

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**

Friday 23 May 2014 – Afternoon  
**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.
- Keep an eye on the time.
- 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.**

**For each question 1 to 10, choose an answer A, B, C or D. Put a cross in the box indicating the answer you have chosen . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .**

**1** The letters PCB stand for:

- A** primary circuit breaker
- B** printed circuit board
- C** prototyping copper block
- D** positive conducting bars

**(Total for Question 1 = 1 mark)**

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**2** Which of the following metals is attracted to a magnet?

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

**(Total for Question 2 = 1 mark)**

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**3** Resistors are used to:

- A** store current
- B** amplify current
- C** measure current
- D** restrict current

**(Total for Question 3 = 1 mark)**

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**4** The legs of a transistor are called base, collector and:

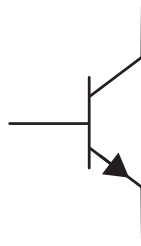
- A** emitter
- B** anode
- C** cathode
- D** radiator

**(Total for Question 4 = 1 mark)**

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5 Identify the circuit symbol below.



- A timer
- B operational amplifier
- C logic gate
- D transistor

(Total for Question 5 = 1 mark)

6 Name the component shown in this picture.



(Source: © Digi-key corporation)

- A reed switch
- B slide switch
- C micro switch
- D tilt switch

(Total for Question 6 = 1 mark)




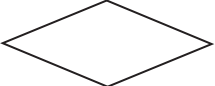


7 Which **one** of the following would be used to measure a battery to see if it is fully charged?

- A ammeter
- B voltmeter
- C capacitance meter
- D ohmmeter

(Total for Question 7 = 1 mark)

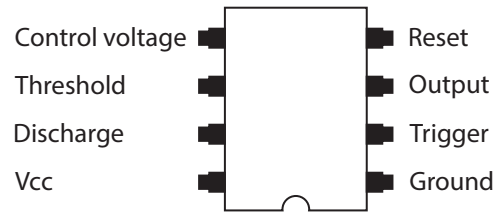
8 Which **one** of the following flowchart symbols is used to show a decision?

- A 
- B 
- C 
- D 

(Total for Question 8 = 1 mark)



9 Identify pin 1 of this 555 timer.



- A Ground
- B Vcc
- C Reset
- D Control voltage

(Total for Question 9 = 1 mark)

10 Which **one** of the following logic gates gives the truth table shown below?

Input 1	Input 2	Output
0	0	1
0	1	1
1	0	1
1	1	0

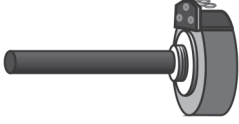
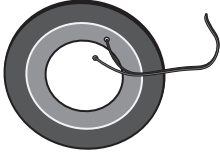

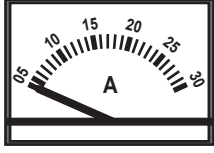
- A AND
- B OR
- C NAND
- D NOR

(Total for Question 10 = 1 mark)



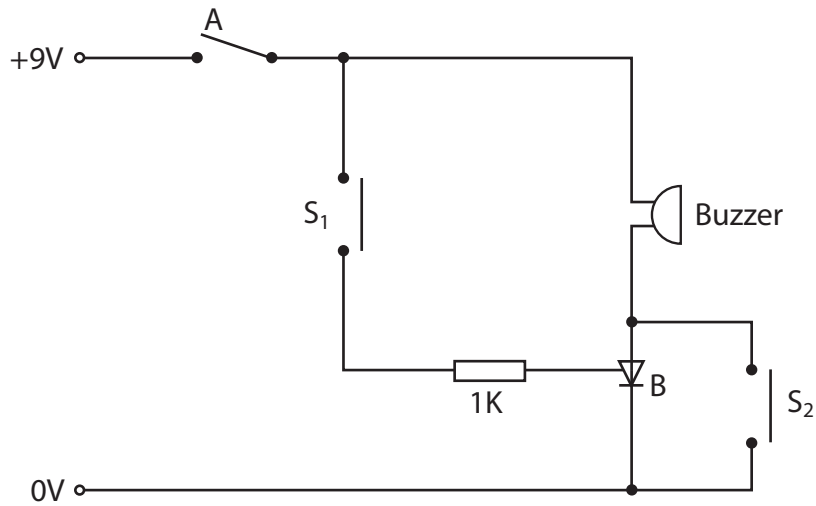
11 (a) The table below shows some equipment and components.

Complete the table below by giving the missing names and uses.

Equipment/Component	Name	Use
	Variable resistor	(1)
	Piezo-electric sensor	(1)
	(1)	For sensing light levels
	(1)	To measure current



The circuit diagram below shows a simple shed door alarm.



(b) Name components A and B. (2)

A .....

B .....

(c) Name the type of switch used in this circuit as  $S_1$  and  $S_2$ . (1)

.....

(d) State how the buzzer behaves when switch  $S_1$  is pressed and then released.

(i) When it is pressed (1)

.....

(ii) When it is released (1)

.....

(e) Explain the function of  $S_2$  in the circuit. (2)

.....

.....

.....

.....



(f) Explain **two** advantages of using a buzzer rather than a loudspeaker.

(4)

Advantage 1

.....

.....

Advantage 2

.....

