Pearson

Examiners' Report
June 2017

GCSE Design and Technology
Electronic Products 5EP02 01

ResultsPlus

edexcel

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk.

Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

ResultsPlus

Giving you insight to inform next steps

ResultsPlus is Pearson's free online service giving instant and detailed analysis of your students' exam results.

- See students' scores for every exam question.
- Understand how your students' performance compares with class and national averages.
- Identify potential topics, skills and types of question where students may need to develop their learning further.

For more information on ResultsPlus, or to log in, visit www.edexcel.com/resultsplus.
Your exams officer will be able to set up your ResultsPlus account in minutes via Edexcel Online.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk.

June 2017

Publications Code 5EP02_01_1706_ER

Introduction

The paper this year continued to follow the now very familiar structure which helped to facilitate access to candidates from across the ability range. As in previous years, almost all candidates tended to perform better in questions which required them to recall knowledge and it is clear that they were well prepared in general. The range and depth of knowledge exhibited by candidates was impressive. Candidates found questions which required them to expand upon their initial response more difficult and these tended to differentiate between stronger and weaker candidates.

The multiple-choice questions allowed all candidates access to marks. Stronger candidates commonly scored 8 or 9 marks here and most were able to identify half, or more, of the answers correctly. Candidates found the later multiple-choice questions more difficult and these helped to reward better prepared candidates.

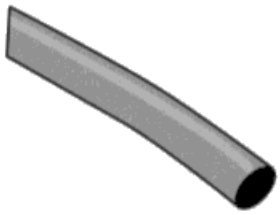
While more candidates were able to access some marks for the longer answer 'describe' and 'explain' type questions most struggled to attract full marks. This was usually because they ignored exclusions in the question stem, they failed to expand upon their initial point, failed to consider the context effectively or relied upon generic terminology in their expansions.

The extended answer questions, 13 (d) and 14 (e), served well to differentiate stronger candidates. The first QWC question, Q13 (d), was addressed at a higher level of response this year, but most candidates exhibited some understanding of the concepts covered by the last QWC question, 14 (e). The level-based marking scheme was applied which rewards candidates who address the focus of the question correctly and can articulate extended arguments. QWC was also assessed here.

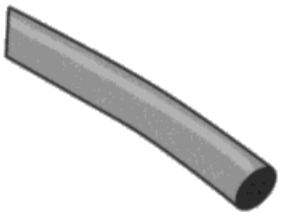
While the quality of written work seemed to be better this year, some candidates struggled to communicate effectively and it is important to encourage candidates to write clearly and legibly. While graphical communication is not assessed in the design question, Q12, it is also important for candidates to be able to express their ideas and some were disadvantaged by poor communication skills. Nevertheless, candidates generally performed very effectively in Q12. This question often requires them to 'show' their design decisions and frequently it was not appropriate to communicate these features through annotation alone.

Question 11 (a) (i)

Most candidates recognised that the heat shrink tubing was used to cover, protect and/or to insulate wires and component legs.

Tools/Components	Name	Use
	Heat shrink tubing	Insulating exposed leads that could cause short-circuiting

ResultsPlus
Examiner Comments
This candidate is clearly familiar with the use of this component.

Tools/Components	Name	Use
	Heat shrink tubing	Heats materials such as plastic causing them to shrink in size.

ResultsPlus
Examiner Comments
This candidate attempts to guess an answer drawing upon the information given in the question.

Question 11 (a) (ii)

Most candidates correctly identified this tool as a pair of wire strippers. A small minority incorrectly provided the answer as 'pliers'.

Question 11 (a) (iii)

Most candidates were able to describe the use of the DIL socket. Some, however, confused this component with an IC.

Question 11 (a) (iv)

A large proportion of candidates struggled to name the etching tank.

Question 11 (b)

This was an early question and most candidates correctly identified the buzzer from the symbol in the circuit diagram. Some identified it incorrectly as a speaker or loud speaker.

It is important for candidates to be able to recognise the Pearson Edexcel IEEE standard electronic symbols for components listed in the specification. The document can be obtained from the Pearson Edexcel website.

Question 11 (c) (i)

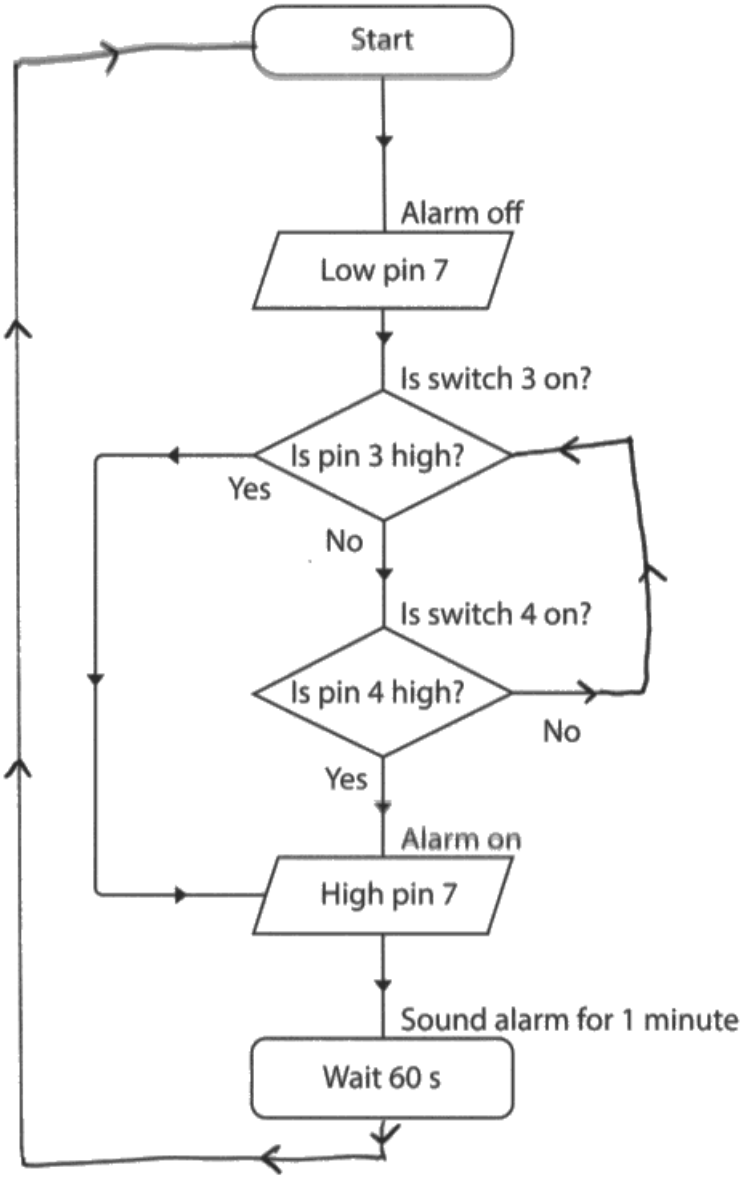
Most candidates attempted to answer this question. Both routes with arrows were required to access full marks. It was important for candidates to draw the return route from the last 'Wait 60 s' symbol through the 'Low pin 7' box in order to turn off the buzzer. Candidates who went on to add unnecessary routes were disadvantaged, especially when these would have affected the functionality of the flowchart. Many candidates only attempted to draw one of the routes. Some candidates omitted arrows.

