



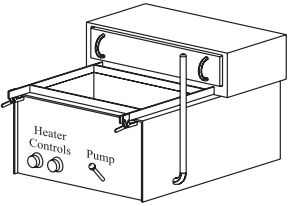
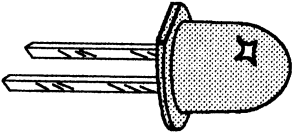
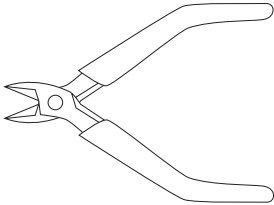
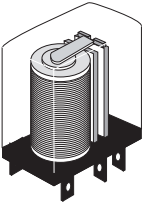
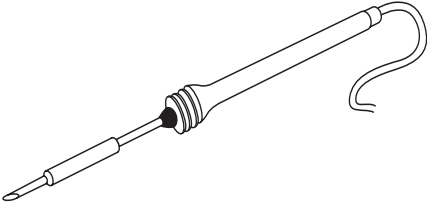
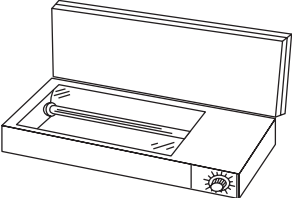
**Answer ALL the questions. Write your answers in the spaces provided.**

1. The table below shows some tools, equipment and components.

(a) Complete the table by:

- (i) naming each tool, piece of equipment or component
- (ii) describing its use.

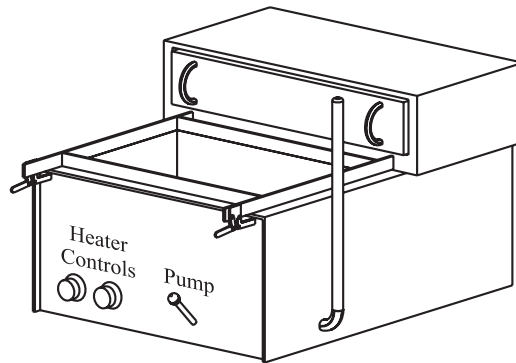
The first one has been done for you.

Tool/Equipment/Component	Name	Use
	Vacuum forming machine	Forms shapes for plastic cases
		
		
		
		
		

(10)



(b) The drawing below shows a vacuum forming machine. It can be used to make thermoplastic cases for electronic products.



Give **two** reasons why vacuum forming is used to form cases for electronic products.

- 1 .....
  - 2 .....
- (2)**

(c) Computer Aided Design (CAD) and Computer Aided Manufacture (CAM) are used in the production of one-off electronic products.

(i) Give **one** way that CAD can be used in the production of one-off electronic products.

.....

**(1)**

(ii) Describe **one** way that CAM can be used in the production of one-off electronic products.

.....

.....

**(2)**



(d) Electronic products are manufactured in differing numbers depending on how many are needed.

(i) Mark with a cross (☒) the best type of production for the statement below.

Specialist electronic products manufactured for individual use.

<b>One-off</b>	<input type="checkbox"/>	<b>Stock control</b>	<input type="checkbox"/>	<b>Pick and place</b>	<input type="checkbox"/>
<b>Automatic</b>	<input type="checkbox"/>	<b>Batch</b>	<input type="checkbox"/>	<b>High volume</b>	<input type="checkbox"/>

**(1)**

(ii) Mark with a cross (☒) the best type of production for the statement below.

Electronic games that are made for a limited market.

<b>One-off</b>	<input type="checkbox"/>	<b>Stock control</b>	<input type="checkbox"/>	<b>Pick and place</b>	<input type="checkbox"/>
<b>Automatic</b>	<input type="checkbox"/>	<b>Batch</b>	<input type="checkbox"/>	<b>High volume</b>	<input type="checkbox"/>

**(1)**

(iii) Mark with a cross (☒) the best type of production for the statement below.

Switches that are required all the time.

<b>One-off</b>	<input type="checkbox"/>	<b>Stock control</b>	<input type="checkbox"/>	<b>Pick and place</b>	<input type="checkbox"/>
<b>Automatic</b>	<input type="checkbox"/>	<b>Batch</b>	<input type="checkbox"/>	<b>High volume</b>	<input type="checkbox"/>

**(1)**

(e) Pick and place machinery is often used when making electronic products.

