OCR
RECOGNISING ACHIEVEMENT

GCSE

Design & Technology (Electronic Products)

General Certificate of Secondary Education **GCSE 1953**

General Certificate of Secondary Education (Short Course) **GCSE 1053**

Report on the Components

June 2010

1953/1053/R/10

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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CONTENTS

General Certificate of Secondary Education Electronic Products (1953)

General Certificate of Secondary Education (Short Course) Electronic Products (1053)

REPORT ON THE COMPONENTS

Chief Examiner's Report

Results from the D&T Electronic Products Specification for June 2010 show a slight increase in passes at A and C grades. Whilst marks for the papers remained very similar to previous sessions there was a clear increase in the marks awarded by centres for the Coursework element.

In all four written papers there were few 'no response' gaps, this can only be to the benefit of candidates.

Preparation for the themed question in papers 3 and 4 appeared to have been carried out very effectively by centres and this was reflected in the marks for that question.

The issue of poor handwriting remains a problem. It has always been a problem that examiners do their best to overcome; however if a response really cannot be deciphered it will result in no marks being awarded.

It was noticeable that some candidates were unfamiliar with the more traditional skills of breadboarding and PCB design. While the CAD software now available will do an excellent job there are still occasions when it is quicker and more accurate to carry out a test on a prototype circuit using real components. The alternative, when using simulation software is to ensure that it is set to show faults when simulating.

In both of the Foundation Tier papers it was noticeable that many candidates are not gaining confidence in the use of basic component knowledge, such as the resistor colour code and tolerances found in components. Symbols for relays and transistors were not well known, neither were the standard circuit layouts using these components.

Calculations in the papers were carried out to a reasonable standard but in some cases the standard letters or symbols used to represent values in the formula were not known.
The following points should be drawn to the attention of candidates for written papers in future examinations.

- Take a ruler and pencil into the examination;
- Take a calculator into the examination;
- Make use of the printed formulae in calculation questions and be aware of the standard letters / symbols used in these formulae;
- Attempt all questions;
- Answer in the spaces provided;
- Take care with the legibility of handwriting.

1053/03 and 1953/05 Coursework

General Comments

The increasing use of ICT continues to add to the presentation of the design folders but many candidates need to consider how they annotate their work, in order to clearly show the relevance of each piece produced. Once again examples were seen having several pages of computer generated images with no headings or evaluative comments, making it very difficult to understand the relevance of the work presented.

It is important to stress that electronics is the essential element in this specification which must not be overlooked. A number of candidates had spent a lot of time designing enclosures, but failed to offer more than one basic circuit idea. The implications of this are that they score low marks in both objectives three and four as there is little opportunity for development work.
The highest attaining candidates were those who had selected their own individual problems to solve and had generated a good range of valid ideas which were then carefully evaluated before a choice was made.

Specific Comments on the Assessment Objectives

Objective 1: Identification of a need or opportunity leading to a design brief.
There are still a few centres who allow their candidates to spend too long on this section to the detriment of later work. The identification of possible users of the product would benefit from consideration of: age range, gender, interests, nationality, and ability/disability of the users. The use of digital images, extracts from magazines or papers, or brief statistics to support the need, is to be encouraged. Several candidates who had used the "client" format eg '*I have been asked to design…….'* failed to explain the problem sufficiently. Design briefs in most cases were clear, but a number had included specification points.

Objective 2: Research into the design brief that results in a specification.
Internet based research was widely used but candidates must evaluate the material in order to gain credit; simply printing out web pages is a non productive activity.

Survey / questionnaire techniques, in many cases remained basic, resulting in information that was not of any great benefit to the candidate. Better examples, in which the questions were carefully framed to discover what the user required from the product, did in fact lead to information that was used to form the specification. It would be beneficial if candidates presented their surveys to potential users of the product which should result in more valid comments compared to the "school based" surveys. Work on existing products in the majority of cases was based on those products found on a website. For many candidates greater benefit would come from examining in detail products or components that have *similar* functions to their intended product rather than searching for those that are *identical* in function. Eg those including a number display could examine any item with a 7 segment display. This approach would give functional information; the website approach is only likely to give evidence of specifications and manufacturing process for the casing.

Specifications were generally well produced but the stumbling block is still the inclusion of relevant aspects for the, "System to ensure control over the production of the product in batches". This needs to refer to a system which would allow standardised products to be produced efficiently. Several instances were found where candidates explained in detail the different levels of production eg job, batch and mass production. This information is not required although it is part of the Specification knowledge base.

