

Examiners' Report
June 2013

GCSE Design and Technology
Electronic Products 5EP02 01

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June 2013

Publications Code UG035698

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Introduction

This written paper enables candidates to access a maximum of 80 marks compared to 120 for the Controlled Assessment.

The specification is now well established and centres are generally preparing students appropriately for the different types of question that they will encounter. The paper is compiled in order to test candidates' knowledge of electronic components, and for the higher grades, their ability to use knowledge in new and unfamiliar situations. The paper also tests their creativity with regard to selecting appropriate components, materials and processes.

It was pleasing to see far fewer students leaving questions unanswered in comparison to previous years, although there are still too many candidates repeating responses within question 12. A common area where candidates failed to achieve marks was within 'explain' type responses, where students often achieved the first mark but failed to quality or explain their response, even though their initial response indicated a good understanding of the question.

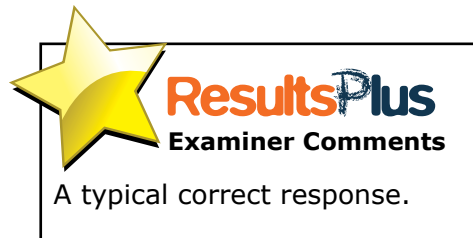
Question 11 (a) (i)

The dot matrix is a display component, it is not designed to illuminate or light up areas.

Question 11 (a) (ii)

This was generally well answered. Most candidates suggested measuring current or voltage, while some suggested testing for continuity and broken PCB tracks.

	Multimeter	To measure current, test amps and like like. (1)
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Question 11 (a) (iii)

This is a rocker switch. Too many candidates identified it as a 'flick' switch, which achieves no mark.

Question 11 (a) (iv)

This was a more challenging question, but 'solder remover' achieved no marks as this could have been ascertained from the content of the question.

Question 11 (b) (i)

A high proportion of candidates identified the capacitor, timer chip and lamp.

Question 11 (b) (ii)

Most candidates achieved one mark for this question by stating that the figure did not belong to any particular group, but then failed to go on to suggest how those would avoid causing offence.

Question 11 (c)

Few candidates responded correctly to this question. Most candidates suggested that the transistor would reduce or share the current/voltage. Few stated that a transistor amplifies or increases current, and even fewer suggested that additional current was required to make the bulb function.

(c) Explain why a transistor has been used between components **B** and **C**.

(2)

So that it feeds enough voltage to each component in order to work.



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Examiner Comments

This response lacks sufficient detail to justify any marks.

(c) Explain why a transistor has been used between components **B** and **C**.

(2)

~~It is to condition when the bulb lights and also~~
to amplify the current so that there is enough current to operate the bulb.



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Examiner Comments

This candidate understands the function of the transistor in this circuit and has accessed both marks.

Question 11 (d) (i)

On the whole, candidates made reference to a variable resistor. Most, but not all then suggested that this would replace the fixed resistor, but some lost the second mark by not stating where it would be located. Virtually no candidates suggested the use of variable capacitors.

(2)

Res A resistor.



ResultsPlus
Examiner Comments

This response is either incorrect or far too vague to justify a mark.

You can add a virable resistor to the circuit to adjust the time delay.



ResultsPlus
Examiner Comments

Mention of the variable resistor achieves a single mark.

Question 11 (d) (ii)

Generally candidates responded to this question very well. Many suggested that soldering would not be needed, that components could easily be changed or repositioned, that time was not required to manufacture a PCB, or that the board could be reused.

Question 11 (e) (i)

Most candidates identified the Brown and Black bands of the resistor, but the Yellow 'multiplier' band caused difficulty and achieved far fewer correct responses.

Question 11 (f) (i)

This was generally well answered, although a significant minority of candidates failed to read the question properly, and suggested that MDF is readily available and economical. Some responses lacked detail, e.g. MDF is waterproof when treated, or is lightweight if thin. Students must avoid using the word 'strong' as it lacks detail.

- 1 Its easy to cut and make into any shape so easier to design the case.
- 2 Its cheaper and does not conduct electricity.



ResultsPlus

Examiner Comments

This response achieves two marks, 'easy to cut' and 'does not conduct electricity'.