Give **two** reasons for using pick and place machinery when making electronic products.

1 .....

2 .....

**(2)**

(f) EPOS tills are used by retailers when selling electronic products.

Describe **one** task automatically carried out by an EPOS till when a product is sold.

.....

.....

**(2)**

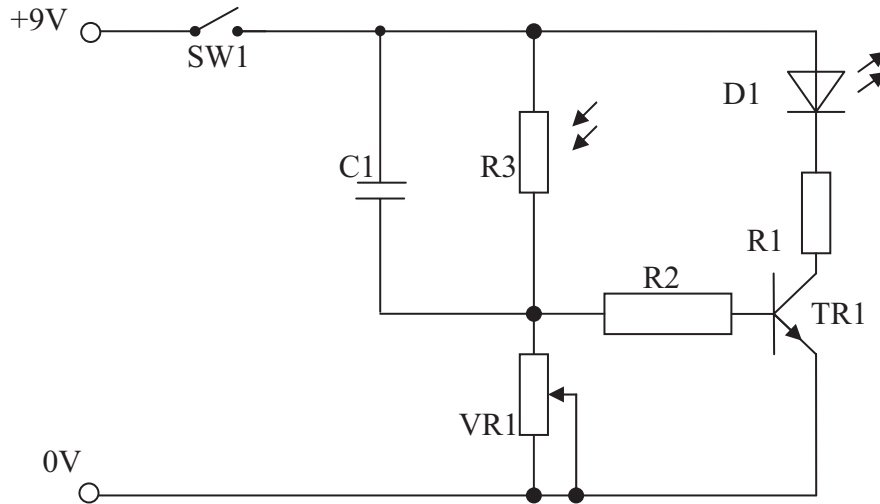
**(Total 22 marks)**

**Q1**

--	--



2. The diagram below shows a transistor switching circuit.



(a) (i) Name components D1, C1, VR1 and R3.

D1 .....

C1 .....

VR1 .....

R3 .....

(4)

(ii) State the action of D1 in the circuit when the transistor (TR1) switches on.

.....

(1)

(iii) Give the reason for using R2 in the circuit.

.....

(1)

(iv) Give **one** reason for using VR1 in the circuit.

.....

(1)

(v) Give **one** reason why SW1 is in the circuit.

.....

(1)

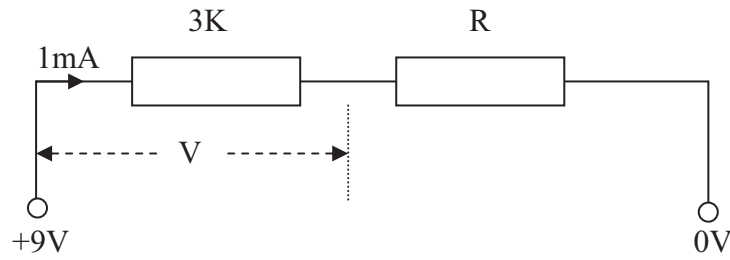
(vi) Mark with a cross (☒) the action which describes SW1.

SPST  DPDT  SPDT  DTSP

(1)



(b) The diagram below shows a potential divider.



Calculate the voltage V across the 3K resistor when a current of 1mA flows through it.

Use the formula  $V = I \times R$

Number ..... Units .....  
**(2)**

(c) CAD/CAM is used to make electronic products in quantity cheaply.

(i) Give **three** advantages of using CAD/CAM to make electronic products in quantity cheaply.

- 1 .....
- 2 .....
- 3 .....

**(3)**

(ii) Give **two** disadvantages to society of using CAD/CAM to make electronic products.

- 1 .....
- 2 .....

**(2)**

(d) Electronic products such as mobile phones are tested to ensure that they meet safety standards.

Give **two** reasons why it is important to consumers that mobile phones meet safety standards.

- 1 .....
- 2 .....

**(2)**



- (e) When mobile phones become out-of-date, some of their parts can be reclaimed for reuse.

Describe **one** way in which some parts of mobile phones can be reclaimed for reuse.

