

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCSE**

Centre Number

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Candidate Number

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# Design and Technology

**Electronic Products**

**Unit 2: Knowledge and Understanding  
of Electronic Products**

Tuesday 24 May 2016 – Morning

**Time: 1 hour 30 minutes**

Paper Reference

**5EP02/01**

**You do not need any other materials.**

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

## Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed  
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*
- You may use a calculator.

## Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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**PEARSON**

Answer ALL the questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Identify the switch shown below:



- A slide switch
- B toggle switch
- C rocker switch
- D tilt switch

(Total for Question 1 = 1 mark)

2 The voltage across a fully charged AAA battery is:

- A 0.5 volts
- B 1.0 volt
- C 1.5 volts
- D 2.0 volts

(Total for Question 2 = 1 mark)

3 The cleaning substance found in multicore solder is called:

- A flocks
- B gel
- C emery
- D flux

(Total for Question 3 = 1 mark)



4 Why do the battery wires pass through the circuit board in the way shown below?



- A to relieve strain on the wires
- B to ensure the battery is on the correct side of the board
- C to make the wires lay flat
- D to ensure the correct polarity

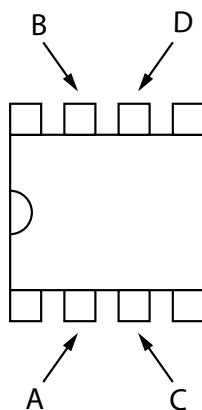
(Total for Question 4 = 1 mark)

5 Which **one** of the following materials is the best conductor of electricity?

- A mild steel
- B aluminium
- C copper
- D brass

(Total for Question 5 = 1 mark)

6 Which letter indicates pin 2 on the circuit symbol shown below?



- A
- B
- C
- D

(Total for Question 6 = 1 mark)



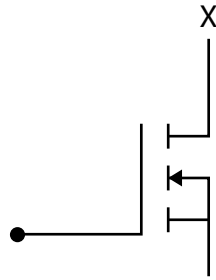
7 Which **one** of the following describes the type of capacitor shown below?



- A non-polarised
- B polarised
- C semi-polarised
- D de-polarised

(Total for Question 7 = 1 mark)

8 The symbol for a field effect transistor (FET) is shown below.



The leg labelled with an X is called the:

- A drain
- B collector
- C anode
- D source

(Total for Question 8 = 1 mark)



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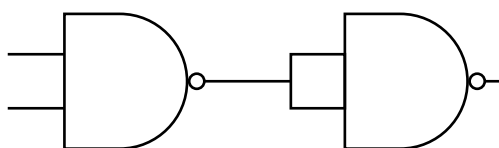
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9 Which **one** of the following values indicates the maximum resistance of a 100k resistor with a gold tolerance band?

- A 95k
- B 100k
- C 105k
- D 110k

(Total for Question 9 = 1 mark)

10 Which **one** of the following describes the function of the logic gate diagram shown below?



- A AND
- B OR
- C NAND
- D NOR

(Total for Question 10 = 1 mark)



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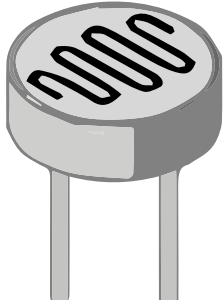
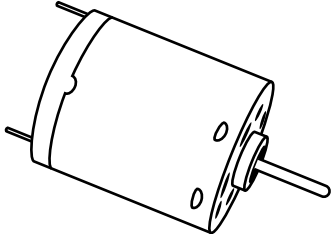
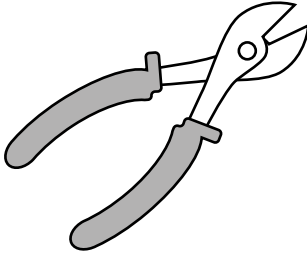
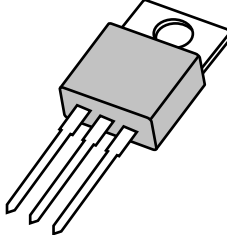
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11 (a) The table below shows some tools and components.

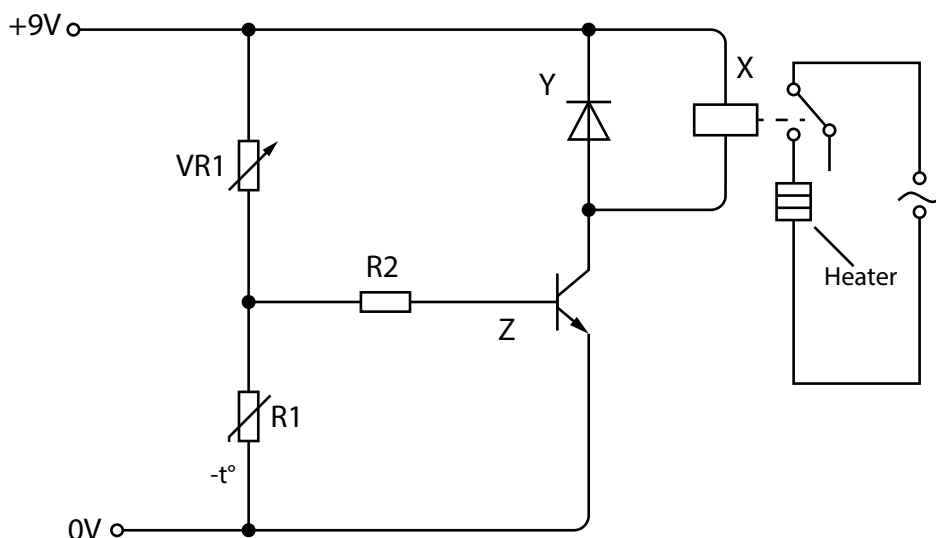
Complete the table by giving the missing names and uses.