- 1 it doesn't conduct electricity
- 2 its cheap & fairly dense for the price



ResultsPlus

Examiner Comments

This response achieved a single mark for 'does not conduct electricity'.



ResultsPlus

Examiner Tip

Do not use non-technical words such as; cheap, light, heavy, strong.

Question 11 (f) (ii)

The vast majority of candidates correctly suggested burning waste MDF. There were too many who did not read the question and suggested recycling or reusing it.

Burning the waste in a furnace



ResultsPlus

Examiner Comments

Burning is a correct response.

You could break the MDF into its constituent parts and re-make the MDF into boards



ResultsPlus

Examiner Comments

Recycling does not recover energy - no marks awarded.

Question 12

This question was very well answered with some excellent ideas communicated. Where candidates lost marks it tended to be due to a lack of specific detail, particularly stating that there would be 'moisture sensor', but not giving any detail about how it would detect the water electronically.

Poorly drawn solutions made many of these responses difficult to mark; many candidates gave messy annotations which were difficult to interpret.

Although less than in previous years, many candidates are still repeating solutions in the second proposal, for which they achieve no marks.

Design idea 1 (8)

LED (to indicate when batteries are low)

LED (to indicate if circuit is on)

On the back of the circuit will be a easy switchable off tabs, this will enable it to be stuck to the side of the battery

AS soon as water goes past this level a buzzer will go off

waterproof material (hard plastic)

Design idea 2 (8)

Led to indicate when circuit is on

Curved roof some water can stay on it



ResultsPlus Examiner Comments

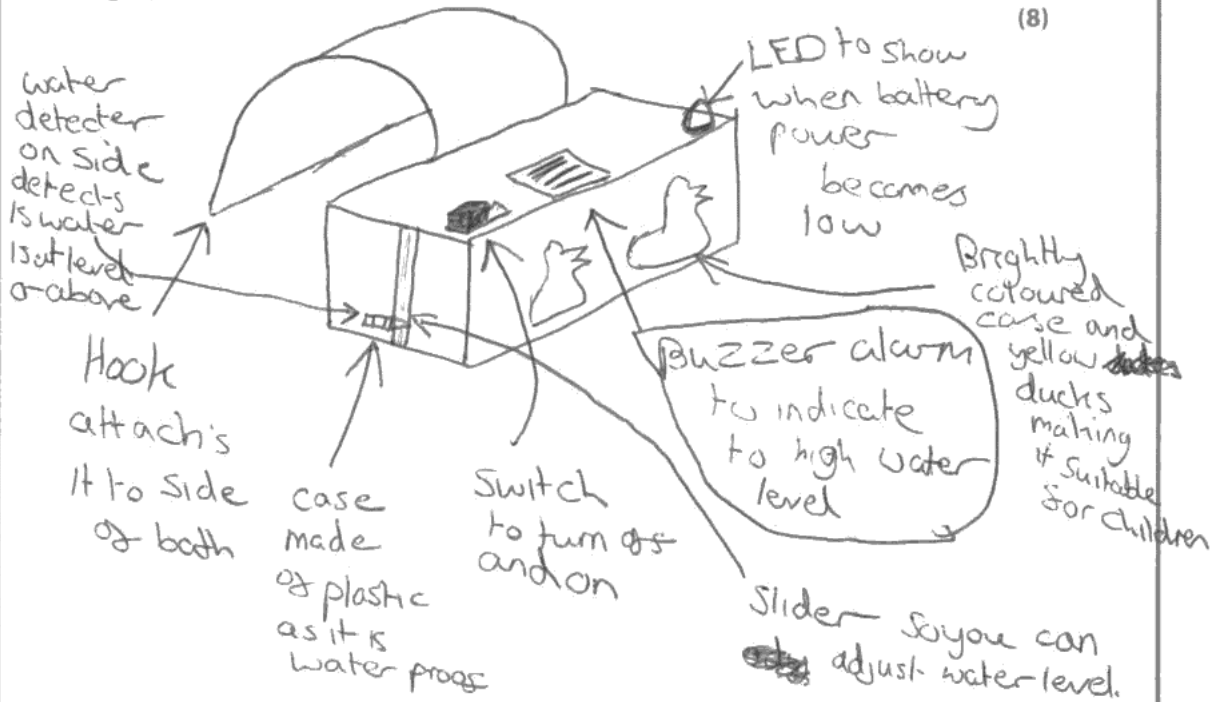
A very poor response to this question, achieving a single mark out of the 16 available.



