

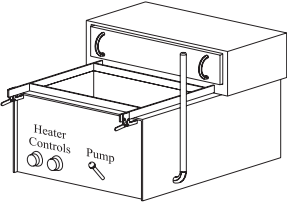
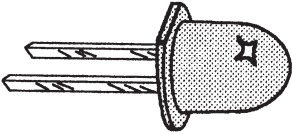
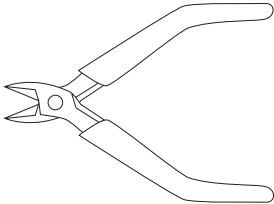
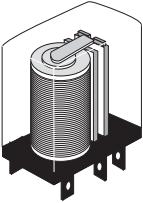
Answer ALL the questions. Write your answers in the spaces provided.

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.

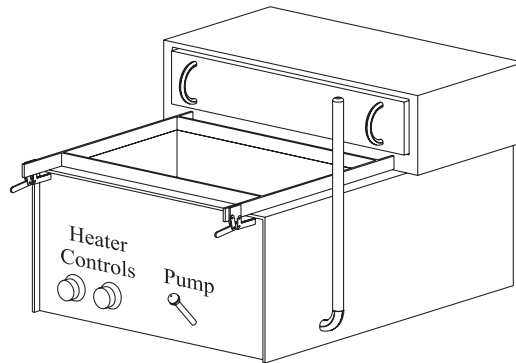
The first one has been done for you.

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

(6)



(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.

.....

.....

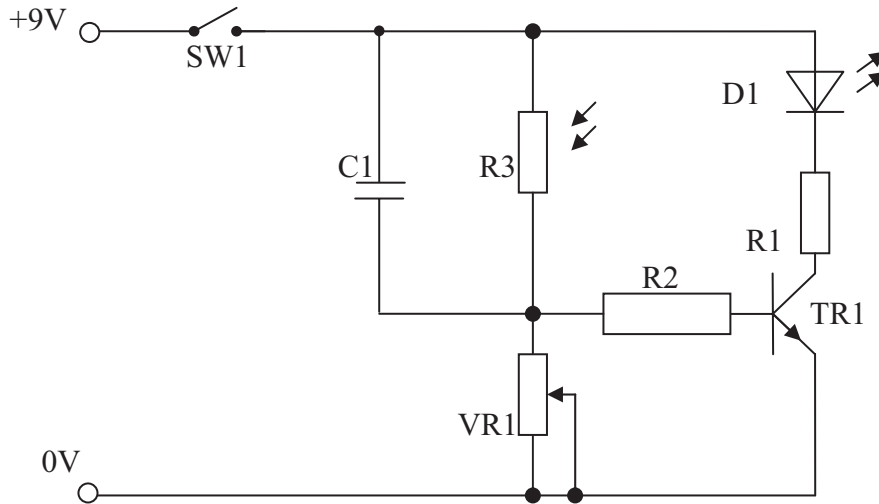
(2)

(Total 11 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)

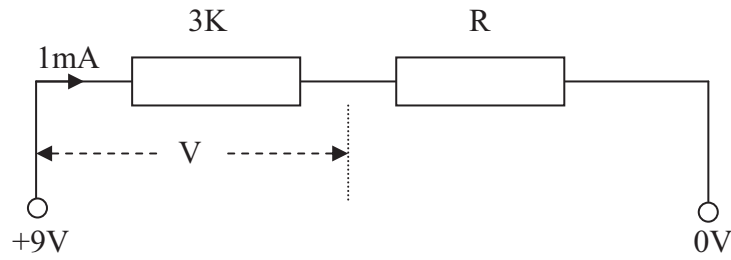
(vi) Mark with a cross (☒) the action which describes SW1.