(c) The program flowchart for the alarm is almost finished.

- The alarm should sound for one minute if either switch is pressed and then turn off.
- It should also sound for one minute if both are pressed and then turn off.
- When it is not sounding the circuit should be able to detect when a switch is pressed.

(i) Add the remaining **lines** and **arrows** to the flowchart below so the alarm will sound for one minute each time either switch is pressed.

(4)



Program flowchart

ResultsPlus
Examiner Comments

This is a well-drawn response which attracted full marks.

Question 11 (c) (ii)

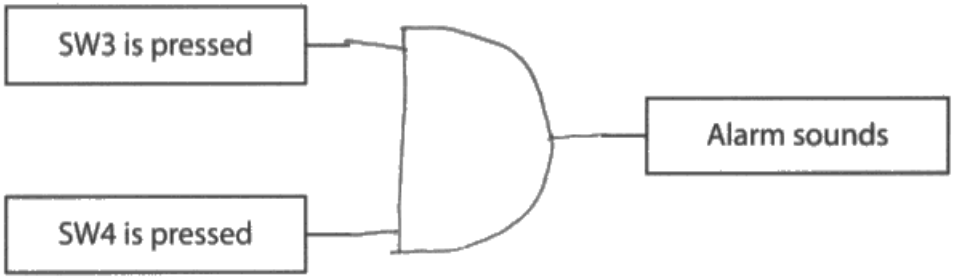
Most candidates were able to provide a logic gate symbol here. However, fewer than half of candidates drew the correct OR gate symbol.

Quality of communication was not assessed here, but candidates needed to construct the gate symbol with the three curved lines to make up the correct shape.

(ii) The program could be represented by a logic gate.

Add the logic gate symbol to the diagram below.

(1)



ResultsPlus
Examiner Comments

This response appears to be an AND gate.

Question 11 (d)

There was a full spread of marks evident here, from 0 to 4. It was important for candidates to provide evidence that they were describing the correct injection moulding process, as many of the stages are common to other forming processes. Generic answers or answers which appeared to describe another forming process were not credited. Good answers exhibited a clear and detailed understanding of the injection moulding process and used appropriate technical terminology. Preparatory and post process operations were not credited.

(d) The case for the alarm will be injection moulded.

Give **four** of the main stages in the injection moulding process.

(4)

1 Making the mould for the case can be made from wood ply.

2 Placing HIPS on top of mould in machine.

3 Vacuum forming the HIPS on to the mould

4 Cutting of any excess HIPS

ResultsPlus
Examiner Comments

This response describes a different process so cannot be credited.

Question 11 (e) (i)

A wide range of responses were accepted and almost all candidates answered this question correctly.

Question 11 (e) (ii)

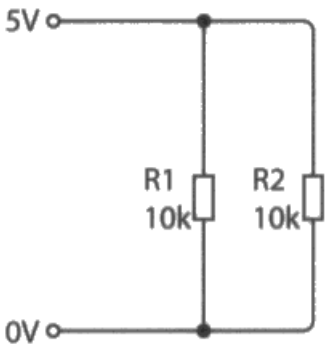
Over half of the cohort managed to attract credit with this question. In order to attract both marks for this question candidates were required to provide a correct answer with full working. Incorrect answers were automatically awarded zero. When candidates failed to record accurate working but produced a correct answer, one mark was available.

(ii) Calculate the total resistance of this circuit.

- Use **one** of the formulae:

$$R_{total} = \frac{R1 \times R2}{R1 + R2} \quad \text{or} \quad \frac{1}{R_{total}} = \frac{1}{R1} + \frac{1}{R2}$$

- Show your working.



(2)

$R_{total} = \frac{R1 \times R2}{R1 + R2}$

$R_{total} = \frac{10000 \times 10000}{10000 + 10000} = \frac{100m}{20000} = 5000$

5k Ω

ResultsPlus
Examiner Comments

This response represents a good, clear and complete method of answering questions like this.

ResultsPlus
Examiner Tip

When you are asked to show your working it is important to record every stage in full, correctly and clearly.

Question 11 (e) (iii)

Just over half of the cohort answered this question correctly.

The question asks candidates to provide the correct term. It would not be sufficient, therefore, to describe or draw an answer, when you are asked to 'name' something'.

Question 12

A large proportion of the cohort performed well in the design question and it was clear that candidates had been well coached. As in previous years, it was important for candidates to 'show' their design solutions for most of the specification points. The addition of supplementary views often helped them to communicate ideas. Labels alone often failed to attract credit. When candidates went on to reference the specification by 'numbering' each of their eight annotation points it was easier for examiners to identify evidence in support of marks.