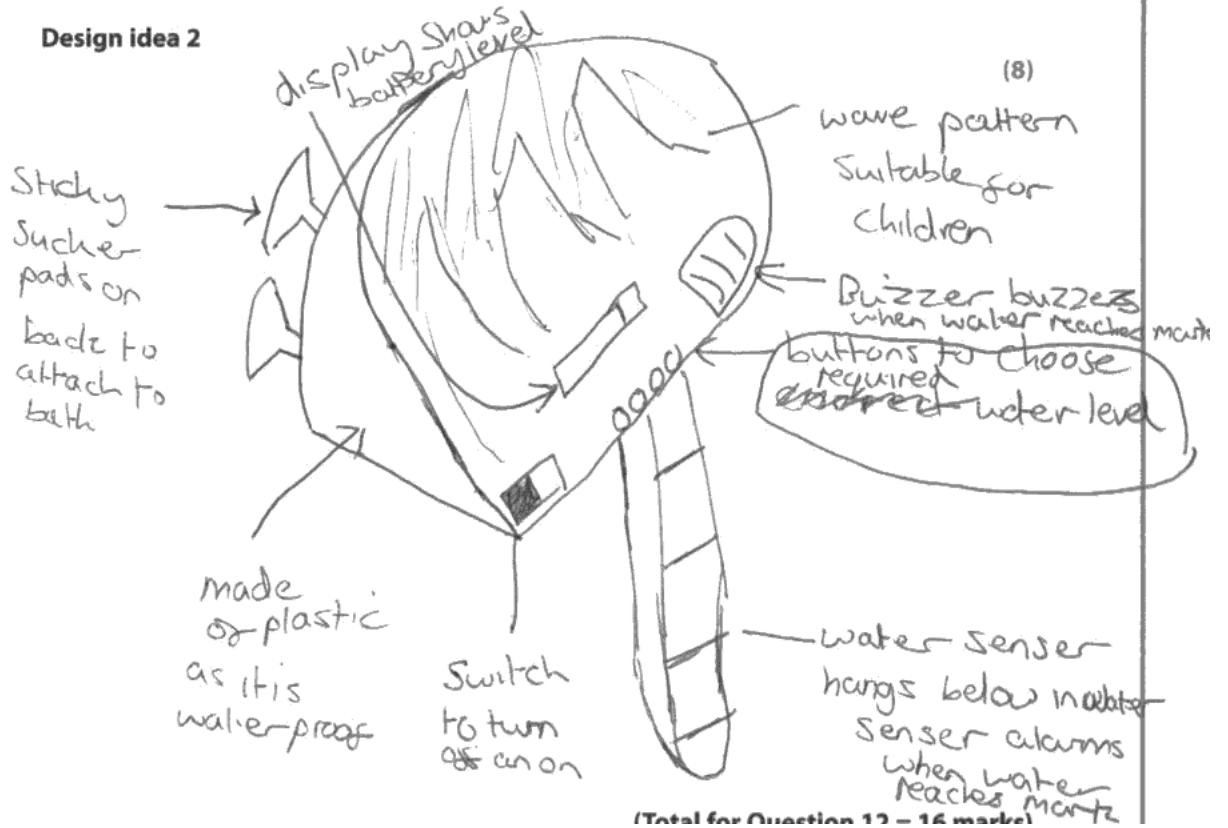
ResultsPlus Examiner Tip

Show the examiner that you understand electronic components and circuits.

