



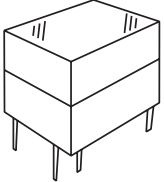
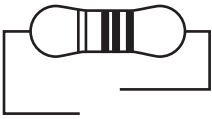
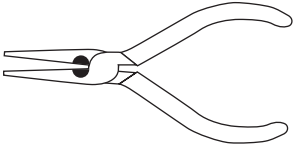
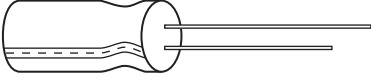
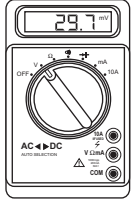
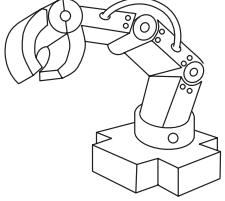
**Answer ALL the questions. Write your answers in the spaces provided.**

1. The table below shows some tools, equipment and components used in the making of electronic circuits.

(a) Complete the table by:

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

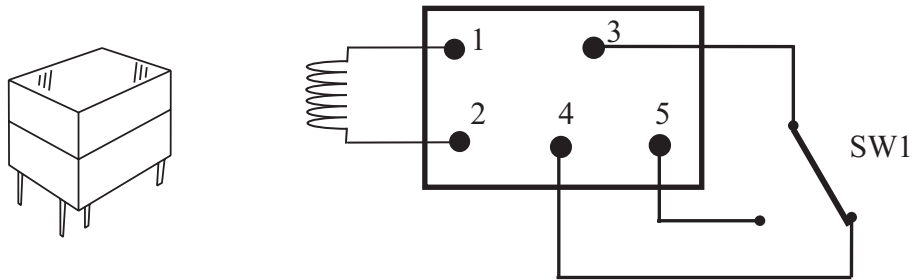
The first one has been done for you.

Tool/Equipment/Component	Name	Use
	Relay	Separates DC and AC circuits
		
		
		
		
		

**(10)**



(b) The drawings below show a relay and its circuit diagram.

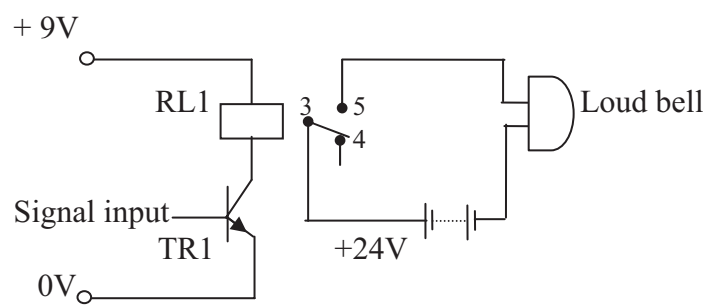


A relay has a coil between pins 1 and 2 and a switch (SW1) between pins 4 and 5 and pin 3.

State what happens to the switch (SW1) when +9V is applied to pin 1 and 0V is applied to pin 2 of the relay.

..... (1)

(c) The circuit diagram below shows the relay connected between a transistor and a loud bell.



(i) One reason for connecting the relay (RL1) between the transistor (TR1) and the loud bell is to separate the two power supplies.

Give **two** other reasons for connecting the relay between the transistor and the loud bell.

1 .....

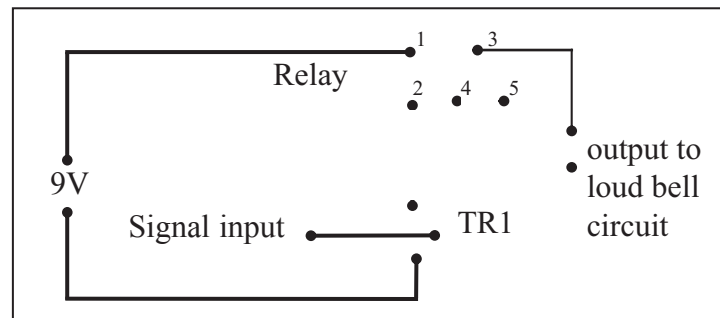
2 .....

(2)



- (ii) The relay circuit is to be prototyped. The electronic components will be mounted on a printed circuit board (PCB).

The diagram below shows part of the PCB layout.



Complete the PCB layout by drawing in the **two** missing tracks.

(2)

- (d) A barcode on the package of an electronic product stores different pieces of digital information about the product. An EPOS till is used to read this information.

A barcode is shown below.



Mark with a cross (☒) **three** pieces of information which are stored within a barcode of an electronic product and can be scanned and read by an EPOS till.

- |                     |                          |              |                          |                      |                          |
|---------------------|--------------------------|--------------|--------------------------|----------------------|--------------------------|
| Store Name          | <input type="checkbox"/> | Battery Size | <input type="checkbox"/> | Selling Price        | <input type="checkbox"/> |
| Product Description | <input type="checkbox"/> | Components   | <input type="checkbox"/> | Stock Control Number | <input type="checkbox"/> |

(3)



Leave  
blank

(e) A prototype of an electronic product will be made before it is batch produced.

Give **two** reasons for prototyping an electronic product.