.....  
.....

**(2)**

- (f) When choosing a battery to power a mobile phone, the designer should consider environmental issues.

Describe **one** way in which the choice of battery could reduce damage to the environment.

.....  
.....

**(2)**

**Q2**

**(Total 22 marks)**

--	--



3. A company is designing a controller for a football penalty kick video game.

A case must be designed to hold the electronic system for controlling the game.



The specification for the case is that it must:

- be comfortable to hold in the hand
  - include a method of switching on and have a visual indication that it is on
  - have a way of changing the aim of the kick and kicking the ball
  - be made from materials and processes suitable for one-off production.
- (a) In the spaces opposite, use sketches and, where necessary, brief notes to show **two different** design ideas for the prototype controller case which meet this specification.

Do **not** evaluate your designs in part (a).

Candidates are reminded that if pencil is used for diagrams/sketches, it must be dark (HB or B). Coloured pens, pencils and highlighter pens must **not** be used.

**PLEASE DO NOT WRITE OR DRAW IN THIS SPACE.**

**PLEASE USE THE SPACES OPPOSITE FOR YOUR DESIGNS.**





**Design Idea 1**

**(8)**

---

**Design Idea 2**

**(8)**



(b) Three of the original specification points are repeated below.

Evaluate how **one** of your design ideas succeeds or fails to meet each of these specification points.

Write down the number of your chosen design idea (1 or 2) here: .....

(i) The penalty kick controller case must have a method of switching on and have a visual indication that it is on.

.....  
.....  
.....

**(2)**

(ii) The penalty kick controller case must have a way of changing the aim of the kick and kicking the ball.

.....  
.....  
.....

**(2)**

(iii) The penalty kick controller case must be made from materials and processes suitable for one-off production.

.....  
.....  
.....

**(2)**

**(Total 22 marks)**

**Q3**

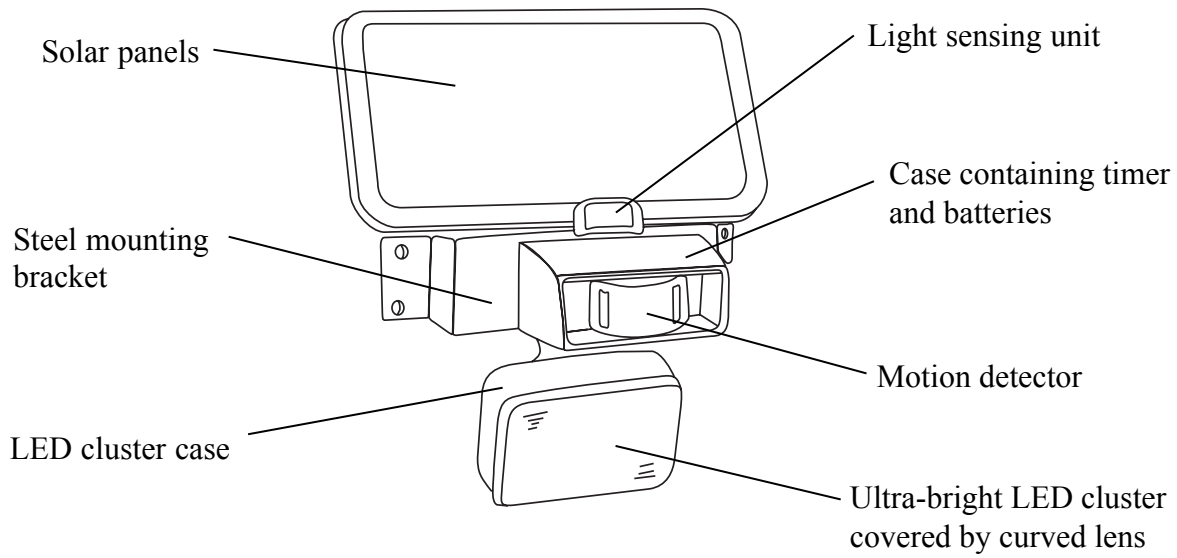
--	--



**BLANK PAGE**



4. The drawing below shows details of a solar powered security light.



(a) Two specification points for the solar powered security light are that it must:

- light a large area
- be powered without mains electricity.