.....

(g) The circuit designer wishes to change the circuit in order to reduce its environmental impact.

Name a power supply that would be more environmentally friendly than disposable batteries and give a reason for your choice.

(2)

Name

.....

Reason

.....

.....

(h) The case of the alarm will be injection moulded.

Explain why this is a suitable manufacturing process for the case.

(2)

.....

.....

.....

.....

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





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**12** Many parents are concerned about how much time their children spend playing computer games. You have been asked to design a one-off prototype for a computer game timer that will tell a child when to stop playing.

Design the **casing** only. Do **not** design any circuits.

The specification for the computer game timer is that it must:

- have a computer theme
- be adjustable for different time periods
- have a warning method when time is up
- have a suitable power supply
- be able to be attached to and removed from the computer
- have a method of accessing the circuit for maintenance
- be made of a material suitable for a prototype
- be made using process(es) suitable for prototype manufacture.

In the spaces opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the computer game timer 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.

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

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



**Design idea 1**

**(8)**

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**Design idea 2**

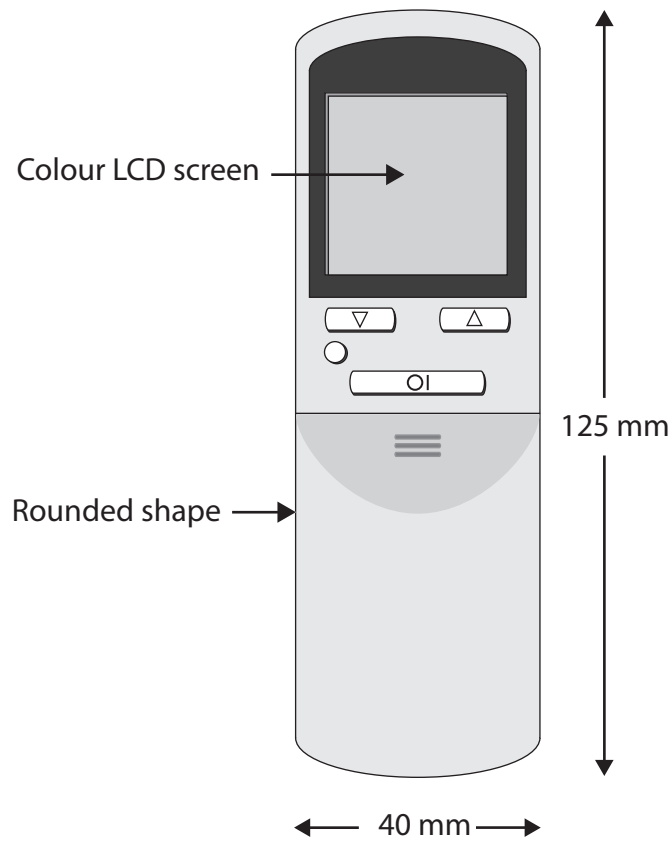
**(8)**

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



13 The picture below shows a remote control handset. It is used to control a projector through a wireless link.



(a) Explain how the handset is successful in meeting the following specification point:  
It fits comfortably into the user's hand.

(2)

.....

.....

(b) Explain **two** advantages of using an LCD screen for the handset.

(4)

Advantage 1

.....

.....

Advantage 2

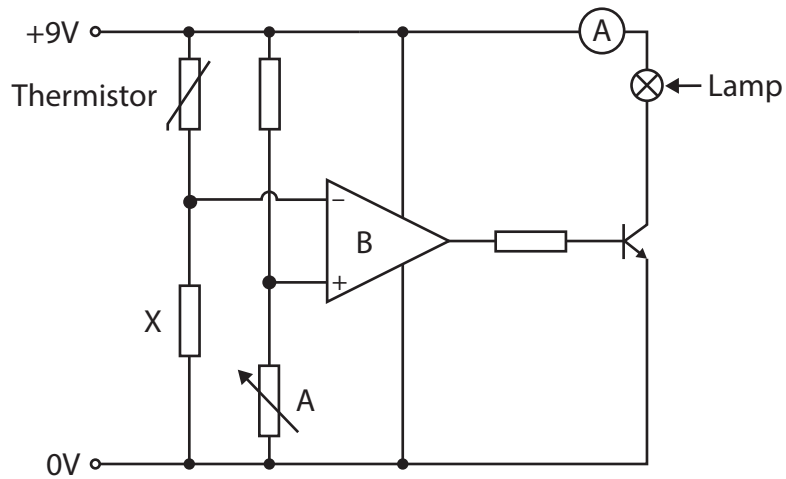
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14 The circuit diagram below shows how a lamp can be switched on and off.



(a) Name component X.

(1)

(b) Explain the function of a thermistor.

(2)

(c) Referring to its two inputs, describe how the operational amplifier (Op-Amp) works as a comparator.

(3)



(d) This circuit switches the light on at low temperatures.

Explain how the lamp could be made to come on at high temperatures.

(2)

.....

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(e) Explain the function of the transistor in this circuit.

(2)

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(f) The ammeter in the circuit reads 0.25A.

Calculate the resistance of the lamp using Ohm's Law  $V = I \times R$ .

**Assume the transistor has zero resistance.**

(3)

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.....

.....

..... Ohms