1 .....

2 .....

(2)

(f) Computer Integrated Manufacture (CIM) is used by manufacturers when making electronic products.

Describe **one** task carried out using CIM.

.....

.....

.....

(2)

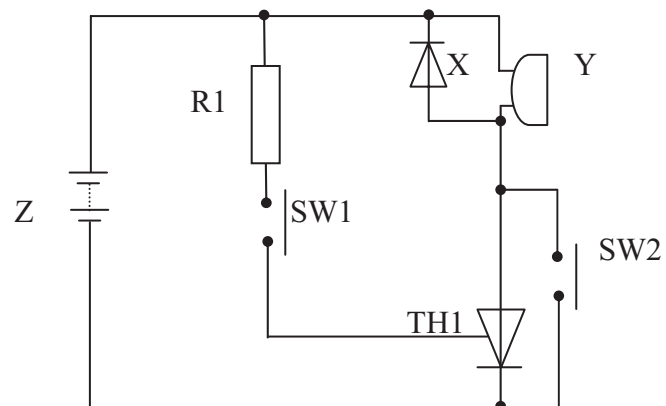
Q1

(Total 22 marks)

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2. The diagram below shows a simple thyristor alarm circuit.



(a) (i) Name components SW1, X, Y and Z shown in the diagram above.

SW1 .....

X .....

Y .....

Z .....

(4)

(ii) State the action of thyristor (TH1) in the circuit when SW1 is operated.

.....

(1)

(iii) State the action of TH1 in the circuit when SW1 is released.

.....

(1)

(iv) Give **one** reason why SW2 is in the circuit.

.....

(1)

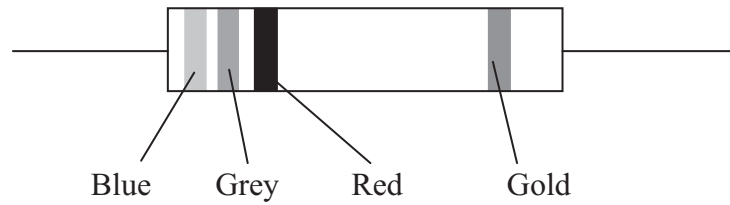
(v) Give **one** reason for using component X in the circuit.

.....

(1)



(b) R1 in the circuit has the following coloured bands.



The resistor colour code is shown below.

Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Grey	White
0	1	2	3	4	5	6	7	8	9

The resistor tolerance is

- Red = 2%
- Gold = 5%
- Silver = 10%

(i) Using the resistor colour code determine the resistance of R1.

.....  
(2)

(ii) Give the meaning of the term “tolerance” as used above.

.....  
(1)

(c) Product reliability is important for modern electronic devices.

Playback speed on a personal stereo is an example of where product reliability is important.

(i) Give **one** reason why playback speed reliability of a personal stereo is important for the user.

.....  
(1)

(ii) Give **one** other playing function of a personal stereo where product reliability is important.

Give **one** reason why the reliability of this function is important.

Function .....

Reason .....

(2)



Leave blank

(d) New personal stereos come onto the market when the older versions are still being used.

Mark with a cross (☒) the term that completes each of the sentences below. Each term may be used once or not at all.

(i) Personal stereos are often updated by the manufacturer whilst the older versions are still being used.

This is known as:

**changing fashion**  **planned product obsolescence**  **product evolution**  (1)

(ii) Consumers often replace their current personal stereos with new ones because they want the latest model.

This is known as:

**changing fashion**  **planned product obsolescence**  **product evolution**  (1)

(e) Personal stereos are often thrown away instead of being recycled.

(i) Give **one** environmental disadvantage of throwing away old personal stereos.

..... (1)

(ii) Describe **one** way in which personal stereos can be recycled.

.....  
..... (2)

(f) The development of PICs led to control systems in domestic appliances becoming smaller and more advanced.

Name **three** functions that PICs are used to control in domestic appliances.

1 .....

2 .....

3 .....

(3)

Q2

(Total 22 marks)

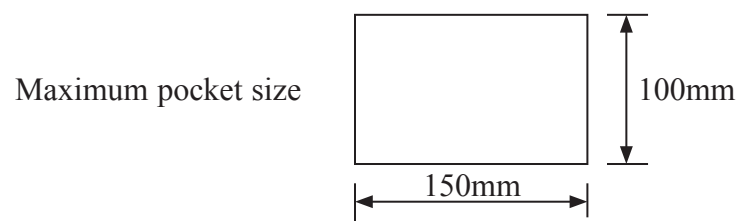




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3. A company makes hand-held torches that are designed to fit into pockets.  
A prototype case design for a small pocket torch is needed.



The specification for the prototype case of the small pocket torch is that it must

- fit easily into the given pocket size
  - switch on and stay on
  - have a powerful beam of light
  - 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 small pocket torch case that meet this specification.

Do **not** show electrical/electronic connections in your designs.

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**

Leave  
blank

**(8)**

**Design Idea 2**

**(8)**



Leave  
blank

(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 small pocket torch must fit easily into the given pocket size.