Objective 3: Generation of design solutions.

This is one area where the appropriate use of ICT can make a substantial impact. In the better examples this was certainly the case. The use of CAD packages and the Internet when used effectively are a very powerful tool but candidates must still evaluate each idea against the specification to ensure that the user's needs are catered for. A lack of realistic circuit ideas often coupled to a proliferation of case shapes illustrated the opposite end of the spectrum. We must not lose sight of the fact that this Specification is firmly based upon the electronics element of the product.

Several instances were seen, particularly where centres had restricted their candidates themes, of generic sheets being used as part of the design work. It would be useful if these were clearly labelled to indicate their source.

Greater use was made of ProDesktop for case designs and whilst this is encouraged care must be taken to show specific detail. How the base would be fitted for example. The use of hand drawn sketches to investigate a range of case ideas prior to ProDesktop development still has its place and should not be overlooked.

Each idea for the circuit and case should be evaluated to determine the suitability. A more objective approach to this would be beneficial, checking to ascertain whether the design fulfils the requirements of the specification.

Decisions on which circuit and case are to be taken forward for development should be clear and supported by relevant information. This still remains an area of weakness.

Communication was varied but in the best examples was excellent, with a wide range of techniques being used.

Objective 4: Product development.
Extensive use of CAD for testing and good photographs of breadboards were seen. From the number of non-working circuits that were seen it would appear that CAD testing alone is not proving to give such accurate information for some candidates, and circuit breadboarding may give more reliable results.

When developing circuits and producing the PCB artwork, editing facilities offered by CAD could be used more to benefit the candidate. Centres offering PIC based projects should realise that credit is available for evidence of testing during simulation. A print of the screen image or a photograph of the test board would be suitable. A number of projects using PIC`s failed to explain how the program was developed and tested.

A wide variety of enclosures were seen, from bought in cases modified to suit the purpose to individually designed packages. Whatever approach is taken it is important that the final product represents as near a professional finish as is possible in the school environment. Some excellent cases were seen; particularly those produced using CAD/CAM facilities. PCBs should be correctly mounted as should batteries and the decisions on all these points should be included within this section. When modifying the case top to add, for example, a row of leds or a pattern of holes to let out sound, the use of a jig or template would allow the candidate to consider the implications for quantity manufacture. This is the area which is often overlooked.

Objective 5: Product planning and realisation.
A large proportion of the available marks for this Objective are awarded for planning and there must be evidence for this in the folder otherwise the maximum that may be awarded is 3 marks. More action plans were seen this year including, tools and equipment used, health and safety issues, and quality control.

The most frequent cause of low marks in this section resulted from uncompleted products. It is easy to underestimate how much time the practical work can take but in a 40 hour project it is recommended to allow a minimum of 20 hours, which is in line with the total marks available. At the higher achieving level some excellent projects were seen with little increase in the number of PIC based products. Care must be taken when deciding to adopt a PIC based solution, as instances of inappropriate use can lead to unnecessarily complex solutions, when traditional alternatives would have been more suitable.

A small number of commercial kit based projects were seen and these are to be discouraged as they do not meet the spirit of this specification which is for the candidates to design and build a marketable electronics product.

When awarding marks for this section, it must be remembered that there must be clear evidence in the quality of the practical outcome to support the assessment made. This remains the area where most moderation adjustments are required, usually as a result of high marks being awarded for uncompleted or low quality work.

Objective 6: Evaluation and testing
The majority of candidates produced reasonable results in this section but uncompleted products proved a problem for some. Even in these cases there were many features which could have been assessed against the specification eg if a PCB had been manufactured the tracks could be tested for continuity. Testing remains subjective, in many cases not covering the conditions in which the device was intended to operate. Numeric data collected as a result of testing is required at the higher level. Digital images of testing the final product produced useful evidence. Few candidates had commented upon the performance of the system used to control manufacture.

Presentation
It must be remembered that this section is concerned with the logical and concise nature of the folder and not simply the aesthetics. Separators for each section are to be encouraged as they demonstrate a logical order in the production of the folder.

Papers 1 and 2

General comments

The examination resulted in a wide spread of marks for both Foundation and Higher Tier candidates.

Once again poor handwriting caused problems for examiners; if the examiner cannot read it no mark can be awarded.