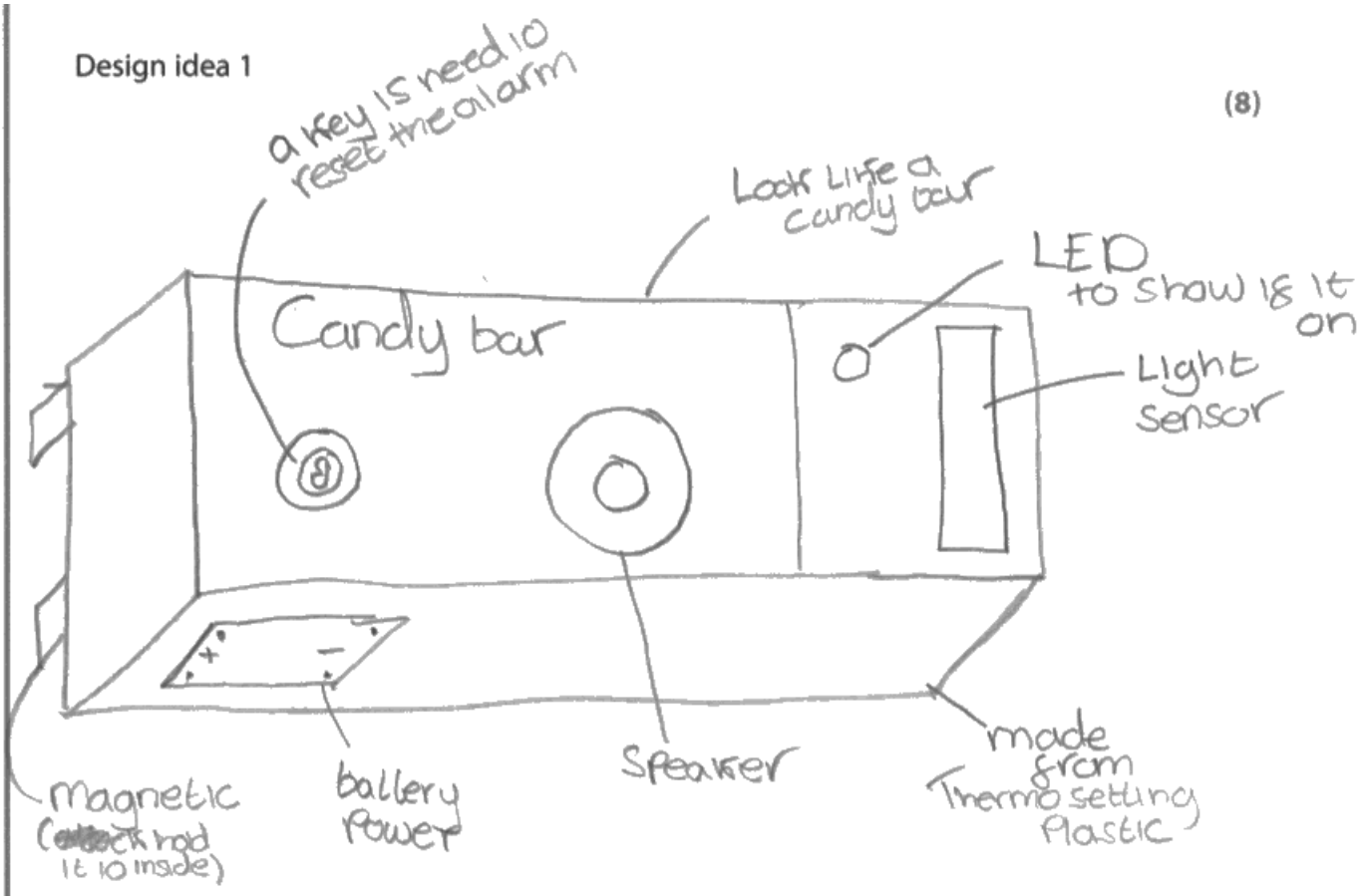
Some candidates lost marks when they failed to include a suitable method of attachment and/or a suitably named sensor. It is good practice to make solutions realistic and clear; a reed switch would probably need to be wired and would require a separate component, with a means of attachment, containing a magnet.

It is important to consider the context of the question: for example, you would not want to damage the fridge by using screws, and magnets would not work on plastic appliances. Many candidates struggled to include a 'secure' method of arming and disarming the alarm, such as a PIN operated keypad or key switch. When candidates used similar components such as different coloured LEDs they could only be credited in one of the ideas.

This response does not score highly. An attempt is made to address all of the specification points but named features and components are not specific. The first idea can only be credited for providing a clear food theme (candy bar), an LED indicator, a speaker as a sound output and a key switch for secure arming/disarming of the alarm. However, the power source, material and sensor are not identified and named. The second solution repeats some features of the first solution, including the (flashing) LED, and can only be credited for the theme, keypad control and material ('Polyproplene': incorrect spelling but close enough to accept).

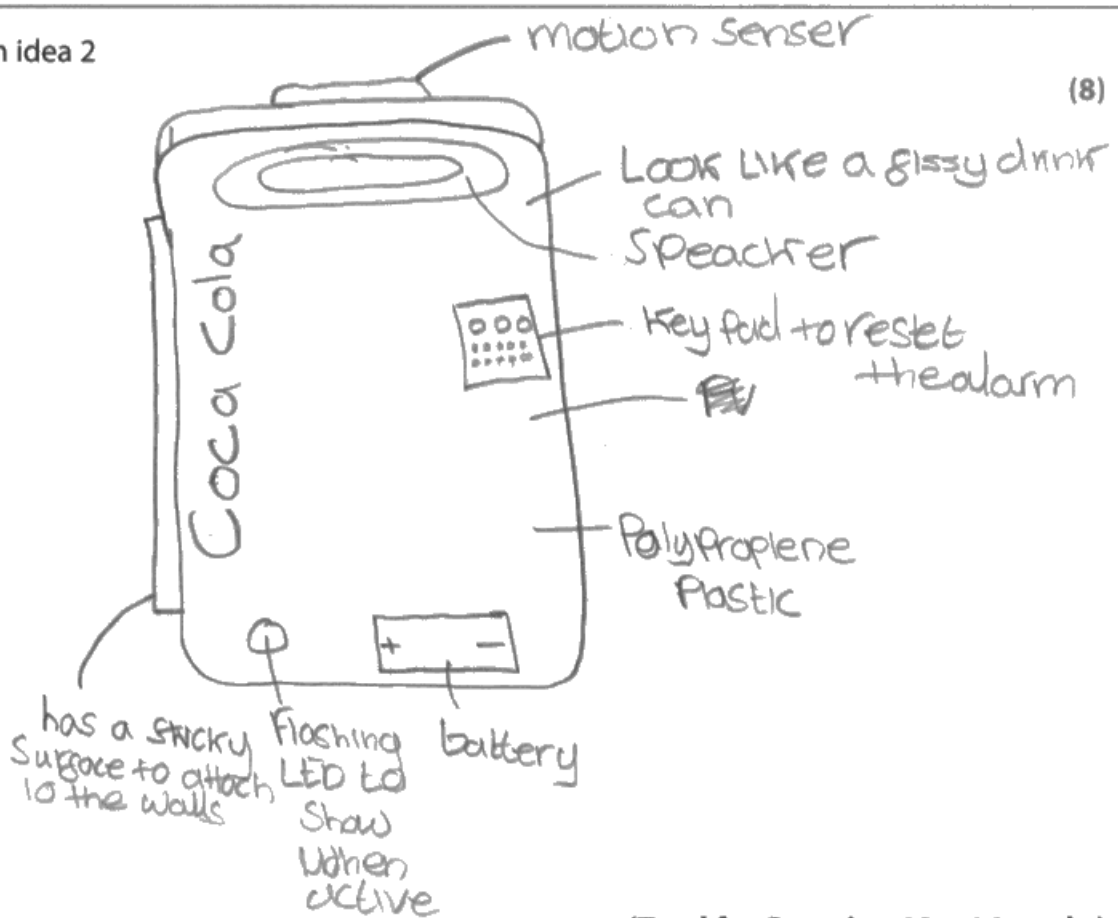
Design idea 1

(8)



Design idea 2

(8)



ResultsPlus
Examiner Comments

Labelled features which are not 'shown' may not be credited.

