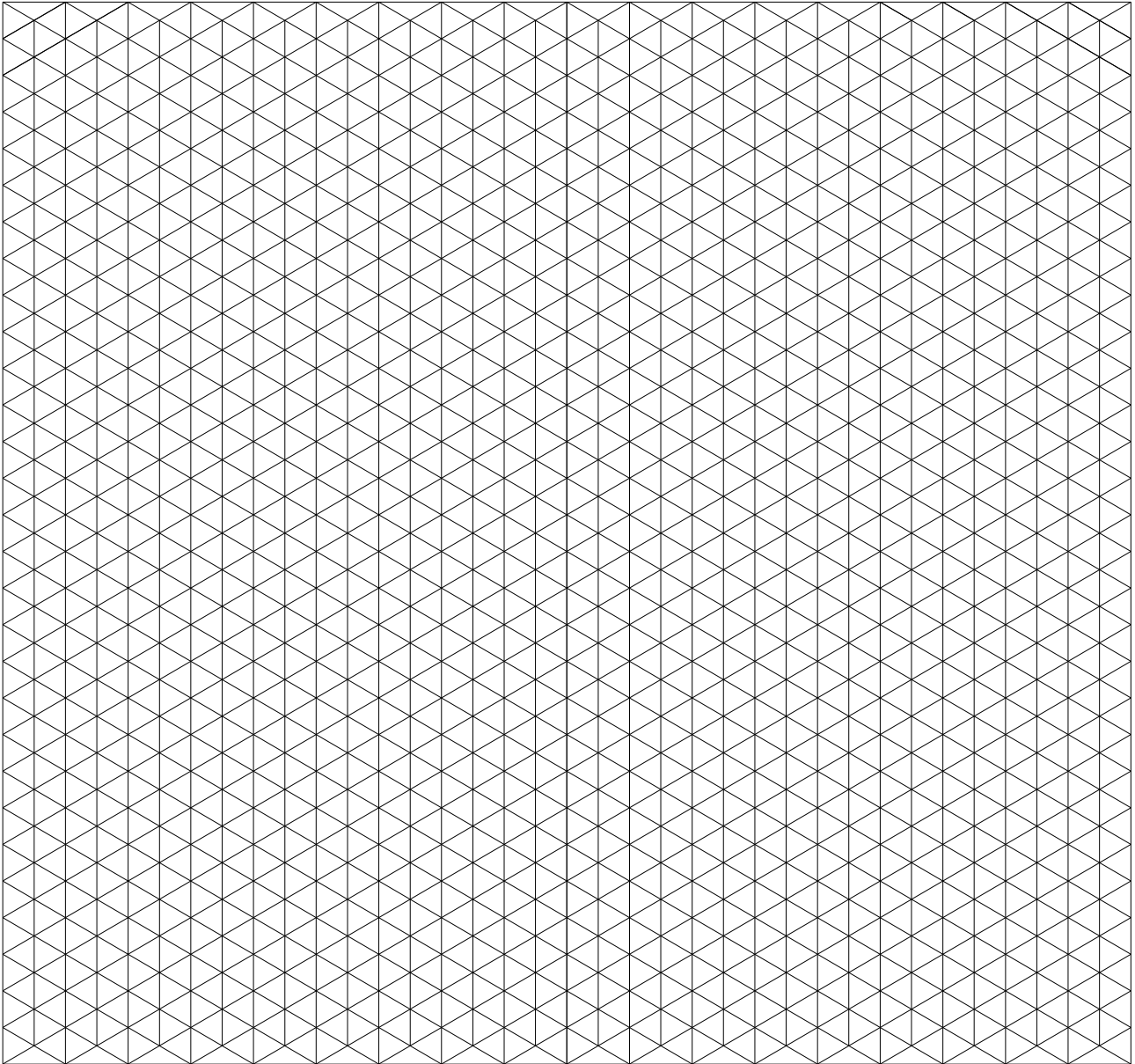
- (ii) Suggest a reason for using cap nuts.

Answer _____



- (c) (i) In the *Design and Manufacture* module you designed and manufactured a product. Name the product you made and make an isometric sketch of it on the grid below.

Product Name _____



- (ii) Outline two main objectives you identified before you designed the product.

Objective 1 _____

Objective 2 _____

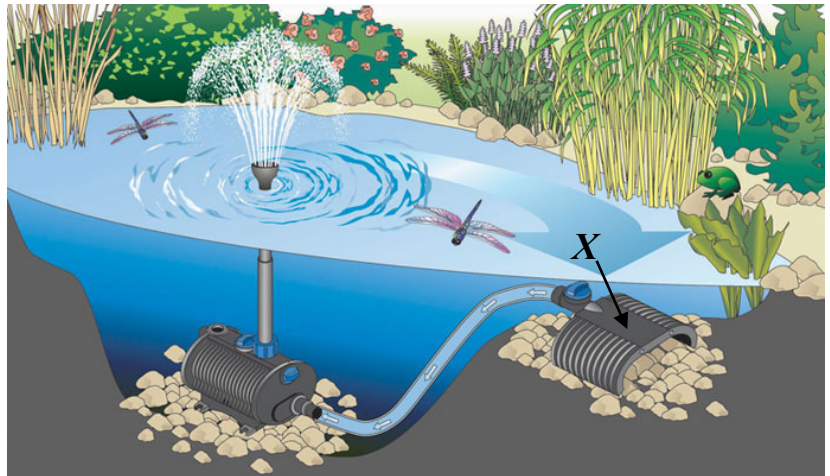
3. Water Technology

(50 marks)

- (a) The graphic shows a section through a garden pond with a fountain pump in place.

