OCR
Oxford Cambridge and RSA

Cambridge **NATIONALS LEVEL 1/2**

Cambridge NATIONALS

ENGINEERING SYSTEMS

Combined feedback on the June 2017 exam paper (including selected exemplar candidate answers and commentary)

Unit R113 – Electronic principles

Version 1

ocr.org.uk/engineering

CONTENTS

INTRODUCTION

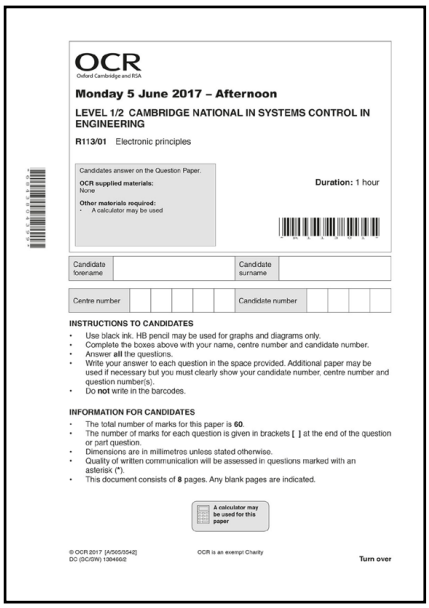
This resource brings together the questions from the June 2017 examined unit (Unit R105), the marking guidance, the examiners comments and the exemplar answers into one place for easy reference.

We have also included exemplar candidate answers with commentary for Questions 2c, 5a, 6a, 6b.

The marking guidance and the examiner's comments are taken from the Report to Centre for this question paper.

The Question Paper, Mark Scheme and the Report to Centre are available from:

https://interchange.ocr.org.uk/Modules/PastPapers/Pages/PastPapers.aspx?menuindex=97&menuid=250



OCR
Oxford Cambridge and RSA

Monday 5 June 2017 – Afternoon

LEVEL 1/2 CAMBRIDGE NATIONAL IN SYSTEMS CONTROL IN ENGINEERING

R113/01 Electronic principles

Candidates answer on the Question Paper.

OCR supplied materials: None

Other materials required:
- A calculator may be used

Duration: 1 hour

Candidate forename | Candidate surname

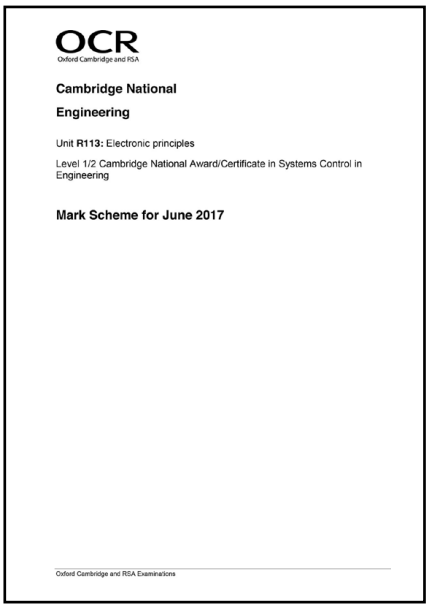
Centre number | Candidate number

INSTRUCTIONS TO CANDIDATES
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES
- The total number of marks for this paper is **60**.
- The number of marks for each question is given in brackets **[ ]** at the end of the question or part question.
- Dimensions are in millimetres unless stated otherwise.
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- This document consists of **8** pages. Any blank pages are indicated.

A calculator may be used for this paper

Turn over



OCR
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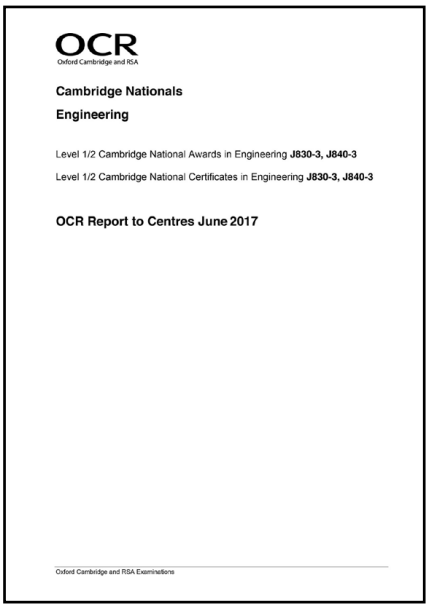
Cambridge National
Engineering

Unit **R113:** Electronic principles

Level 1/2 Cambridge National Award/Certificate in Systems Control in Engineering

Mark Scheme for June 2017



OCR
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Cambridge Nationals
Engineering

Level 1/2 Cambridge National Awards in Engineering **J830-3, J840-3**

Level 1/2 Cambridge National Certificates in Engineering **J830-3, J840-3**

OCR Report to Centres June 2017

GENERAL EXAMINER COMMENTS ON THE PAPER

A high proportion of candidates attempted all six questions.