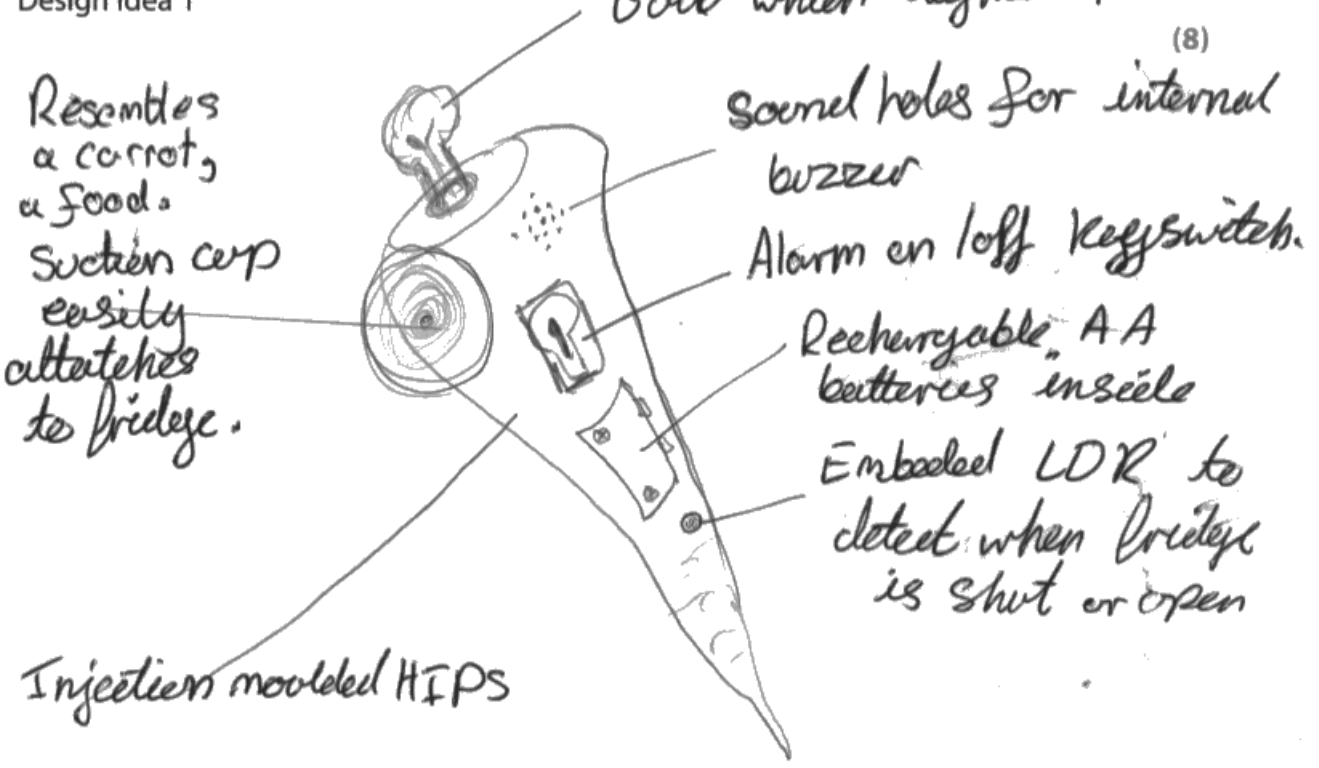
ResultsPlus
Examiner Tip

Use different views to help to explain your ideas. Use a '1 to 8' numbering system with your labels to make sure that you do not miss anything.

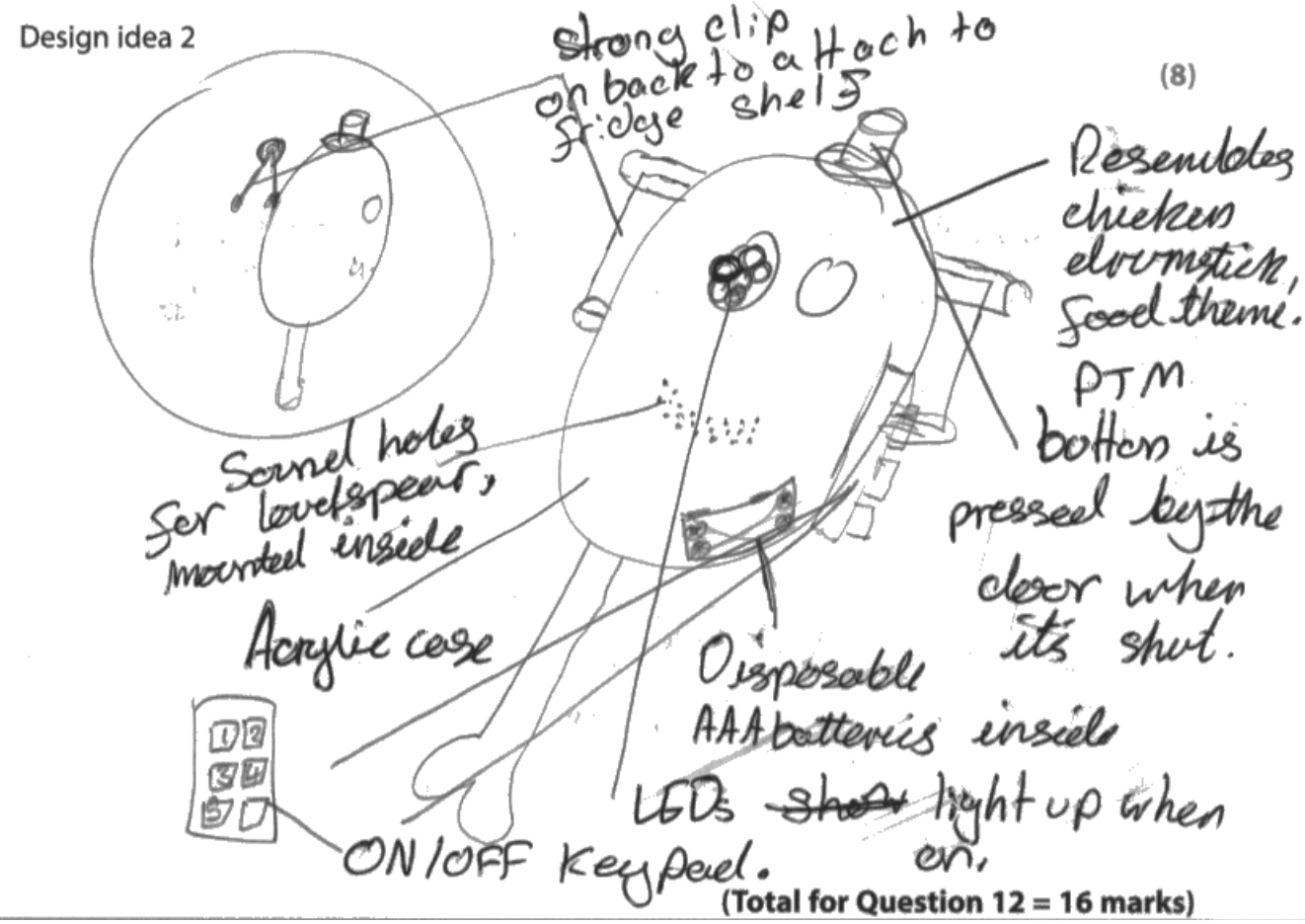
Explain solutions briefly, when necessary.

Include all component parts; a reed switch, for example, would probably need to be wired, and would require a method of attachment as does the magnet used to trigger it.

Design idea 1



Design idea 2



(Total for Question 12 = 16 marks)

ResultsPlus

Examiner Comments

This is a stronger response. The use of additional sketches helps to 'show' each design solution. The operation of the sensor in the second solution (PTM switch) is explained in a rational way. Stronger responses often identify labels with numbers to link to the specification (1 to 8).