Design idea 1



Design idea 2



ResultsPlus
Examiner Comments

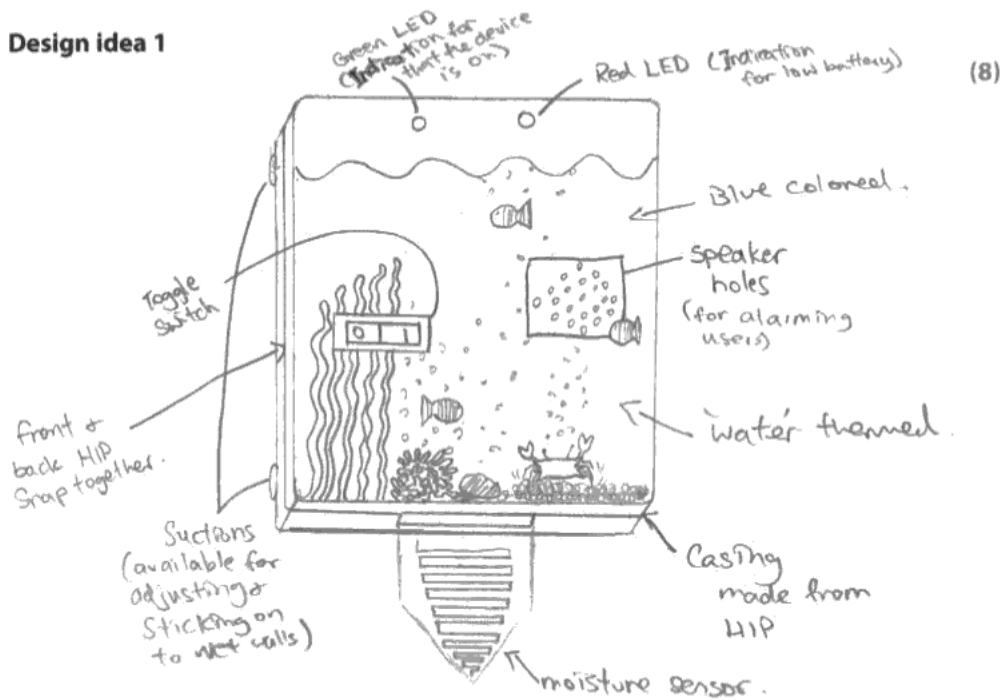
A better response, but far too much repetition in the second response.



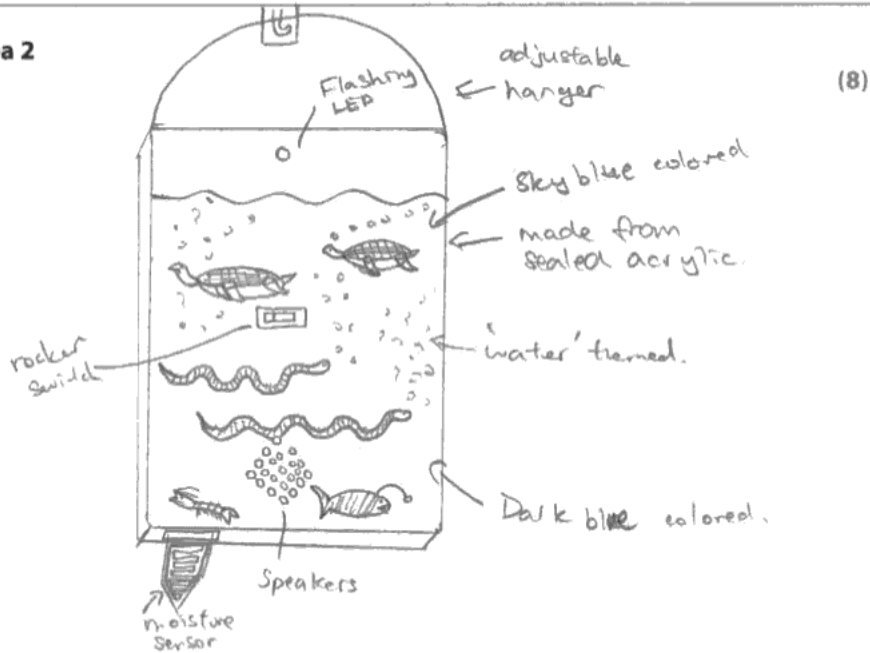
ResultsPlus
Examiner Tip

Every specification point must be answered differently to get marks for your second design.