.....  
.....  
..... (2)

(ii) The small pocket torch must switch on and stay on.

.....  
.....  
..... (2)

(iii) The small pocket torch must be made from materials and processes suitable for one-off production.

.....  
.....  
..... (2)

(Total 22 marks)

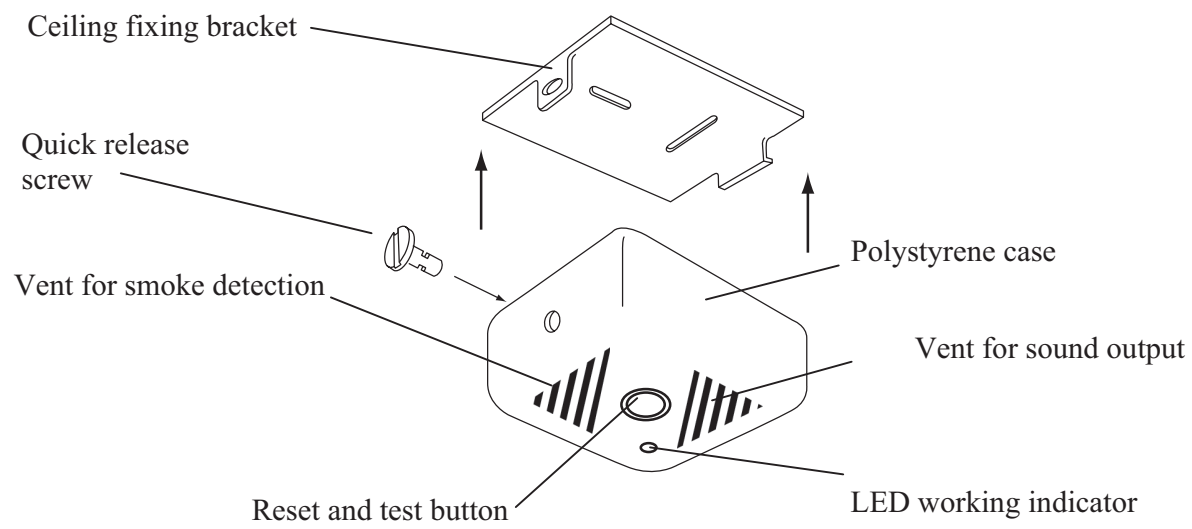
Q3



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4. The drawings below show details of a smoke alarm.



(a) Two specification points for the smoke alarm are that

- the alarm sound must be clearly heard
- it must have a means of fixing to a ceiling

Under each of the following headings, give **one** more point that should be included in the specification for the smoke alarm.

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

(i) **Market**

Point .....

Reason .....

(2)

(ii) **Quality**

Point .....

Reason .....

(2)

(iii) **Environment**

Point .....

Reason .....

(2)



(b) The ceiling fixing bracket for the smoke alarm is made from aluminium.  
One reason for using aluminium is that it can be finished using plastic dip coating.

(i) Give **two** other reasons why aluminium is a suitable material from which to make the ceiling fixing bracket for the smoke alarm.

1 .....

2 .....

(2)

(ii) Give **two** reasons why plastic dip coating is a suitable process for finishing the ceiling fixing bracket.

1 .....

2 .....

(2)

(c) The connections between the electronics and the battery of the smoke alarm are made from copper.

Give **two** properties of copper that make it suitable for the connections between the electronics and the battery.

For each property, give **one** reason why it makes copper suitable.

Property .....

Reason .....

Property .....

Reason .....

(4)

(d) Quality control checks are carried out at important stages during the manufacture of the smoke alarm.

Name **two** important electronic quality control checks that should be made during the manufacture of the smoke alarm.

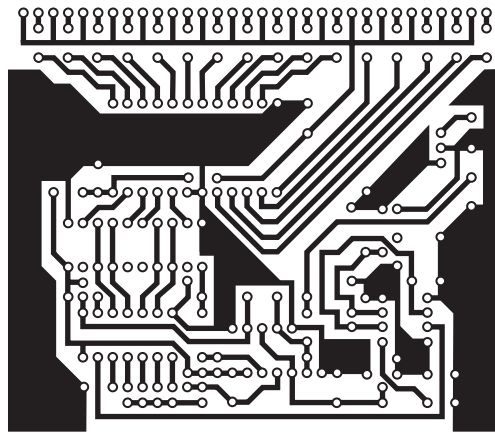
1 .....

2 .....

(2)



(e) The drawing below shows the layout of the tracks for the Printed Circuit Board (PCB) inside the smoke alarm. It is made in batches using the photo-sensitive etching process.



Describe **one** way in which the layout of the tracks makes it suitable to be made in batches using the photo-sensitive etching process.

.....  
.....

(2)

(f) Two purposes of the smoke alarm are that

- the alarm sound must be clearly heard
- it must have a means of fixing to a ceiling

Explain, under the following headings, how the smoke alarm achieves these purposes.

(i) The alarm sound must be clearly heard.

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

(2)

(ii) Have a means of fixing to a ceiling.

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

(2)

(Total 22 marks)

Q4

TOTAL FOR PAPER: 88 MARKS

END