Question 13 (a) (i)

Most candidates answered this question with a suitable marking point. However, only half of the cohort added a suitable expansion. This question required candidates to focus upon a property of a material/component. Successful answers went on to include an expansion to help describe ways in which this property helped the material/component to perform its function.

This is a strong, well-justified response which answers the question twice.

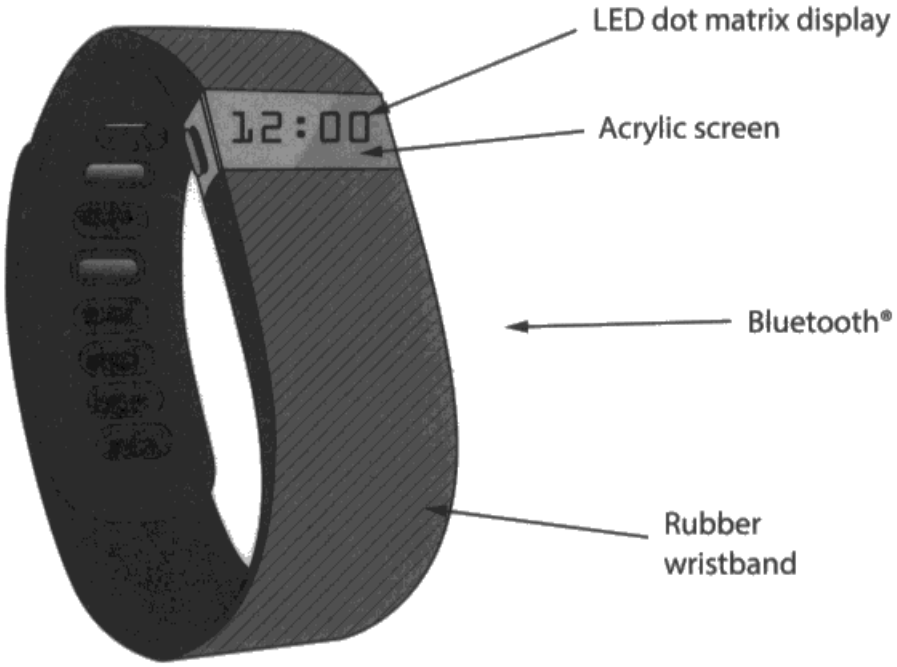


Figure 1

(a) Describe how the properties of the materials/components of the fitness watch, other than acrylic, are successful in meeting the following specification points:

(i) It is comfortable to wear.

(2)

Rubber is quite a soft and flexible material. This means it can bend and flex with the movement of the wearers wrist and it is comfortable to wear. Also has an adjustable strap for different sized wrists to make it more comfortable

ResultsPlus
Examiner Comments

It is important to refer to the property of a material or component which makes it suitable for its purpose.

ResultsPlus
Examiner Tip

Ask yourself which property of the material/component made the designer choose that particular material/ component. Think about how the product will be used, and the property which would make a material/component particularly suitable.

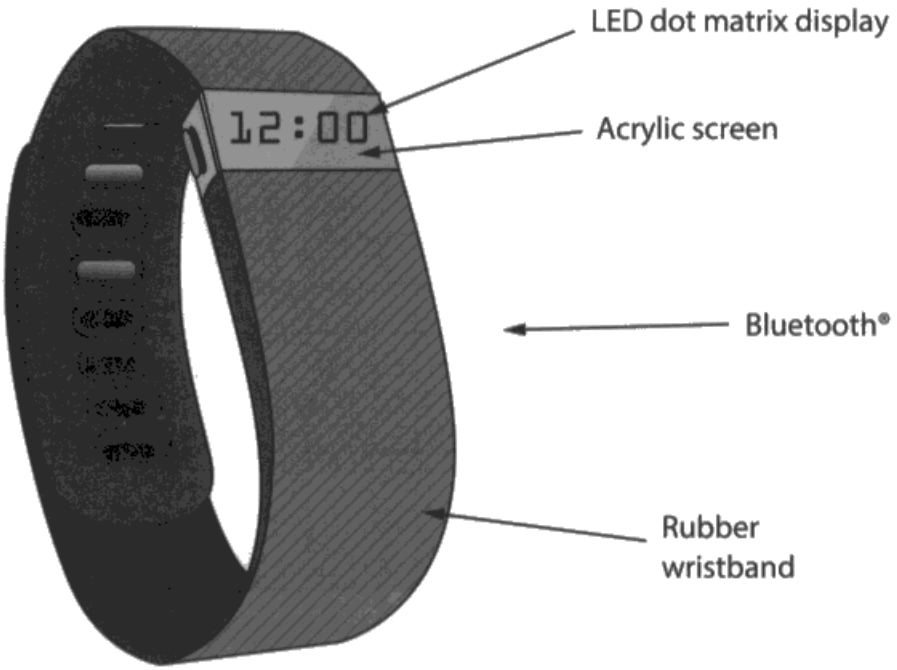


Figure 1

(a) Describe how the properties of the materials/components of the fitness watch, other than acrylic, are successful in meeting the following specification points:

(i) It is comfortable to wear.

(2)

Rubber wristband so its easy / comfortable for the customer to wear

ResultsPlus
Examiner Comments

This answer merely repeats the words and phrases used in the question.

ResultsPlus
Examiner Tip

Read the question carefully to make sure that you do not repeat the same phrases in your answer.

Question 13 (a) (ii)

Once again, the easier first mark required the candidates to identify a suitable property but for the second mark the candidates were expected to expand their description with a point related to the property identified. It is important to encourage candidates to read the entire question carefully as 'acrylic' was excluded in the question stem.

(ii) It is easy to read.

(2)

Yeah because it will be a clear material

ResultsPlus
Examiner Comments

This response appears to be referencing acrylic which has been excluded and it does not go on to expand upon the identified property with an explanation.

This response provides a good explanation.

(ii) It is easy to read.

(2)

The LED Dot Matrix display is very easy to read as it forms numbers in digital form which is easier to read then analogue. Also Acrylic is See through so the LED dot Matrix display should be Clear.

ResultsPlus
Examiner Comments

This response provides a good explanation, which is referenced by the Mark Scheme. The candidate has identified the digital display and has made a comparison to analogue alternatives. Although the candidate goes on to address the use of acrylic, which has been excluded in the question stem, we would not want to apply a penalty as a correct answer has already been provided.

Question 13 (b)

=Most candidates were able to pick up marks here but it was rare to see candidates accessing full marks. Candidates were expected to identify two appropriate, technical material properties and to explain how these enhanced the functionality of the component. Generic answers, or responses which were considered to be inaccurate, were excluded in the Mark Scheme. Acrylic is not particularly scratch resistant, for example, unless treated with coatings or additives. Again, it was important to consider the context of the question.

(b) Explain **two** properties of acrylic which make it a suitable material for the fitness watch screen.