Failure to read the question carefully was a problem with both tiers; in many cases this resulted in the problem being described rather than a solution being given.

The majority of questions were attempted by all candidates in both tiers and fewer single word responses were seen eg ‘faster’, ‘cheaper’.

A number of the responses highlighted common weaknesses in basic electronics knowledge; also common sense answers were ignored in favour of those that were too complex.

Problems were encountered by many candidates in thinking through a process in logical order and then going on to describe it step by step.

Responses requiring drawing were in general clear, though detailed sketching and annotation is an area where candidates could benefit from regular practice.

Accurate drawing of circuit symbols was a requirement in a number of questions. Question 5 (a) (i) on the Higher paper required an OR gate to be drawn; a significant number of responses were barely distinguishable from AND gates.

The product analysis question, which was one of the overlap questions appearing in both tiers, was generally well answered. The majority of candidates attempted all parts of the question, many bringing in their practical experience to provide suitable responses.

There was evidence that more candidates had used calculators for the questions involving formulae. It is worth noting that correct units should be used for answers and where possible answers should be rounded to two decimal places.

1053/01, 1953/01 Paper 1 (Foundation)

1 (a) (i) This first question on the paper was generally well answered; the majority of candidates knew the features on each component that could be used for orientation.

(ii) The value of the capacitor was the required answer, along with the working voltage of the capacitor. The understanding of working voltage was in some cases not clear, with '16 volts' being given as the answer.

(b) (i) The majority of candidates could place the diode leg correctly in the circuit from the given symbol.

(ii) The result of placing the diode incorrectly should have referred to the blocking or 'one way' effect of the diode. This could result in damage to a transistor if the diode were there to prevent reverse EMF. The level of damage mentioned in many responses went far beyond this but the most common response was 'the circuit will not work'. As the question appeared early in the paper this response was allowed.

(c) Benefits of using an IC holder were generally well known and most candidates gained at least one mark. It should be noted though that this method is no quicker than soldering an IC directly to the board as the same number of joints still have to be soldered.

2 (a) (i) The characteristics of an NTC thermistor in terms of resistance change were not well known and some candidates confused the drop in temperature of the ice with the rise in resistance of the thermistor.

(ii) This question was not well answered; in particular few candidates knew the purpose of a variable resistor in setting the switching temperature or sensitivity of the circuit. Those who gave the reason for using R3 as 'protection' and failed to mention the transistor being protected did not get a mark.

(b) Of the three pin numbers required the output pin was the most frequently identified. Lack of knowledge of how IC pins are numbered was visible on many papers as candidates had incorrectly numbered the pins on the IC outline drawing.

(c) Those candidates who had read the question correctly and stated how the two faults could be corrected generally gained marks. In too many cases the faults were simply described and no marks were given.

(d) (i) The purpose of flux was known and stated by better candidates, very often unclear descriptions were given which could not be rewarded. The word 'protection' was the key to a correct response.

(ii) The majority of candidates knew that lead is the metal no longer used in solders for commercial manufacture.

3 (a) (i) Knowledge of logic gates was not widespread; a small minority recognised the NOR gate.

(ii) Any candidates who gave an incorrect answer for part (i) but completed the truth table to match their answer were awarded a mark.

(iii) Practical application of logic ICs and the need to avoid floating inputs was not a familiar area for most candidates.

(b) To answer this part correctly candidates had to look carefully at the body of the key switch to see that it fitted the shaped hole. Those who did this realised that the body of the switch would rotate if a round hole was used.

(c) (i) Those candidates who matched the 'P' in the formula with the coil power consumption in mW generally gained at least one mark for the calculation. Correct units were not necessary for the marks unless an answer was given with no working.

(ii) Very few candidates seemed familiar with the benefits of a relay. Of those who did gain marks the most popular response was that a higher current can be operated.

(iii) Connections for a diode were known by most candidates, somewhat fewer gained a mark for the Darlington driver connection; extra connections from the transistor collectors were often seen joined to the output contacts of the relay.

4 (a) A well answered question; the majority of candidates identified accuracy as a benefit of using CAD with the second benefit showing a bit more variety. A relatively high number of candidates incorrectly thought that the use of CAD cuts out human error.

(b) Better candidates were able to give a suitable reason for the use of a tolerance on the mounting holes with some clearly bringing their own practical experience to bear on the response.