Under each of the following headings, give **one** more point that should be included in the specification for the solar powered security light.

For each point, give **one** reason why it should be included.

(i) The needs of the user.

Point .....

Reason .....

.....

.....

**(2)**

(ii) Environmental considerations.

Point .....

Reason .....

.....

.....

**(2)**



(iii) Quality.

Point .....

Reason .....

.....

.....

(2)

(b) The mounting bracket is made from steel.  
One reason for using steel is that it can be bent to shape.

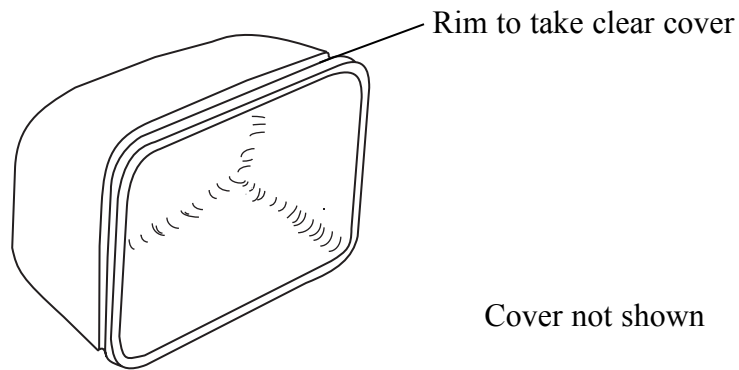
Give **two** other reasons why steel is a suitable material from which to make the mounting bracket for the solar powered security light.

1 .....

2 .....

(2)

(c) The ultra-bright LED cluster case is shown below. It is manufactured using injection moulding.



Give **two** reasons why injection moulding is a suitable process for manufacturing the ultra-bright LED cluster case.

1 .....

2 .....

(2)



- (d) The connections between the solar panels and the batteries of the security light are made from copper.

Give **two** properties of copper that make it suitable for the connections between the solar panels and the batteries.

For each property give **one** reason why it makes copper suitable for the connections between the solar panels and the batteries.

Property 1 .....

Reason .....

Property 2 .....

Reason .....

**(4)**

- (e) Quality control checks are carried out at important stages during the manufacture of the solar powered security light.

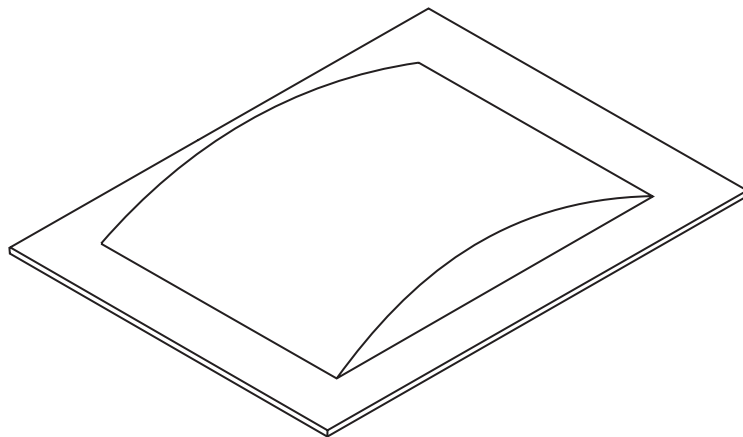
Name **two** important electronic quality control checks, other than safety, that should be made during the manufacture of the solar powered security light.

1 .....

2 .....

**(2)**

- (f) The thermoplastic cover for the motion detector is shown below. It is made in batches using the vacuum forming process.



Describe **one** way in which the shape of the thermoplastic cover for the motion detector makes it suitable to be made in batches using the vacuum forming process.

.....

.....

**(2)**



(g) Two purposes of the solar powered security light are that it must:

- light a large area
- be powered without mains electricity.

Explain, under the following headings, how the solar powered security light achieves these purposes.

(i) Lights a large area.

.....  
.....  
.....

(2)

(ii) Be powered without mains electricity.

.....  
.....  
.....

(2)

Q4

(Total 22 marks)

**TOTAL FOR PAPER: 88 MARKS**

**END**



**BLANK PAGE**