(4)

Property 1

It can be clear and seethrough. It will allow light to pass through so the user can see the display clearly.

Property 2

It is weterproof. It will not allow weter in which might damage the components inside.

ResultsPlus
Examiner Comments

This answer explains two advantages successfully.

ResultsPlus
Examiner Tip

Use connective words such as 'so' and 'because' to expand your explanation.

(b) Explain **two** properties of acrylic which make it a suitable material for the fitness watch screen.

(4)

Property 1

Strong

Property 2

Cheap and easy to manufacture

ResultsPlus
Examiner Comments

This response uses generic, unjustified points which fail to attract any credit.

ResultsPlus
Examiner Tip

Try to avoid general unjustified terms such as 'cheap' or 'strong' and make sure that you explain your answers.

Question 13 (c)

Candidates were generally familiar with this technology and this question was generally accessible to most. Answers were expected to focus upon the technical features of Bluetooth® PAN networks. The term 'wirelessly' was used twice in the question text so answers which repeated this feature were not credited. Again it is important for candidates to avoid repeating information from the question.

(c) The fitness watch band can be connected wirelessly to other devices using Bluetooth® technology.

Explain one **advantage** and one **disadvantage** of using Bluetooth® to wirelessly connect the fitness watch to another device to transfer data.

(4)

Advantage

It does not need any wires to transfer data and it is quick.

Disadvantage

The radio waves transmitted can only travel a short distance, so both devices must be relatively close to one another.

ResultsPlus
Examiner Comments

The advantage refers to the wireless aspect of Bluetooth® which is referenced in the question stem, and is excluded by the Mark Scheme. However, the disadvantage is correct and justified.

ResultsPlus
Examiner Tip

Make sure you understand the focus of the question. Read it more than once. You need to expand your answers beyond the information given in the question.

Question 13 (d)

This question triggered a range of responses and was a good differentiator. The bulk of answers were marked as Level 1 or Level 2 responses. Most candidates appeared to be familiar with the products or were able to use the information provided to make sensible comparative arguments. The level-based marking scheme was applied. Stronger responses tended to:

- focus on 3 or 4 areas, expanding arguments in depth beyond the information provided in the question
- focus upon the form and user requirements
- make a balanced comparison
- relate arguments to product context and use

Weaker comparisons listed information provided in the paper with limited expansion. This type of answer was confined to 0 to 2 marks. Stronger responses focused upon the contexts in which each product would be used.

Most candidates successfully focused upon the differing forms of the two products and addressed the functional features related to user requirements. Strong level 3 comparisons exhibited good subject knowledge and expanded relevant arguments to explain points more effectively. For example, when discussing the issues related to product use and user requirements, a strong response would go beyond the fact that the adjustable elastic fabric straps of the second product could be uncomfortable, arguing for example that it might be constricting, might slip off the chest, or would absorb sweat.

There were fewer instances of candidates who submitted grids or lists which failed to form effective expansions and comparisons. Many candidates tried to cover as many aspects as they could and this prevented them from discussing the issues in any depth. Higher scoring responses tended to focus on fewer areas and explored them in more detail, establishing links between related points. Issues of legibility were sometimes a concern and candidates should be reminded to communicate their ideas clearly and effectively. QWC was also assessed here.

This level 3 response demonstrates a good understanding of the subject. The candidate provides a real comparative analysis, which is related to the use of the product, user requirements and form. Points are expanded effectively and conclusions are drawn.

*(d) Figure 2 shows another fitness product which is designed to be worn around the chest, next to the skin. It can be linked with compatible gym equipment, mobile phones and computers to give real time or recorded data such as heart rate.

- Wireless connection to phone/computer
- Adjustable elastic fabric strap
- HIPS case
- Printed logo

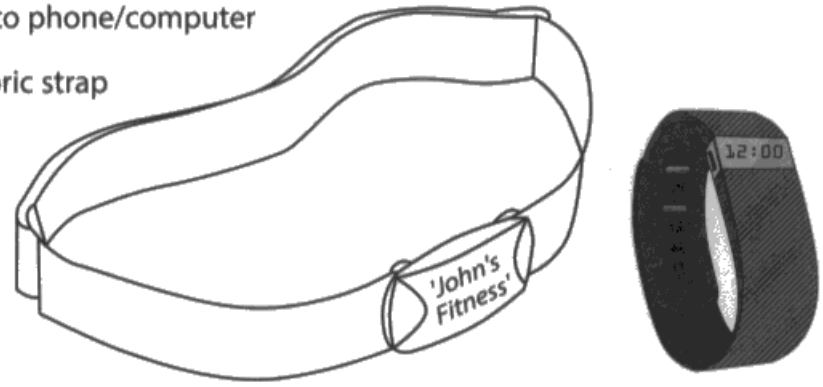


Figure 2

Compare these two products in terms of:

- Form
- User requirements.

(6)

The form of both products are quite similar. The John's fitness product has an adjustable strap which is good if the user has a large or small chest. This meets the user requirement of it being adjustable. The strap is also elastic and fabric meaning that the strap would be nice and confortable to wear but would also bend into your chest shape due to the elastic in the strap. This means that when you are exercising and moving the product won't be uncomfortable and will allow you to move freely. However the John's fitness doesn't have a LED dot matrix display like the other product in figure 1. This means there won't be any way for you to tell the time. Also the John's fitness product is worn on the chest so you wouldn't be able to use it as a watch. The form of the John's fitness product is larger than the other product as it needs to be able to fit around the chest. This means that the product is larger to be carried around

and it cannot be used for everyday use. Whereas the product in figure 1 can be used for everyday use and will also keep track of how your doing fitness wise on that particular day. This makes the product in figure 1 more ideal for users that want to use it for fitness and everyday use. The Johns fitness product is for users that want it specifically for exercise only as it can record data such as heart rate.

ResultsPlus
Examiner Comments
For questions like this it is important to focus upon the areas provided in the question stem.

This is a good example of a weaker level 1 response. Some valid comparisons are identified but the candidate fails to expand upon them and fails to push the comparison on to explore issues in more detail. This response is essentially a list of comparisons extracted from the question preamble.

*(d) Figure 2 shows another fitness product which is designed to be worn around the chest, next to the skin. It can be linked with compatible gym equipment, mobile phones and computers to give real time or recorded data such as heart rate.

- Wireless connection to phone/computer
- Adjustable elastic fabric strap
- HIPS case
- Printed logo

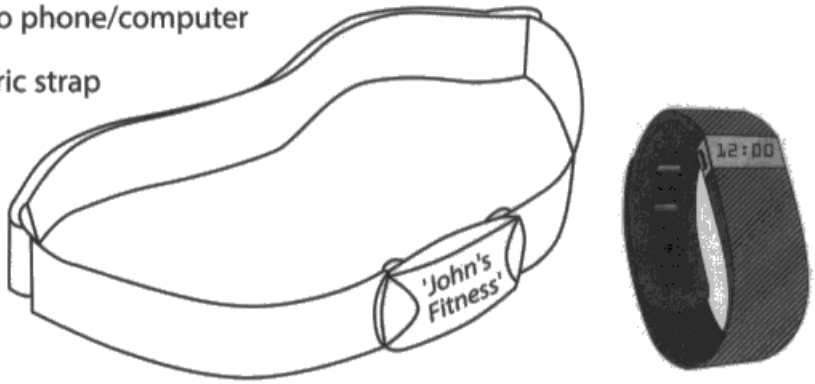


Figure 2

Compare these two products in terms of:

- Form
- User requirements.