(c) (i) A minority of responses referred to measuring the test line for accuracy; others gained the mark through using sensible practical measures such as checking with a component or another template. Measuring the diameter of the holes was not given a mark because of the lack of accuracy that would be obtained.

(ii) A number of candidates failed to read the question carefully and resorted to repeating the question. Those who did note that the comparison was *during use* generally gained marks; very few noted that the acrylic template would guide the drill, rather than just providing a position for the hole.

(iii) The two areas being looked for were alignment of the template and securing it. Clear drawings were seen in response and in many cases good annotation was used. Allowable holding methods ranged from G cramps to double sided tape.

(d) The two symbols being looked for were a recycling symbol and identification of the material type. The majority of candidates gained at least one mark on this question.

5 (a) This question, based on the ergonomic design of the detector, was well answered with most candidates gaining at least one mark. Candidates should be advised that single word responses with no justification will not gain marks, eg 'size' or 'shape' need relating to the hand of the user.

(b) **(i)** The use of self tapping screws was not understood by many candidates even though they will quite probably have been seen in disassembly work. A pilot hole would be required though it would normally be a part of the moulding.

(ii) Features of the injection moulding process were known by many candidates and the fact that two colours cannot be moulded together gave them the mark. The mark was also given to those who noticed the lack of indentation of the symbols.

(c) **(i)** This part was generally well answered; most candidates recognised that the glue was securing the wires but a few thought that it was an alternative to soldering.

(ii) The need to keep windings of a coil electrically insulated was not well known. In many cases the enamel was identified as a conductor.

(d) **(i)** A number of really good sketches were seen in response to this question.
A high proportion of responses used cutting the legs to length as the method of controlling height; others used methods that would have interfered with the soldering of the legs.

(ii) One mark was awarded for noting the faults in the method shown and one mark for a clear advantage of the alternatives offered. Saving on space to reduce the casing size was not an accepted response as the casing and circuit board were already manufactured.

1053/02, 1953/02 Paper 2 (Higher)

1 (a) A well answered question; showing less reliance on 'accuracy' as a response than was found with Foundation tier candidates. In many case both marks were gained.

(b) Higher tier candidates generally showed more understanding of tolerance on the mounting holes.

(c) (i) A minority of responses referred to measuring the test line for accuracy; other allowable measurements included the distance between mounting holes.

(ii) As with the Foundation tier a number of candidates failed to read the question carefully and missed the words 'in use'. Too many candidates concentrated on the accuracy of the laser cutter rather than the difference in use between the two templates.

(iii) The two areas being looked for were alignment of the template and securing it. Clear drawings were seen in response and in many cases good annotation was used. Better candidates suggested a jig that would do both jobs.

(d) The two symbols being looked for were a recycling symbol and identification of the material type. The majority of candidates gained at least one mark on this question.

2 (a) This question, based on the ergonomic design of the detector, was well answered with a majority of candidates gaining marks. Candidates should be advised that single word responses with no justification will not gain marks, eg 'size' or 'shape' need relating to the hand of the user.

(b) (i) The use of self tapping screws was not understood by many candidates even though they will quite probably have been seen in disassembly work. A pilot hole would be required though it would normally be a part of the moulding.

(ii) The injection moulding process was well known to many candidates who stated that two colours cannot be moulded together. The mark was also given to those who noticed the lack of indentation of the symbols or that any symbol placed into the mould would end up inaccurately placed or distorted.

(c) (i) This part was generally well answered; most candidates recognised that the glue was securing the wires but a few thought that it was an alternative to soldering.

(ii) The need to keep windings of a coil electrically insulated was not well known. In many cases the enamel was identified as a conductor.

(d) (i) The use of spacers to achieve a set height gained marks for many. The key factor was that the method should be suitable for batch production; this was frequently missed. Use of measuring devices rather than spacers is not really suitable for a batch of boards.

(ii) Recognition of the damage caused by bending the legs of capacitors was noted in many cases. One mark was awarded for noting the faults in the method shown and one mark for a clear advantage of the alternatives offered.

3 (a) A few very good responses which gained all three marks but many had neglected to insulate the thermistor legs from each other or had chosen a complex solution that did not allow for connecting wires to be attached to the thermistor. The question achieved good differentiation between candidates.

(b) (i) Generally very well answered with the majority of candidates showing knowledge of the comparator.

(ii) Well answered with reduced parts count as the most popular response.

(c) The question indicated that the multi-turn preset required 10 turns to cover the range. Very few candidates saw this as a method of accurate or precise setting of the output voltage.