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)

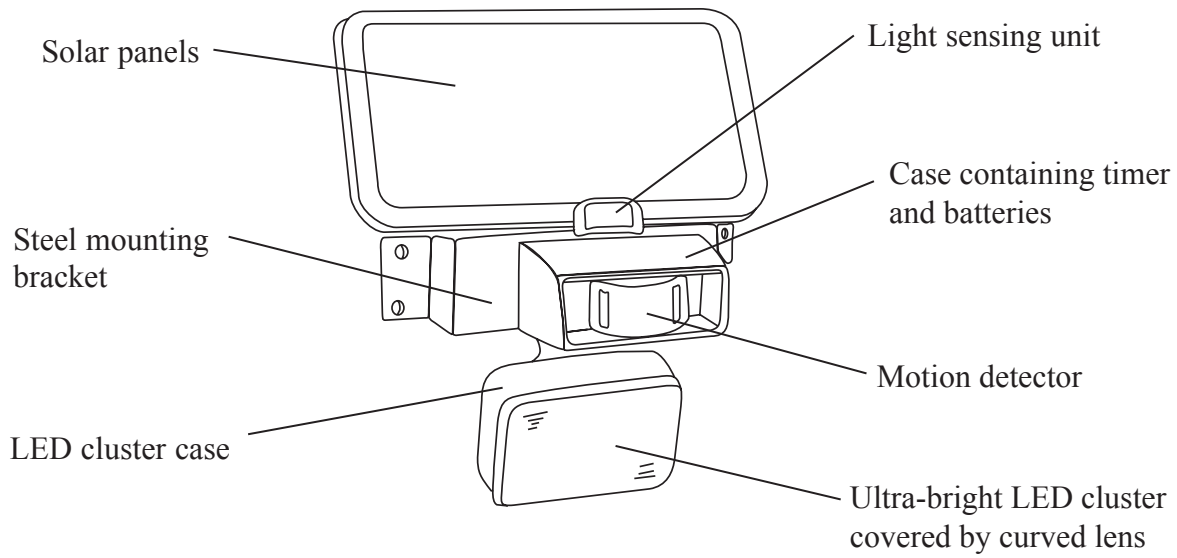
Q2

(Total 11 marks)

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3. 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.

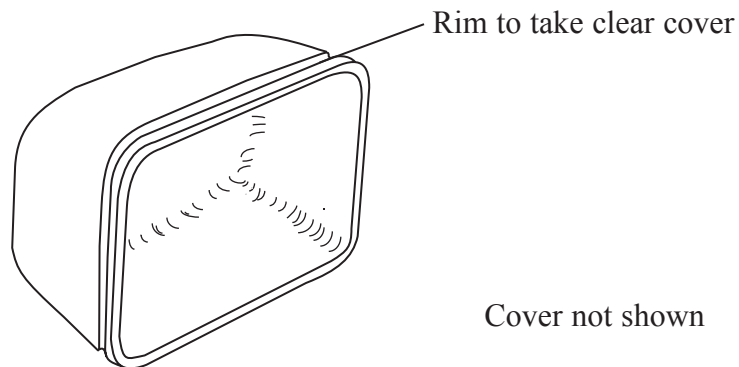
Give **two** other reasons why steel is a suitable material from which to make the mounting bracket for the solar powered security light.

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.

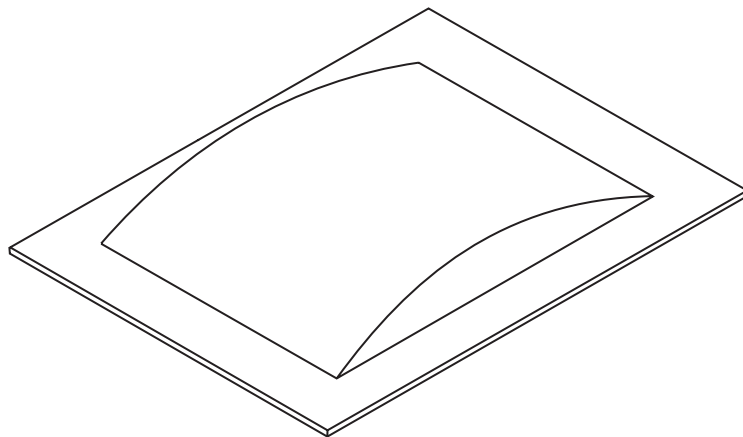
Name **two** important electronic quality control checks, other than safety, that should be made during the manufacture of the solar powered security light.

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)

Q3

(Total 22 marks)

TOTAL FOR PAPER: 44 MARKS

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