

GCSE
D&T: ELECTRONIC PRODUCTS
Paper 3 (**Foundation Tier**)
WEDNESDAY 13 JUNE 2007

F **1953/3**

Afternoon

Time: 1 hour

Candidates answer on the question paper.
No additional materials are required.



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write on the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

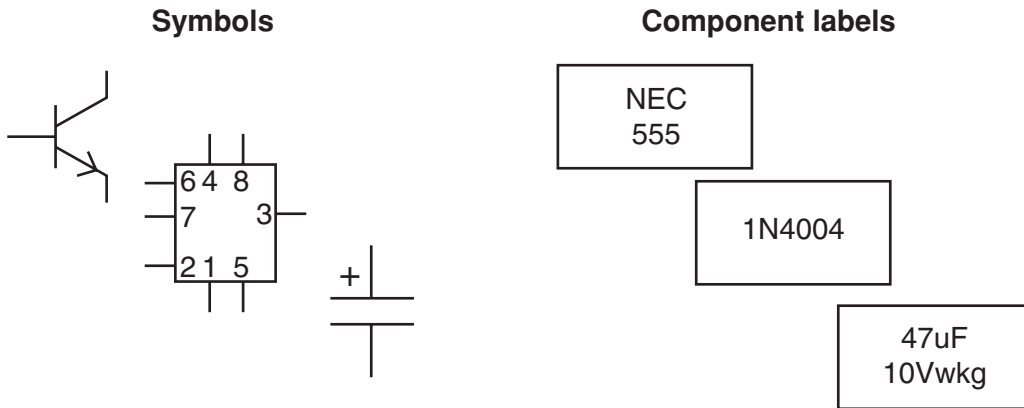
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The marks allocated and the spaces provided for your answers are a good indication of the length of answers required.
- Marks will be awarded for the use of correct conventions.
- Dimensions are in mm unless stated otherwise.
- Show all working for calculations.
- This examination paper contains a product analysis question based on the theme of **External Power Supplies used with electronic products.**

FOR EXAMINER'S USE	
Q1	
Q2	
Q3	
Q4	
Q5	
TOTAL	

This document consists of **12** printed pages.

- 1 (a) The table in Fig. 1 shows some common electronic components. These components normally have labels printed on their cases for identification labels.

Complete the table in Fig. 1 by adding the missing circuit symbols and




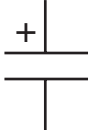
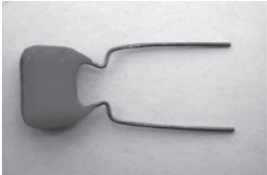
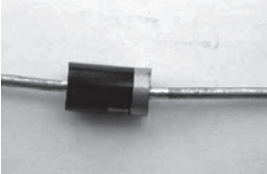

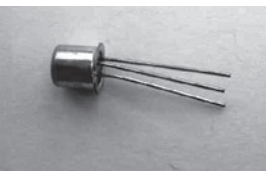

Component	Name	Symbol	Label
	electrolytic capacitor		
	capacitor		10n 250V
	diode		
	transistor		BC108
	timer IC		

Fig. 1

(b) (i) State the name of the component shown in Fig. 2.

.....[1]

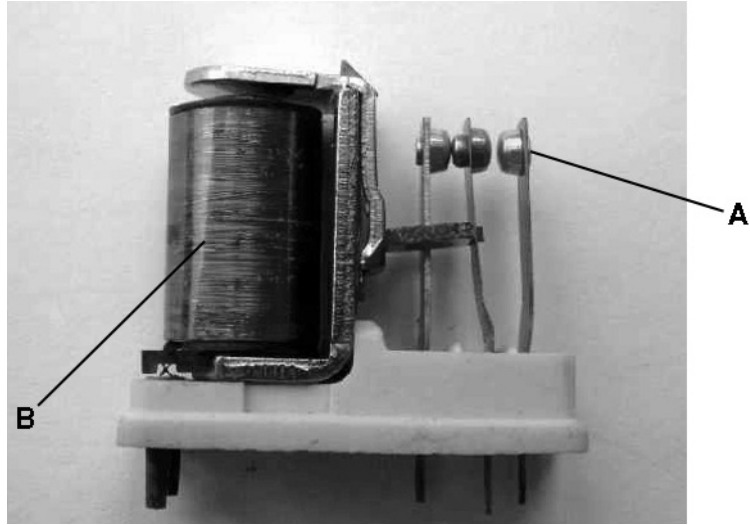


Fig. 2

(ii) State the names of parts A and B as shown in Fig. 2.