(6)

Figure 1 is able to display the time while figure 2 can't. Figure 1 will be more comfotable than Figure 2 as it is in a less awkward position. Both designs can wirelessly connect to other devices. Figure 2 has a printed logo, Figure 1 doesn't. Figure 2 can fit multple sizes as it has an adjustable strap while Figure 1 can't as it is only one size. Both will record data. Figure 2 can show real time while Figure 1 can only show recorded data

ResultsPlus
Examiner Comments

Candidates who plan their answers tend to perform better. It is important to encourage them to write clearly and neatly.

ResultsPlus
Examiner Tip

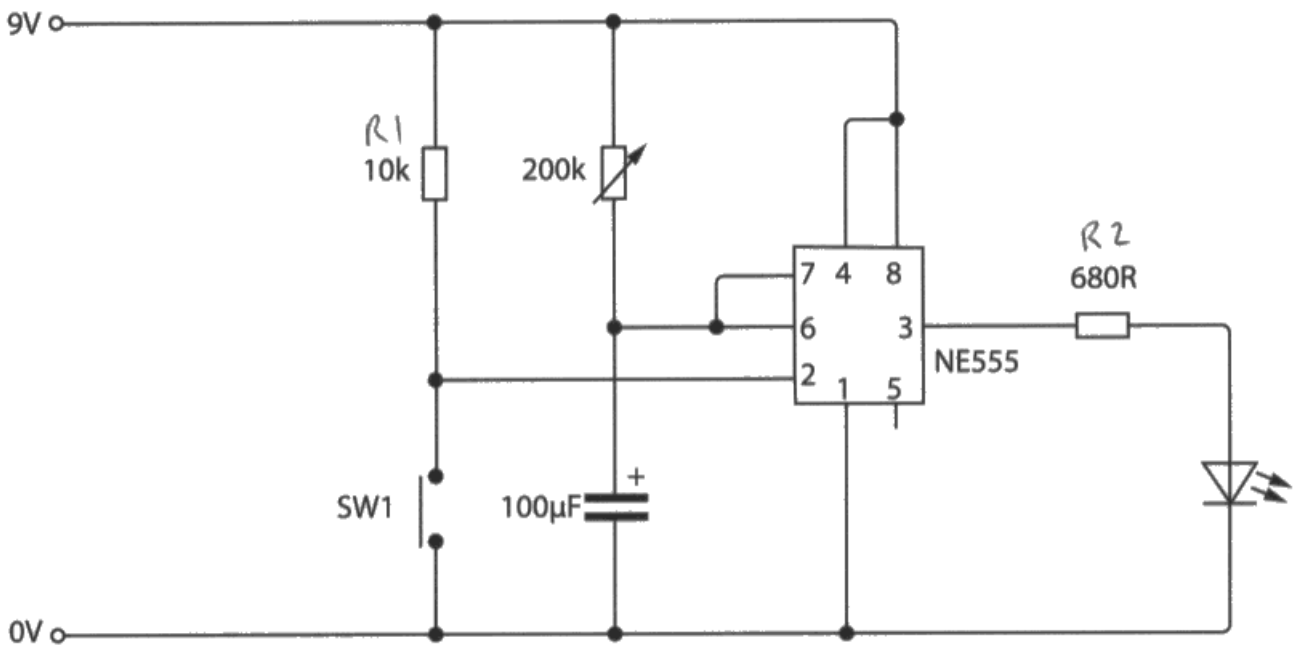
It is important to avoid writing a long list. You should try to expand upon your points using connective words and phrases such as '...so that...' and '...because...'. Once you have written a point add a connective.

Question 14 (a)

This question elicited a balanced spread of responses and mark awards. About one third of candidates were able to describe the initial operation of the LED. About one third made an appropriate reference to the timing period and were able to explain the complete operation of the monostable circuit. Some candidates confused the output with an astable output.

14 A company manufactures timers used in quizzes.

The diagram below shows the monostable circuit which will be used for the timer.



(a) Describe what happens to the LED after SW1 is pressed and released.

(2)

the LED will turn ~~on~~ one when the switch is pressed for a few seconds and then will turn off again.

ResultsPlus
Examiner Comments

This is an example of a good response which describes the operation of the LED.

ResultsPlus
Examiner Tip

Make sure that you can explain commonly occurring circuits.

Question 14 (b)

Less than half of candidates were able to provide a creditable answer for this question. Most understood the VR and capacitor values had to be changed but a smaller percentage were able to explain that the values had to be doubled. Some responses lost credit as they did not specifically identify the VR as one of the components, the value of which could be changed.

(b) Give **two** methods of doubling the timing period.

(2)

Method 1

Increase resistance in variable resistor

Method 2

Increase capacity of the capacitor

ResultsPlus
Examiner Comments

This response attracted one mark as the candidate recognised that both values needed to be increased for the correctly identified components, including the VR.

(b) Give **two** methods of doubling the timing period.

(2)

Method 1

Double the resistance on the variable ~~resistor~~ resistor
(400k instead of 200k)

Method 2

Double the capacitance of the capacitor
(200 μF instead of 100 μF)

ResultsPlus
Examiner Comments

This response correctly identifies the components whose values need to be doubled.

Question 14 (c)

Most candidates appeared to understand that 'pick and place' technology was used to automate the population of PCBs. The fact that speed and accuracy were excluded in the question stem caught out some candidates.

(c) When the timer is batch produced 'pick and place' technology is used to populate the circuit. The technology is extremely fast and accurate.

Describe **two** other advantages of using pick and place technology to build electronic products.

(4)

Advantage 1

Humans are not used allowing for inexpensive operation and can operate 24/7 all hours while humans require breaks creating more circuits in a set time.

Advantage 2

Surface mount used saving resources for solder causing less material total used and is more sustainable.

ResultsPlus
Examiner Comments

This response successfully draws upon a good understanding of the technology. The first advantage which recognises that continuous production leads to higher levels of output. The second advantage explains that the production SMT PCBs reduces the consumption of materials.

ResultsPlus
Examiner Tip

Try to explain your answers in detail.

Read the entire question carefully so that you avoid talking about properties or features which have been excluded.

(c) When the timer is batch produced 'pick and place' technology is used to populate the circuit. The technology is extremely fast and accurate.

Describe **two** other advantages of using pick and place technology to build electronic products.

(4)

Advantage 1

It will get it in the correct Place So it is highly accurate

Advantage 2

~~It can compleat~~ The machine can run 24/7 all day and night.