Tool/Component	Name	Use
	LDR	(1)
	(1)	Converts electrical energy to rotary motion
	Side cutters	(1)
	(1)	Latches a circuit output



(b) A company manufactures automatic heaters.

The diagram below shows the circuit which will be used.



(i) Name **one** input component in the circuit.

(1)

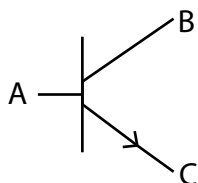
(ii) Other than the heater, name **one** output component in the circuit.

(1)

(iii) The circuit contains a process component Z. The three legs of component Z are labelled. Leg A has been named for you.

Give the names of the remaining two legs.

(2)



A ..... base

B .....

C .....





(c) Explain the function of component X in the circuit.

(2)

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(d) (i) Name component Y in the circuit.

(1)

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(ii) Explain what could happen if component Y was not used in this circuit?

(2)

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(e) When this circuit was designed, it was tested using circuit design software on a computer.

Explain **two** advantages of using circuit design software to test this circuit.

(4)

Advantage 1

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Advantage 2

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(f) The circuit has been manufactured in China instead of the UK.

Explain **one** advantage for the manufacturer of producing the circuit in China.

(2)

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**(Total for Question 11 = 19 marks)**



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P 4 8 5 2 2 A 0 1 1 2 4

**12** A company is planning to manufacture a themed welcome light. It will be fixed to the outside of a house and can be turned on manually for a timed period when it gets dark to help guide visitors to the front door.

Design the welcome light only. Do **not** design any circuits.

The specification for the welcome light is that it must:

- have a festive or celebration theme
- be able to be fixed to the outside of a house
- have a means to adjust the length of time that the light stays on
- have a suitable power supply
- be made from a weather resistant material
- have easy access to the components inside
- have an appropriate light source
- have a method of turning on and off manually.

In the spaces opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the welcome light that meet the specification points above.

Candidates are reminded that if a pencil is used for diagrams/sketches, it must be dark (HB or B).

Coloured pens, pencils and highlighter pens must **not** be used.

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PLEASE USE THE SPACES OPPOSITE FOR YOUR DESIGNS.**



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**Design idea 1**

(8)

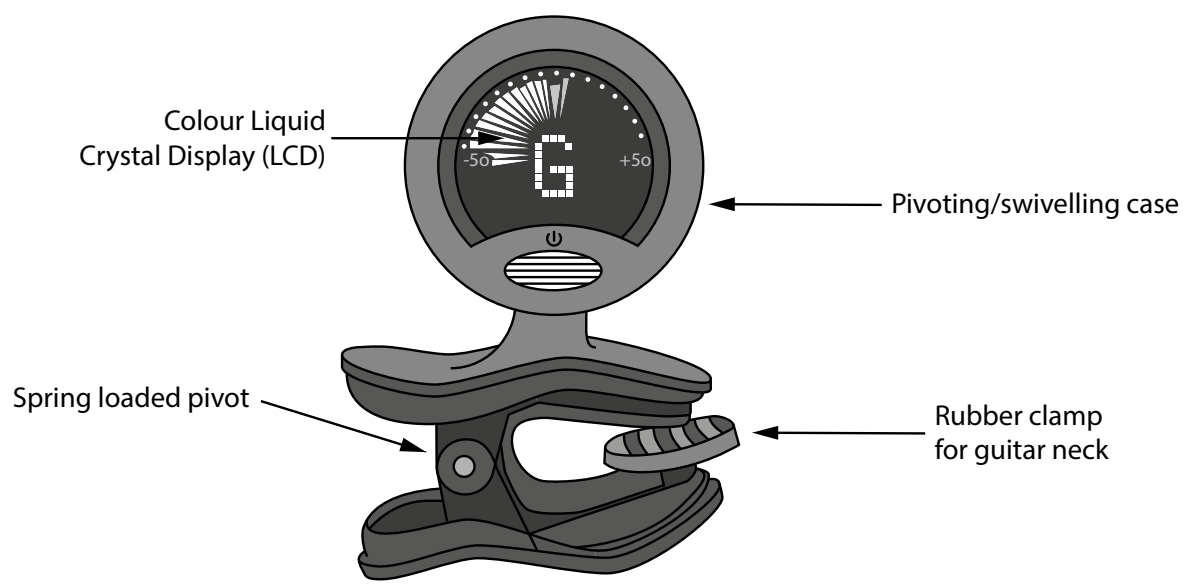
**Design idea 2**

(8)

**(Total for question 12 = 16 marks)**



13 The picture below shows a battery operated guitar tuner.



(a) Describe how the tuner is successful in meeting the following specification points:

(i) It is easy to fix to the guitar. (2)

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(ii) It is easy to see if the note being played is in tune. (2)

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(b) Explain **two** advantages of using a liquid crystal display (LCD) instead of an LED dot-matrix display for the tuner:

(4)

Advantage 1

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Advantage 2

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(c) The tuner does not use any words in its display.