Design idea 1



Design idea 2



ResultsPlus
Examiner Comments

This high quality response is clearly drawn and addresses most specification points in two different ways.



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Examiner Tip

Neat clear drawing with clear labelling will get you high marks.

Question 13 (a)

Most candidates performed well on this question. There were many references to a wide choice of colours, ease of moulding and its low weight/density.

1. It is strong so it won't break if the phone gets dropped.
2. It is relatively inexpensive so the manufacturing of the product is cheaper.



ResultsPlus Examiner Comments

This candidate has achieved a mark for stating that it is unlikely to break when dropped, 'strong' is too vague, while 'inexpensive' is inaccurate.



ResultsPlus Examiner Tip

Do not use non-technical words.

1. It is ~~strong enough to~~ ^{a durable} and aesthetic plastic.
2. If not needed it could be melted and then reused.



ResultsPlus Examiner Comments

Durable and recyclable - 2 marks.



ResultsPlus Examiner Tip

Show that you understand the materials and processes that come up in the question.

Question 13 (b)

This question was generally well attempted with most candidates gaining some marks. Many good responses showed an understanding of injection moulding. Once again, where marks were lost it was usually due to superficial responses or a lack of justification. Candidates were often unaware of injection moulding as a high-speed commercial process.

1 easy to form the shape

2 easily snap together.



ResultsPlus Examiner Comments

Two accurate responses but no explanations - two marks.



ResultsPlus Examiner Tip

Explain means 'justify', not just 'say'.

1 Is quick - phones can be made quickly, high frequency
in given time
=> more phones made, => more money made.

2 It accurate - very rare for mistakes => case always fits properly
and no cases are chucked out => no waste, better build
quality and more money
made.



ResultsPlus Examiner Comments

These responses are clearly and correctly explained, achieving all four available marks.

Question 13 (c) (i)

This question was generally well answered. By far the most common responses related to the size of the buttons, but there were also many candidates mentioning the low number of buttons and the resulting simplicity of the phone.

Has built in volume buttons which can be adjusted easily.
Has big buttons that are clear to read. Has socket piece for earpiece at bottom and is easy to reach. ~~Has~~ Protects front and back and can be split if you want to change something. e.g buttons. It comes in different colours to look good.



ResultsPlus Examiner Comments

This response achieved full marks for the second line, 'has big buttons that are clear to read'.



ResultsPlus Examiner Tip

Answer the question clearly, then move on to the next one.

The holes for the buttons to get through so that the buttons are not hard to get to. The earpiece socket at the side is shaped different so you know it an earpiece socket.



ResultsPlus Examiner Comments

This response doesn't address the question, and achieves no marks.



ResultsPlus Examiner Tip

Make sure that your answer actually answers the question.

Question 13 (c) (ii)

Again, this was generally well answered. Many candidates referred to the volume control, but failed to access the second mark by failing to state that this allowed the sound to be turned down.

Because it has buttons on it that you press if you're in a quiet or loud environment.



ResultsPlus

Examiner Comments

This response is too vague to achieve the second mark.

The volume is adjustable so that it can be quiet for a quiet environment and loud for a loud one.