In some cases candidates had clearly failed to read the question fully and went on to provide a response that was not actually relevant to the question. Candidates should be advised to read the complete question before attempting a response.

Resources which might help address the examiner comments:

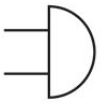
From the link below, you'll find 'The OCR guide to examinations' (along with many other skills guides)
http://www.ocr.org.uk/i-want-to/skills-guides/

Questions 1(a), (b), (c) and (d)

Answer **all** questions

1 **(a)** Complete the table by using words from the list below.

Ammeter
And Gate
Bell
Bridge
Buzzer

Symbol	Component
	Bell
	Buzzer

[2]

(b) Name the quantity that is being measured when a voltmeter is connected across a 2 V cell.

E. Electro M. Motive F. Force **[1]**

(c) A resistor has a current flowing through it of 0.2 A and a voltage across it of 2 V.
Calculate the value of the resistor in ohms.

R = V/I
= 2/0.2
= 10 Ω

[2]

(d) Give **three** reasons why you would select solar power over other forms of power source.

1. • Sustainable for energy consumption
   • Indefinitely renewable (at least until the sun runs out in billions of years)
2. • Relatively simple technology/Low maintenance costs
   • Clean, causes no pollution and silent producer of energy
   • **Helps to slow/stop global warming**
3. • **Can be used in remote areas**
   • **Decreases carbon footprints**
   • **Gives energy reliability, security and independence**
   • **Environmentally friendly**
   • **An efficient system**

[3]

Question 1(e)

(e) State **two** advantages of using rechargeable batteries as compared to non-rechargeable batteries.

1 • Cheap in the long run as they can be re-used i.e. low cost/performance ratio.
• Output stays constant until almost flat.
2 • Disposal of fewer batteries creates less chemical pollution.

[2]

Mark Scheme Guidance

Question 1(a):

Award 1 mark for each correct response.

Question 1(b):

Accept precise wording only.

Question 1(c):

Award 1 mark for R = V/I or 2/0.2.

Award 1 mark for 10 Ω or 10.

Award 2 marks if the correct answer without workings is seen with or without units.

Question 1(d):

Award 1 mark for each correct response.

3 × 1 marks.

Accept other correct responses.

Question 1(e):

Award 1 mark for each correct response.

2 × 1 marks.

Accept other correct responses.

Examiner comments

Question 1(a) – Generally well answered with the two symbols being well known.

Question 1(b) – The statement 'Electro-Motive Force' despite being a fundamental unit within electronic principles was not well known with a variety of incorrect responses being provided.

Question 1(c) – The formula for calculating resistance R = V/I was well known with a majority of candidates achieving maximum marks.

Question 1(d) – Generally well answered with the concept of solar power being understood and a majority of candidates achieving high marks.

Question 1(e) – Generally well answered with the advantages of using re-chargable batteries as compared to non-rechargable batteries being well known.

Question 2

2 **(a)** Complete the **three** missing values of the preferred E12 series resistor series shown below.

10	12	15	18	22	27	33	39	47	56	68	82

[1]

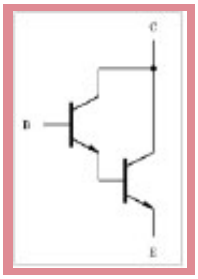
(b) Calculate the maximum and minimum value a resistor will have if it is rated at 120 Ω ± 10%.

Maximum value . Resistor value = 120 Ω ± 10%.
10%. of 120 = 12
Maximum value = 120 + 12 = 132 Ω
Minimum value = 120 – 12 = 108 Ω

Minimum value .....

[3]

(c) **(i)** Explain with the aid of a diagram what is meant by the term 'Darlington Pair'.



A Darlington pair is an arrangement of two bipolar transistors, either integrated or separated devices, connected in such a way that the current amplified by the first transistor is further amplified by the second transistor. A much higher current gain is achieved than using individual transistors. Overall gain is the product of the two individual gains.