Explain why the manufacturer has chosen not to use words in its display.

(2)

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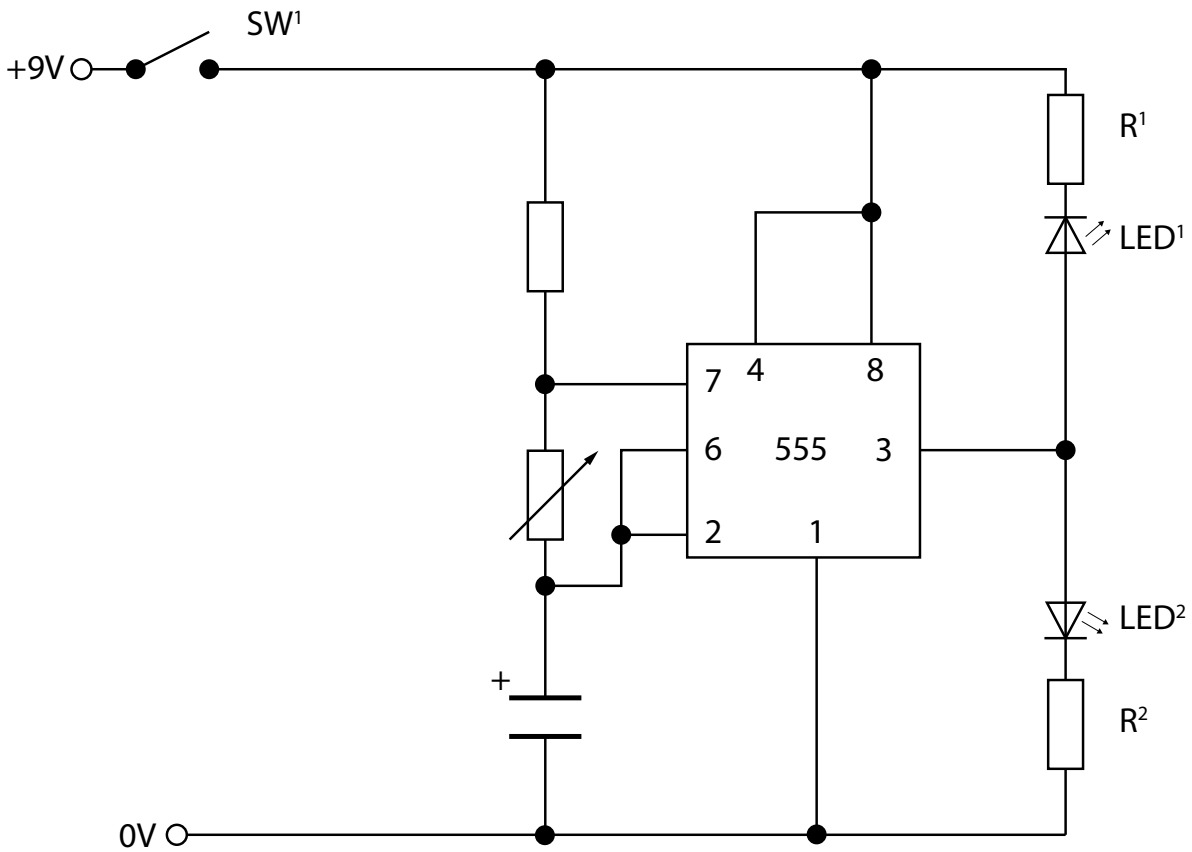
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14 The astable circuit diagram below will be used for a Christmas decoration.



(a) Explain the term 'astable'.

(2)

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(b) When SW<sup>1</sup> is closed, one of the LEDs does not light up.

(i) State which LED does not light up.

(1)

(ii) Explain why this LED does not light up.

(2)

(c) Resistors R<sup>1</sup> and R<sup>2</sup> have the same value.

Apply the formula  $V = I \times R$  to calculate the correct value for R<sup>1</sup> and R<sup>2</sup> using the information given.

LED requires 2V at 10mA

You must show your working.

(4)



(d) The Christmas decoration could be controlled by using a peripheral interface controller (PIC).

Explain **two** advantages of using a PIC to control the Christmas decoration.

(4)

Advantage 1

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Advantage 2

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\*(e) Electronic products are often thrown away when they break or the battery is flat.

Discuss the advantages and disadvantages of disposable electronic products to the user.

(6)

Area with horizontal dotted lines for writing the answer.

**(Total for Question 14 = 19 marks)**

**TOTAL FOR PAPER = 80 MARKS**



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