ResultsPlus

Examiner Comments

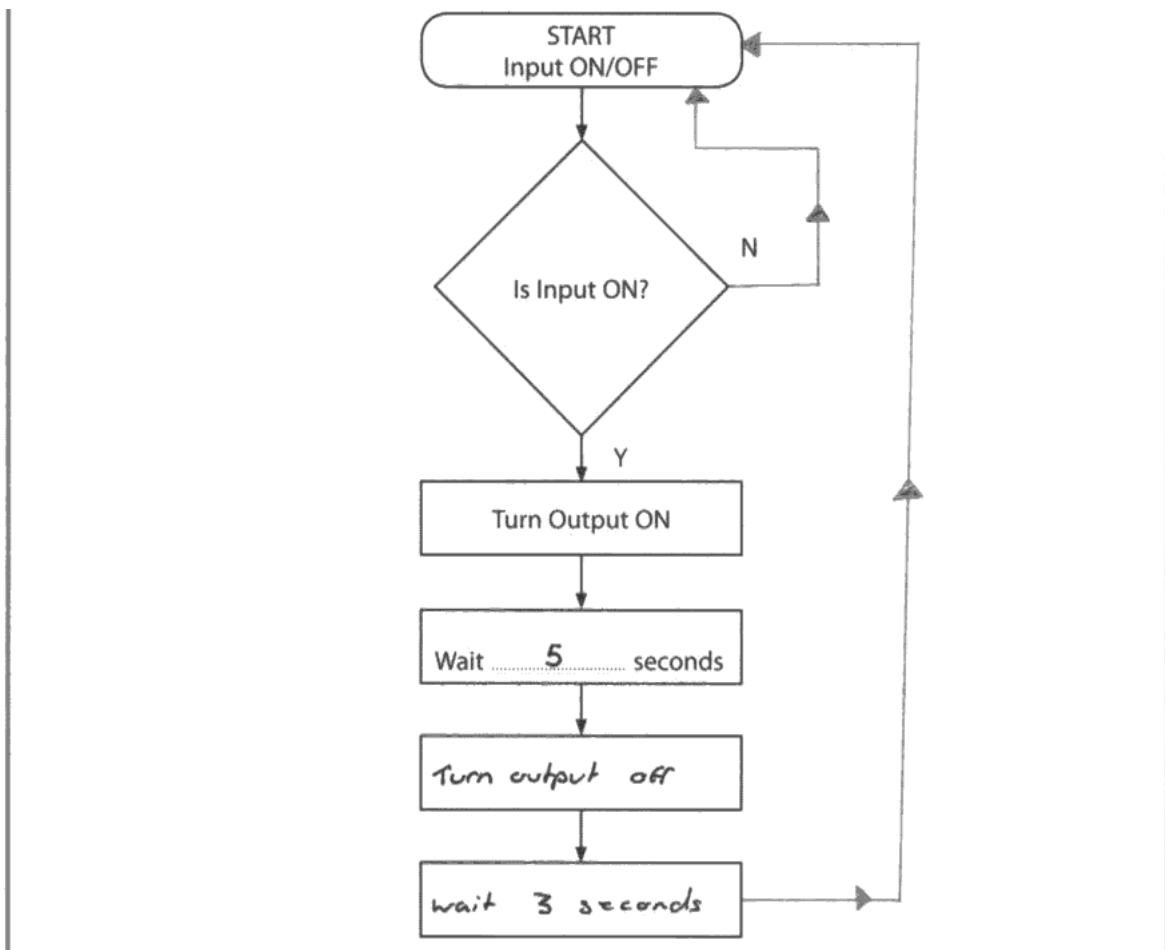
This candidate has achieved one mark in the first line and the second mark in the second line of their response.

Question 13 (d)

This question was reasonably well attempted with the majority of students achieving a reasonable mark. Some of the responses were detailed and indicated a good understanding of the advantages and disadvantages of the two types of battery. Once again, where candidates did not achieve high marks it was usually due to superficial responses or a lack of justification. Written communication continues to be a problem for some candidates, and unfortunately marks were lost as a consequence of this. Candidates will achieve no marks for Quality of Written Communication if they present their response as a table or bullet-points.

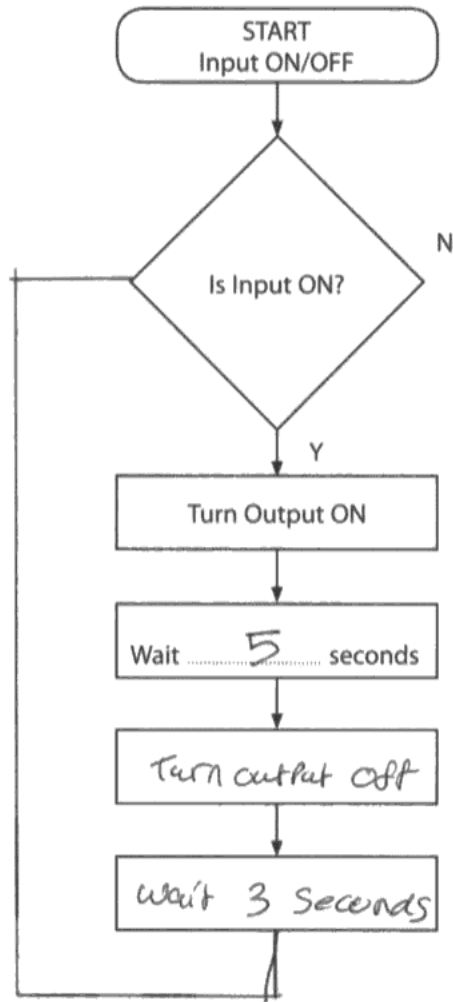
Question 14 (a)