Part A[1]

Part B[1]

(iii) Fig. 3 shows the symbol used to represent the component shown in Fig. 2.

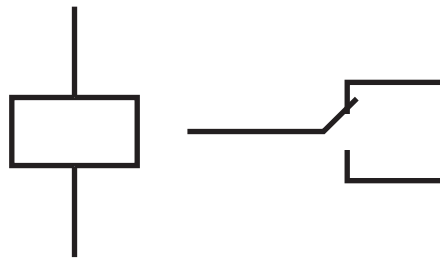


Fig. 3

From the following list select the type of switch used in the component shown in Figs 2 and 3.

- DPS DPST SPST SPDT

.....[1]

[Total: 10]

2 (a) Fig. 4 shows four types of resistor.

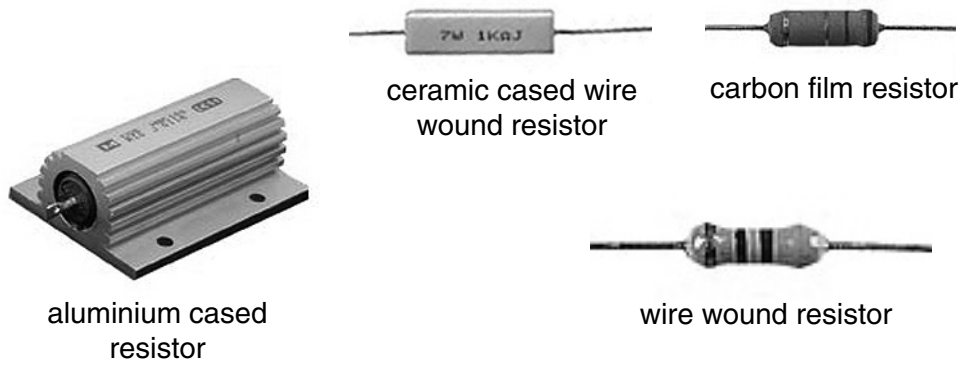


Fig. 4

Place a tick [✓] against the **four** correct statements, and place a cross (x) against the **four** incorrect statements in Fig. 5.

Resistors are fitted with aluminium cases to make them harder to break.	
Resistors fitted with aluminium cases stay cool in use.	
Aluminium cased resistors can pass the largest currents.	
All resistors will heat up when passing a current.	
Only ceramic and aluminium cased resistors heat up when passing a current.	
Ceramic cases are fitted to wire wound resistors to help them lie flat.	
Ceramic cases are fitted to wire wound resistors to protect them against damage from heat.	
Carbon film resistors cost less to manufacture than wire wound resistors.	

Fig. 5

[4]

(b) Fig. 6 shows three ways of fixing a resistor to a PCB.

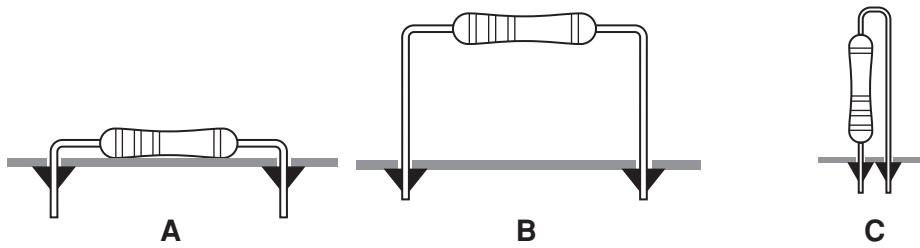


Fig. 6

(i) State which is the correct horizontal fixing method, **A** or **B**.

.....[1]

(ii) State **one** advantage of fixing a resistor using method **C**.

.....[1]

(c) Fig. 7 shows two circuits using resistors.

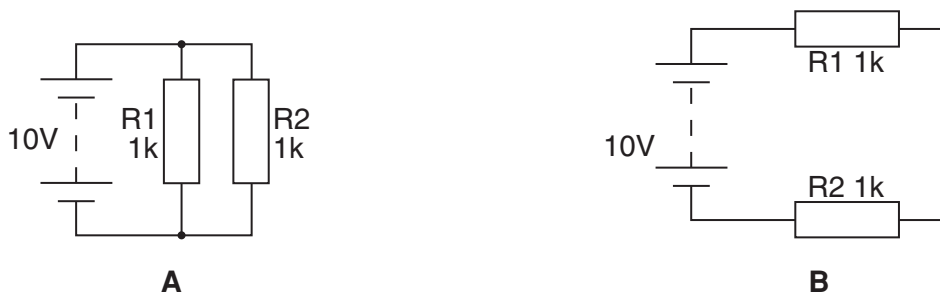


Fig. 7

(i) State the type of resistor arrangement used in the circuits.