(d) (i) This question was well answered by more able candidates but there was some difficulty noted in manipulating the formula.

(ii) A mark was given in this question for the correct value of fuse or for the correct value to match an error in the previous part. In many cases part (i) had been correctly calculated but a lower value fuse was then chosen.

4 (a) (i) Despite this style of question having appeared regularly in the examination there were many candidates who seemed unfamiliar with breadboard use. Marks were frequently lost for placing a wire in the same hole as one of the IC pins.

(ii) Only the more able candidates were familiar with contact bounce; lack of accuracy was also given as a problem and gained the mark.

(iii) A high proportion of correct responses were found but a number lost the mark for putting the answer in seconds rather than minutes.

(b) (i) A valid benefit of using a ribbon cable was known to all but a few candidates.

(ii) The majority of candidates correctly answering the previous part gained a mark here for stating that the purpose of the notch was alignment. Most of those responding incorrectly thought that the notch was to help with removal of the plug.

(c) (i) Compared to previous examinations there was a poor response to this question. Those who had experience in PCB design generally gained at least one mark. Errors were made with pin numbers and by not placing pads for the resistor legs to go through. In a number of cases resistors were placed in the space that would be taken by the IC.

(ii) Generally well answered with many candidates showing knowledge of machinery used for commercial manufacture.

5 (a) (i) There were very few correct responses to this question. A connection from the switch to the positive rail was often found but the pull down resistor from ‘X’ to the 0V rail was rarely seen. In many cases additional connections had been made that would render the circuit inoperable.

(ii) A number of responses showing understanding were seen though descriptions were not always clear.

(b) This part was generally well answered; only a small minority demonstrated lack of logic knowledge by using numbers other than ‘1’ and ‘0’.

(c) The mark for completing connections to the buzzer and transistor was awarded more often than the mark for connection of a logic gate. Either an OR gate or an XOR gate could have been used.

(d) This last question was answered very well. A range of valid evaluation points were available and the majority of candidates gained at least one mark.

Papers 3 and 4

General comments

The papers proved accessible to candidates, presenting few problems during marking with the table layout structure of some of the questions seeming to facilitate candidate's responses.

Question 2di in the Foundation Tier proved difficult for some candidates because their responses failed to specify the capacitor and resistor that needed increasing. Although most candidates did manage to gain marks in question 3a, which dealt with logic gates, it was apparent that this was an area which they found difficult. Responses to Question 4 showed that candidates were generally unfamiliar with industrial soldering processes; in addition many seemed to lack experience of this practical process in school.

Question 5, the product evaluation question, was well received by candidates this year and it was clear that more preparatory research had been carried out than had been the case in past years.

In the Higher Tier the calculations involved in question 3aii proved too much for many candidates; in many cases those that could not do it failed because of basic mathematical skills, or more rarely because they were unable to correctly manipulate the resistance and capacitance units correctly.

Question 5aiv proved to be a problem for almost all candidates who failed to understand what was meant by the term 'light frequency'. Candidates were unable to relate this term to the light spectrum and compare infra-red to visible light; consequently few were awarded a mark for this part.

1953/03 Paper 3 (Foundation)

1 **(a)** This was meant as an easy starter but often the answers were mixed up.

(b) **(i)** Only a few candidates recognised a relay correctly

(ii) The coil was rarely identified correctly for Part A though Part B was generally better known identified.

(ii) 'SPDT' was generally well known as the type of switch used.

2 **(a)** The two answers were often mixed up and the incorrect values chosen. Many responses showed confusion over the number of zeros in the value.

(b) **(i)** The lowest capacitance was rarely chosen correctly.

(ii) The highest value was again not known.

(iii) Some candidates recognised the need to place the capacitor in the correct orientation.

(c) **(i)** Some very interesting insulators were chosen, such as MDF.

(ii) Suitable metals were selected.

(d) **(i)** Though many candidates did state that an increase in the value of the resistor would extend the time delay they failed to identify that it was R1.

(ii) The increase in value of the capacitor was correctly identified by a few candidates.

3 **(a)** **(i)** Though a number of candidates got one mark for the name of the gate many failed to gain a mark for completing the truth table.

(ii) A few candidates knew the NOT gate but got the truth table wrong.

(iii) A few candidates knew the NOR gate symbol but got X values reversed in the truth table.

(b) **(i)** A high proportion of candidates identified the correct switch format.