Many candidates performed well in this question. Where this was not the case it tended to be candidates who added additional boxes to the diagram given, or taking the feedback loops at the back of the 'Start' box rather than below it.



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Examiner Comments

The three boxes have been filled in correctly, but the feedback arrows are incorrect.



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Examiner Comments

One feedback arrow has been correctly added, but the second is missing.

Question 14 (c)

Most responses covered one or two points. The most common was the ability to re programme PICs, while some mentioned the number of input and output terminals. The understanding and hardware required for programming were often raised as disadvantages of PICs. There were common misconceptions that PICs are low cost components, and that they are small components.

PICs are ^{increasingly being} ~~becoming increasingly~~ used over other electronic products, they have both advantages and disadvantages. They are good to use in school projects because as they ~~are~~ programmable they can have different jobs meaning the school can order less different components. ~~and~~ This is both good for the school and pupils undertaking these projects. PICs also have disadvantages though, as they are quite hard to program in the first place which takes time and could lead to errors occurring. PICs are perhaps more useful as they can perform many different ~~to~~ jobs but they are difficult to program so it takes a lot of time to program and to ensure no errors have ~~been~~ occurred. (10)



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Examiner Comments

An accurate, detailed and well presented response - full marks.

~~For~~ It takes time to program each chip, this slowing down manufacturing time. PICs are more likely to fail compared to other chips so they are not suitable for ~~these~~ products. In school, students can learn from the process of PIC, but it requires lots of time. PICs are also expensive, therefore not suitable for product manufacture.



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Examiner Comments

This candidate has achieved a single mark for the first line of their response. The remaining material is factually inaccurate.

Question 14 (d) (i)

This question was generally well answered. The most common responses were that the picture was clearer and that more channels were available. 'Better quality' on its own is too vague to warrant a mark.

1. There are more channels available
2. It can be done through satellite for a clearer more consistent picture



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Examiner Comments

More channels and clearer picture - two marks.

1. Digital signal is more constant and better analog.
2. It is cheaper to run only one type of signal so TV licenses go down.



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Examiner Comments

The viewer does not care about the signal, they only care about the picture, the sound, and the number of channels available.

Question 14 (d) (ii)

Most candidates obtained one mark by recognising that the figure was not a member of any minority group, but far fewer candidates achieved the second mark by saying why this would not cause offence to viewers.

Because the character is not real so no stereotypical
complaints can be made and no one can be
offended.



ResultsPlus Examiner Comments

The candidate has recognised that the figure is not a real person, (one mark), and therefore offense will not be caused, (a second mark).



ResultsPlus Examiner Tip

A two mark question means you need to give a two-part answer.

They made the character a ~~robot~~ robot.
This did not involve any religion, race
or gender as robots have none of the above.



ResultsPlus Examiner Comments

The candidate has accessed the first mark by recognising that the figure is not a member of any social group, but has not gone on to say that this means no offence will be caused, so they have not achieved a second mark.



ResultsPlus Examiner Tip

For two marker questions, you may want to use connectives such as; 'so that', 'or else', 'otherwise', 'because' ect.

Question 14 (e)

This question was generally well answered.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Read every question carefully.
- Never leave a question unanswered.
- Two mark questions require an answer and justification.
- Do not give two responses if you are asked to give one response with an explanation.
- In question 12, give two different solutions for each specification point.
- You will not access Quality of Written Communication marks if you use bullet-points, tables or lists.
- Finally, try to write all responses neatly. If the examiner cannot read a response, they cannot award any marks.

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