Circuit **A**[1]

Circuit **B**[1]

(ii) Calculate the current flow in circuit **B**.

Use the formulas, $R_{Total} = R_1 + R_2 + R_3 \text{ etc}$ and $V = I \cdot R$

.....

[2]

[Total: 10]

3 (a) Fig. 8 shows a circuit used for a rain detector.

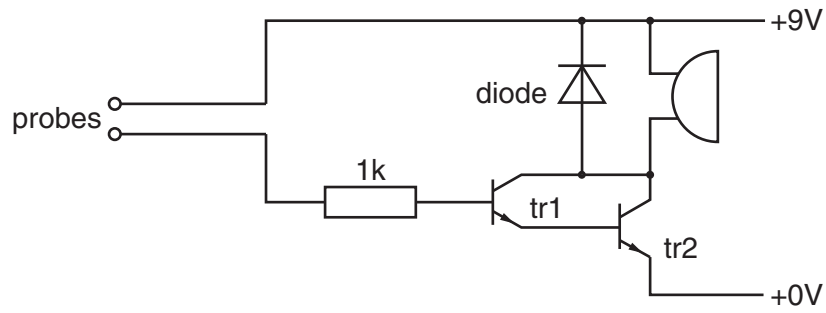


Fig. 8

- (i) Complete the stripboard layout for the circuit shown in Fig. 9.
- Draw in the 1k resistor; and
 - Mark the location of where one of the copper strips needs to be broken.

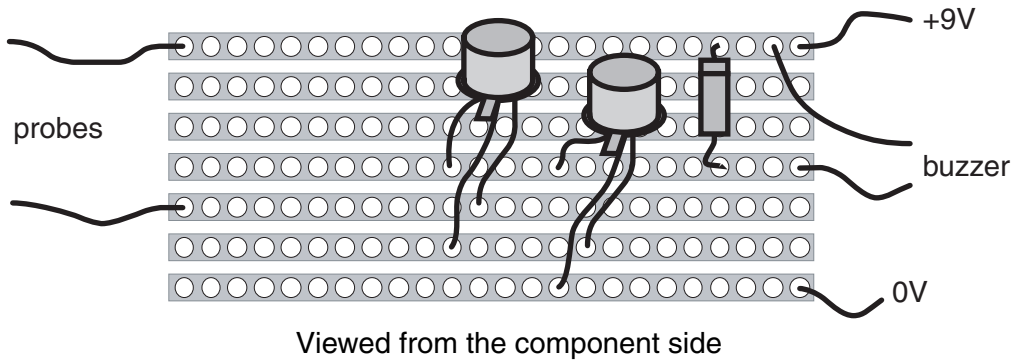


Fig. 9

[2]

(ii) Name the arrangement for the two transistors.

.....[1]

(iii) Give the reason for using two transistors in this arrangement.

.....
[1]

(iv) State the function of the diode in the circuit.

.....[1]

- (v) The two transistors each have a gain (h_{fe}) of 75. Calculate the overall gain of the circuit.

.....
.....
.....[2]

- (b) Use notes and sketches to design a suitable probe for use with the rain detector circuit.

The design should include:

- details of the materials used; and
- a method of attaching wires to the probe.

[3]

[Total: 10]

4 (a) Fig. 10 shows a selection of PCB spacers used for mounting printed circuit boards.

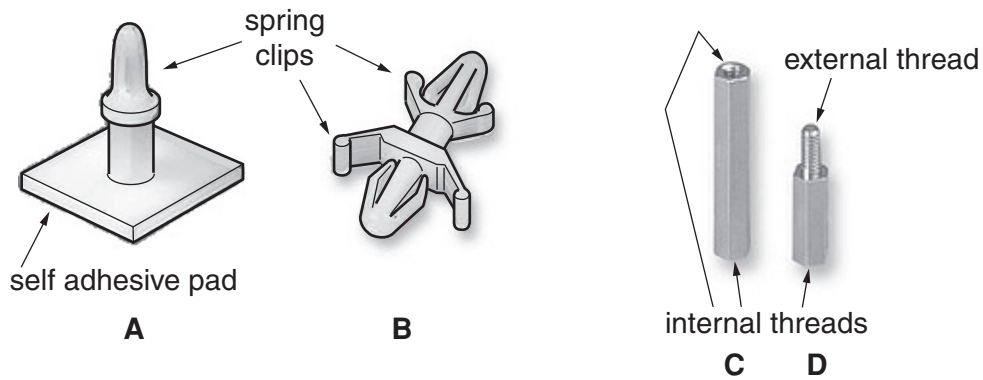


Fig. 10

(i) State the name of a suitable plastic for making spacers **A** and **B**.
[1]

(ii) State the name of a suitable metal for making spacers **C** and **D**.
[1]

(iii) State the process used to manufacture spacer types **A** and **B**.
[1]

(iv) Give the reason that makes this process unsuitable for small scale manufacture.
[1]

(b) (i) State which of the spacers shown in Fig. 10 would be easiest to use when assembling a single prototype device.
[1]

(ii) Give the reason for your choice of spacer.