- (i) What is the function of part X in the system?

Answer _____



- (ii) Suggest **two** reasons why part X is placed at a higher level than the pump itself.

1 _____

2 _____

- (iii) The spray from the fountain has beneficial effects for the pond. Suggest **one** such effect.

Answer _____

- (iv) The pump system for the pond includes the impeller, the motor and the filter.
Explain the function of each of these parts.

Impeller _____

Motor _____

Filter _____

- (b) The materials required to make a straight connection in plastic plumbing pipe are shown.
Explain fully the process of making the straight connection.

Answer _____



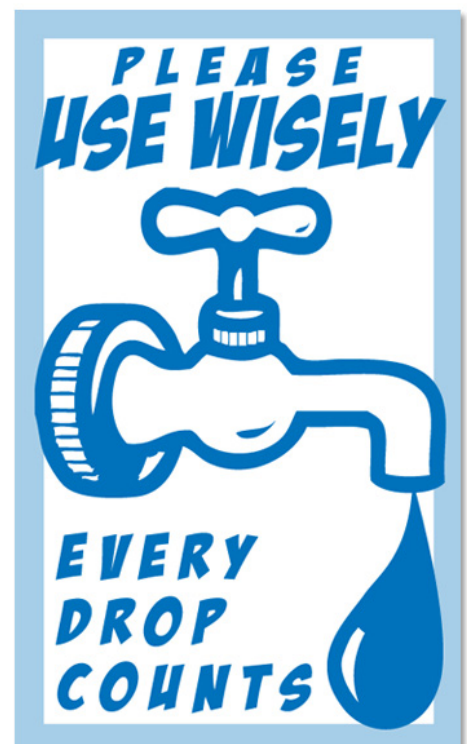
- (c) Outline **four** ways in which you can conserve water both inside and outside your home.

1 _____

2 _____

3 _____

4 _____



4. Electrical Understanding and Electronics

(50 marks)

- (a) The graphic shows a domestic electrical consumer unit (fuse-box).

- (i) What is the purpose of this unit?

Answer _____

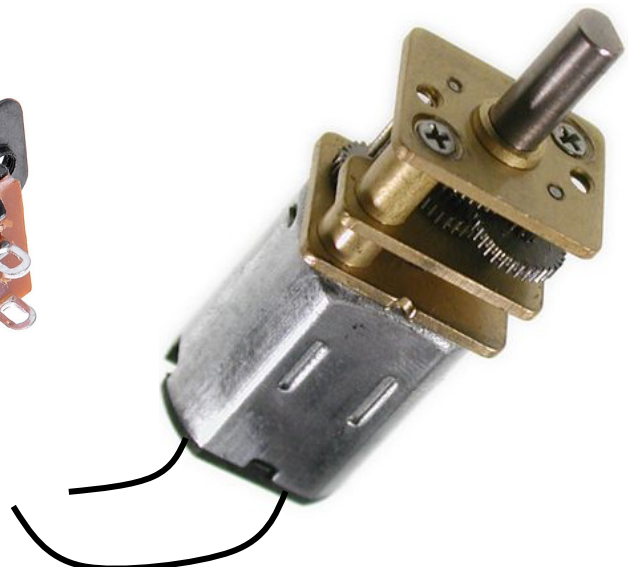
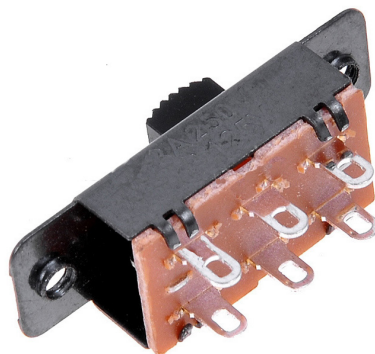
- (ii) An RCD is an important component in the consumer unit. Explain the meaning of the term RCD and outline its purpose.

RCD _____

Purpose _____



- (b) Draw in the wires to connect the components shown so that the gearbox motor can be controlled in both forward and reverse directions (clockwise and anti-clockwise).



(c) A 7.5 Watt LED light bulb is shown.

(i) Convert 7.5 Watts to kilowatts.

Answer _____

(ii) Calculate the operating cost of this bulb for 10,000 hours where the cost of a unit of electricity is 21 cent (€0.21).



Calculation:

(d) Domestic Photovoltaic panels (cells) are becoming popular for generating electrical power for the home. To use this power in the home it must be converted from DC to AC using an inverter.

(i) Explain the terms AC and DC

AC _____

DC _____

(ii) Photovoltaic cells mainly convert the UV part of sunlight into electricity. Explain the meaning of UV.

UV _____

(iii) Outline **two** problems associated with generating power for the home using PV panels (cells).

1 _____

2 _____



Photovoltaic Panels



Inverter

5. Tools & Equipment

(50 marks)

(a) A range of workshop equipment is shown.

1.



2.



3.



4.



Name each piece of equipment and give its use.

No.	Name	Use
1		
2		
3		
4		

(b) A wooden garden lounger (chaise longue) is shown.

- (i) Name a machine that could be used in the manufacture of the wheels of the lounger.

Machine _____

- (ii) Name a type of sander that could be used to prepare the wood prior to assembly.

Sander _____



- (iii) Outline **four** steps in the manufacture of the base frame of the lounger.

- 1 _____

2 _____

3 _____

4 _____

(c) Draw a sketch of **any 4** of the following tools/machines in the spaces below.

Strip Heater	Spirit Level	Spanner	Wood Chisel	G Clamp

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