(ii) A few candidates got one connection in the reversing switch correct but then put in another connection that stopped it from working.

(iii) Only a few candidates correctly identified switch A.

4 **(a)** **(i)** The industrial soldering methods were not well known though most candidates realised that a hand held soldering iron would be appropriate for a prototype PCB board for an egg timer project.

(ii) This question was well answered; most realised that a soldering iron could cause burns and many knew about the possibility of electrocution. Rather too many

responses stated that the soldering iron could get very hot and did not complete the answer by giving the consequence.

(b) **(i)** Most candidates realised that lead can be toxic or poisonous.

(ii) Recycling was a popular response and the use of lead free solder was often known as well.

(c) Some good responses were seen which included poor soldering technique as well as lack of flux and dirt on the joint.

5 **(a)** **(i)** Many candidates scored well on this question, obviously knowing about the range of techniques for controlling traffic speed.

(ii) Infra red lighting was picked up by many candidates.

(iii) This part of the question was poorly answered by the majority of candidates.

(b) **(i)** The candidates needed to know that motorists were not only made aware of the sign but also of their speed.

(ii) Solar and wind power were popular correct answers but some responses also included the use of batteries.

(iii) Generally not well answered though a minority of candidates did know about updates to GPS systems.

1953/04 Paper 4 (Higher)

1 (a) (i) The industrial soldering methods were not well known though most candidates realised that a hand held soldering iron would be appropriate for a prototype PCB board for an egg timer project.

(ii) This question was well answered; most realised that a soldering iron could cause burns and many knew about the possibility of electrocution. Rather too many responses stated that the soldering iron could get very hot and did not complete the answer by giving the consequence.

(b) (i) Most candidates realised that lead can be toxic or poisonous.

(ii) Recycling was a popular response and the use of lead free solder was often known as well.

(c) Some good responses were seen which included poor soldering technique as well as lack of flux and dirt on the joint.

2 (a) (i) Many candidates scored well on this question, obviously knowing about the range of techniques for controlling traffic speed.

(ii) Infra red lighting was picked up by many candidates.

(iii) This part of the question was poorly answered by the majority of candidates.

(b) (i) The candidates needed to know that motorists were not only made aware of the sign but also of their speed.

(ii) Solar and wind power were popular correct answers but some responses also included the use of batteries.

(iii) Generally not well answered though a minority of candidates did know about updates to GPS systems.

3 (a) (i) The 555 monostable circuit was not recognised by many candidates.

(ii) The timing period calculation was not well done and even though the equation was given in the question the substitution was not carried out correctly.

(b) (i) The use of higher voltages was not known though some candidates knew that the buffer could amplify current.

(ii) The transistor symbols were well known but many candidates did not recognise the other two symbols.

(iii) The addition of a protective diode in reverse bias was the full response though most candidates just referred to including a diode.

(iv) This was poorly answered with not many candidates knowing that the FET transistor required less current than the NPN transistor to switch it on.

4 (a) (i) Only a few candidates knew about the wider voltage range of the CMOS type.

(ii) Few candidates knew that ‘fan out’ refers to the ability to drive further ICs in a circuit.

(b) (i) The connection was quite often well drawn though a number of candidates failed to connect both inputs of the second gate together.

(ii) Only a few candidates knew that the Schmitt trigger can be used to convert an analogue signal to a digital signal

(c) (i) Quite often a square wave was seen but not always drawn at the correct 6V switch off point and at the correct 3V switch on point.

(ii) Only a few candidates recognised the sine wave though it was noted by a minority as a.c. or alternating.

(iii) 50Hz was written correctly by a minority of candidates.

5 (a) (i) The Op amp was identified by a minority of candidates.

(ii) Better candidates correctly gave the threshold point as 4.5V.

(iii) Many candidates knew that light affected the resistance of the LDR but did not go on to mention the oscillation that would occur if the two components were too close.

(iv) Very few candidates knew that a photodiode uses Infra red light.

(v) The fact that photodiodes react much faster than LDR’s was noted in many responses.

(b) (i) The CE mark was understood by many candidates but the meaning was not clearly stated.

(ii) The BSI kite mark needed the testing aspect to be stated but only a minority of candidates did this.

(iii) Although the letters ROHS were sometimes known candidates found difficulty in stating the meaning.

(iv) WEEE appears to have been well taught. Many candidates knew that the disposal and recycling of products at the end of the useful life should be considered.

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