[1]

(c) Drilling accuracy is needed when using spacer types **B**, **C** and **D** to assemble printed circuit boards in cases.

(i) State **one** method that could be used to maintain drilling accuracy during batch production using only hand operated machinery.

.....
.....[1]

(ii) During large scale production drilling is not always the most economical method for producing large numbers of holes.

Give **one** reason why drilling might be uneconomical.

.....
.....[1]

(iii) Punching is an alternative method for producing accurate holes in sheet materials.

Give **two** advantages of using this method.

Advantage 1
.....[1]

Advantage 2
.....[1]

[Total: 10]

5 Product Evaluation Question.

Fig. 11 shows two external power supplies used to power electronic products.

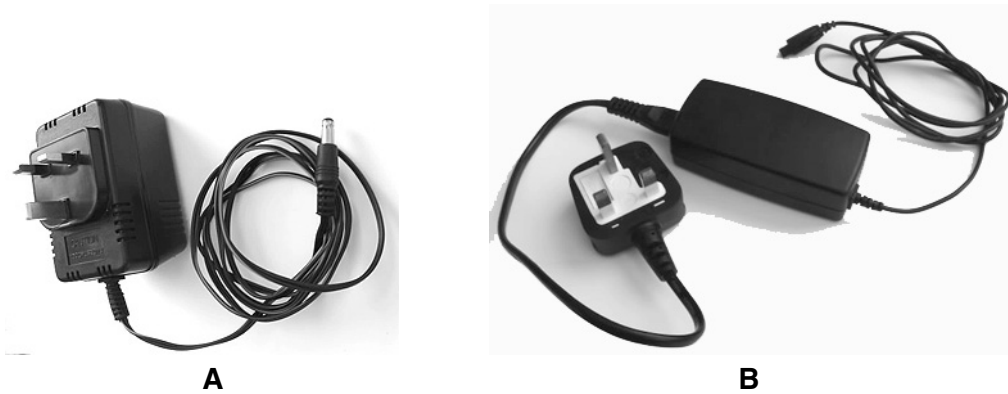


Fig. 11

(a) (i) Give **one** advantage of using external power supplies for electronic products.

.....
.....[1]

(ii) State **one** reason why power supply **A** is safer to use than power supply **B**.

.....[1]

(b) The symbol in Fig. 12 is often found on the labels of power supplies.

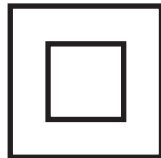


Fig. 12

(i) Give the meaning of the symbol shown in Fig. 12.

.....
.....[1]

(ii) State **two** other pieces of information that you would expect to find on a power supply label.

1[1]

2[1]

(c) Some power supplies are regulated.

Explain the advantage of using a regulated power supply.

.....
.....
.....[2]

(d) Fig. 13 shows two types of transformer used in power supplies.

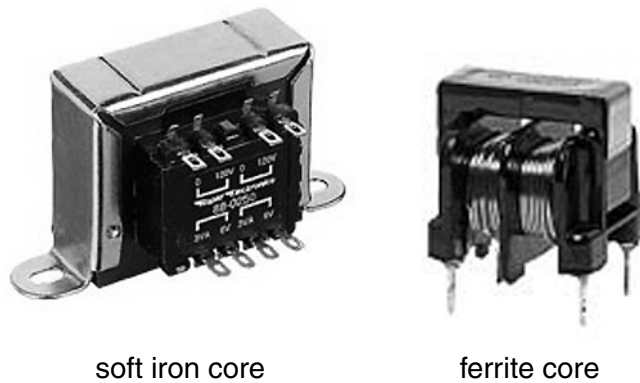


Fig. 13

(i) State the physical property that a transformer core must have.

.....[1]

(ii) State which type of transformer is suitable for use in a switched mode power supply.

.....[1]

(iii) Give the reason why this type of transformer is suitable for use in a switched mode power supply.

.....
.....[1]

[Total: 10]

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