ResultsPlus

Examiner Comments

This candidate failed to recognise the question exclusions for the first advantage and failed to expand upon the second point with a justification.

Question 14 (d)

Although most candidates struggled with this question a significant proportion were able to achieve some marks. The ECF (Error Carries Forward) method was applied which credited each individual step and rewarded candidates when they performed a correct operation. It was therefore very important for candidates to show each stage clearly. However, the final mark for an accurate calculation was not available if candidates had failed to convert at least one value correctly, earlier in the question. Responses which used erroneous working to arrive at a correct total were not credited.

(d) Calculate the time period using the labelled values.

- Show your working
- Include the correct units in your answer
- Use the formula: T = R x C

(4)

$200,000 \times 100 \times 10^{-6}$

$200,000 \times 0.0001 = 20$ Seconds

ResultsPlus
Examiner Comments

This candidate successfully converted microfarads to farads, and kilo-ohms to ohms. They used standard form correctly to arrive at an accurately calculated total and used the correct unit for time.

ResultsPlus
Examiner Tip

If you show your working in clear stages like the examples, you may get some marks even if you get the answer wrong.

This is a very good example of a strong response. Each stage is recorded clearly and logically.

(d) Calculate the time period using the labelled values.

- Show your working
- Include the correct units in your answer
- Use the formula: T = R x C

(4)

T = R x C

T = 200 000Ω x 0·0001F

T = 20s

20 seconds

ResultsPlus
Examiner Comments

The most common mistake was to convert the capacitance value from microfarads to farads incorrectly.

ResultsPlus
Examiner Tip

Practise recalling your formulae and doing calculations.

Question 14 (e)

This question was designed to reward stronger candidates. There were limited examples of Level 3 responses. It was important for candidates to focus upon the 'reduce' and 'recover' strategies in the context of the 4 'R's, which are defined within the subject specification. Many candidates failed to recognise this. 'Recover', in this context, refers to methods of recovering energy from waste outputs, normally through incineration; 'reduce' refers to the reduction of inputs, energy and materials used within a manufacturing environment. The level-based marking scheme was applied and QWC was taken into consideration for this question.

Weaker responses often betrayed a lack of understanding of the primary issues. Sometimes candidates were able to point to material reduction within a manufacturing system and to provide one or more examples. All too often, however, the focus of the response then launched into a description of the consequential environmental impacts. The candidates tended to go from one point to the next and if there was an expansion of the argument it was often superficial. Candidates commonly confused 'recover' with 'reuse' and 'recycling' strategies.

Stronger responses exhibited some understanding of the issue(s). Most responses generally focused upon the 'reduce' concept and where candidates described strategies which could be employed they talked in general terms about reducing materials by reducing product size and reducing energy consumption through investment in more efficient practices or alternative fuel sources.

It was rare to see a response which addressed both issues successfully.

The manufacturer will use 'reduce' and 'recover' methods during the production of the timer.

*(e) Evaluate how these methods could minimise the impact on the environment.

(6)

The reduce methods will mean that, overall, less material is used in the making of the case meaning that less trees will be cut down for their wood, less oil will be needed to make the plastic and less mining will be needed for metals

The recover methods mean that older products that have broken or become obsolete can be recycled to make new ones, thereby reducing the amount of material gathering

needed - and thereby minimalising the impact on the environment.

Overall, the methods work together to allow many products to be made from older products and even when the older products don't have the needed materials, the minimum amount is taken from the environment, thereby completely minimising the production's impact on the environment.

ResultsPlus

Examiner Comments

This is an example of a weak level 1 response. This candidate understands that 'reduce' strategies can include a reduction in the use of material within the product case. However, they miss the opportunity to explore specific solutions such as making the PCB or packaging smaller. The candidate does go on refer to reduced demand for oil and mined metals, but the reference to trees betrays a limited understanding. The rest of the response confuses 'recovery' with recycling, so fails to attract any credit.

This is a much more articulate response by a candidate who clearly understands the issues. The candidate constructs expansive arguments and expresses them relatively articulately. This is a discussion rather than a list, and points are expanded effectively. Technical issues are addressed and there are few grammatical errors. When environmental issues are discussed they are related to the context of the question. It would have been nice to see some more, specific examples, however.

The manufacturer will use 'reduce' and 'recover' methods during the production of the timer.

*(e) Evaluate how these methods could minimise the impact on the environment.

(6)

Reducing the materials used to create a product means the manufacturer is using less natural resources such as crude oil to create plastic. Also, reducing the amount of material used means if it does end up in the rubbish then it will have less effect on the environment as it is not adding to land fills as much. Another way reducing minimises the impacts on the environment is that they are in smaller packaging which means more can transported in one shipment which in turn will reduce the effect on the environment as less fuel is being burned to do many transports.

Recovering means using the energy from rubbish and land fills when they burn to produce heat and electricity. This minimises the impact on the environment because it means we are burning less fossil fuels and not using up the earth's natural resources. Also, it means that we are reducing the size of land fills which can also help the environment. Furthermore, if you burn the waste materials that have been thrown away, you are stopping them biodegrading and limiting

The process of them giving their energy back to the earth which is good because it means we don't need to mine as much out of the earth so we are minimising our effect on the environment.

(Total for Question 14 = 18 marks)

ResultsPlus

Examiner Comments

Although summary tables are provided as an aide memoire within the Marking Scheme, it is not an appropriate format to employ in response to the QWC questions.It is important to explain your points. Use connective words and phrases such as '...so that...', '...therefore...', '...as a result...' and '...this means...'

ResultsPlus

Examiner Tip

Make sure you understand the focus of the question. Read everything carefully and highlight the keywords.

Paper summary

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

- It is important to read question stems carefully. Repeating information from the question is unlikely to get you marks. You should highlight also any excluded areas and avoid using these in your answers.
- It is usually advisable to avoid using general terms such as 'strong', 'cheap', 'fast', 'easy', and 'professional'. If you must use these terms it may help to add a justification and/or comparison e.g. '...cheaper than ... because ...'.
- Communication skills are important. Written responses should be neat and legible; annotated diagrams/sketches need to be clear and easy to understand.
- It is important to confine your answers to the spaces provided. If you need more space additional sheets can be used but it is important to identify and record which questions have required extra space within the booklet and on the additional sheet.
- Use the mark totals and answer spaces as a guide to the length of your answers.
- Try to remember that for two marks you will need a two-part response. Use connectives, such as '...so that', '...or ', '...because'.
- In question 12 it is often helpful to include supplementary sketches to explain your ideas. You need to refer to specific components, e.g. 'key switch for on/off' rather than 'on/off switch'. Again, in question 12, be careful not to use the same components for both ideas, e.g. 'red LED' and 'flashing LED' are both LEDs.
- For long answer questions, it is better to focus upon 3 or 4 areas of discussion and to explore those in more depth. Make sure you understand the focus of the question and try to use technical terms. Try to extend your discussion beyond the information in the question to make comparisons and conclusions. Imagine how the features identified will affect the user and use of the products in the context for which they are designed.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London WC2R 0RL.