[4]

(ii) A Darlington Pair is used as part of a moisture detector circuit.
State the name of **two** other circuits that could use a Darlington Pair.

1 . Circuits
Heat operated switch
2 . Low temperature alarm
Amplifier
Light from darkness
Liquid level sensor

[2]

Mark Scheme Guidance

Question 2(a):

Award one mark for three correct values.

Question 2(b):

Award 1 mark for 12.

Award 1 mark for 132 Ω or 132.

Award 1 mark for 108 Ω or 108.

Award 3 marks if the correct answers without workings are seen with or without units.

Question 2(c)(i):

Award 1 mark for each correctly positioned transistor and correct labels. (Diagram).

Award 1 mark for reference to two bipolar transistors.

Award 1 mark for reference to current amplified or switch.

Award 1 mark for reference to a much higher current gain is achieved than using individual transistors.

Question 2(c)(ii):

Award 1 mark for each correct response.

2 × 1 marks.

Accept other correct responses.

Examiner comments

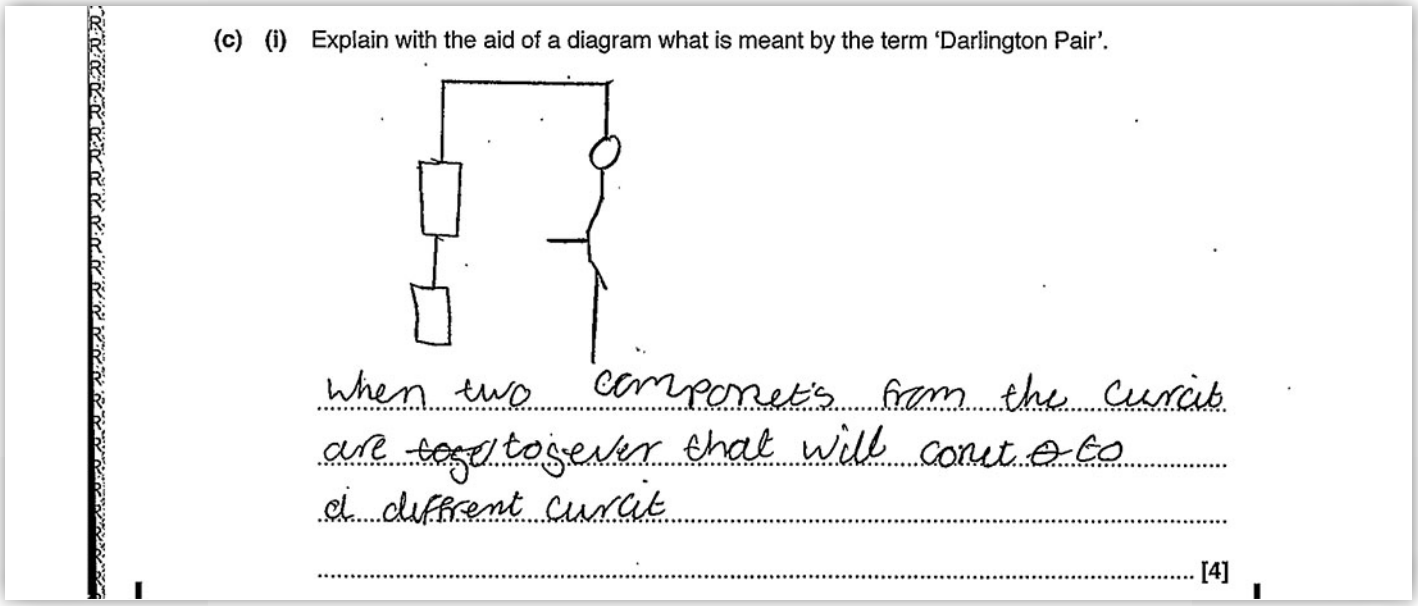
Question 2(a) – Many candidates seemed to have little or no understanding of the preferred E12 series resistor code.

Question 2(b) – Generally well answered with the concept of tolerance being understood and a majority of candidates achieving high marks.

Question 2 c)(i) – There was evidence that a number of candidates did not know how to draw a Darlington Pair diagram or give a reasonable explanation of its function.

Question 2(c)(ii) – Generally well answered with a wide range of correct responses being given.

Exemplar candidate work
Question 2(c)(i) – Low level answer



(c) (i) Explain with the aid of a diagram what is meant by the term 'Darlington Pair'.

When two componets from the curcit are ~~tog~~ together that will conut to to a different curcit

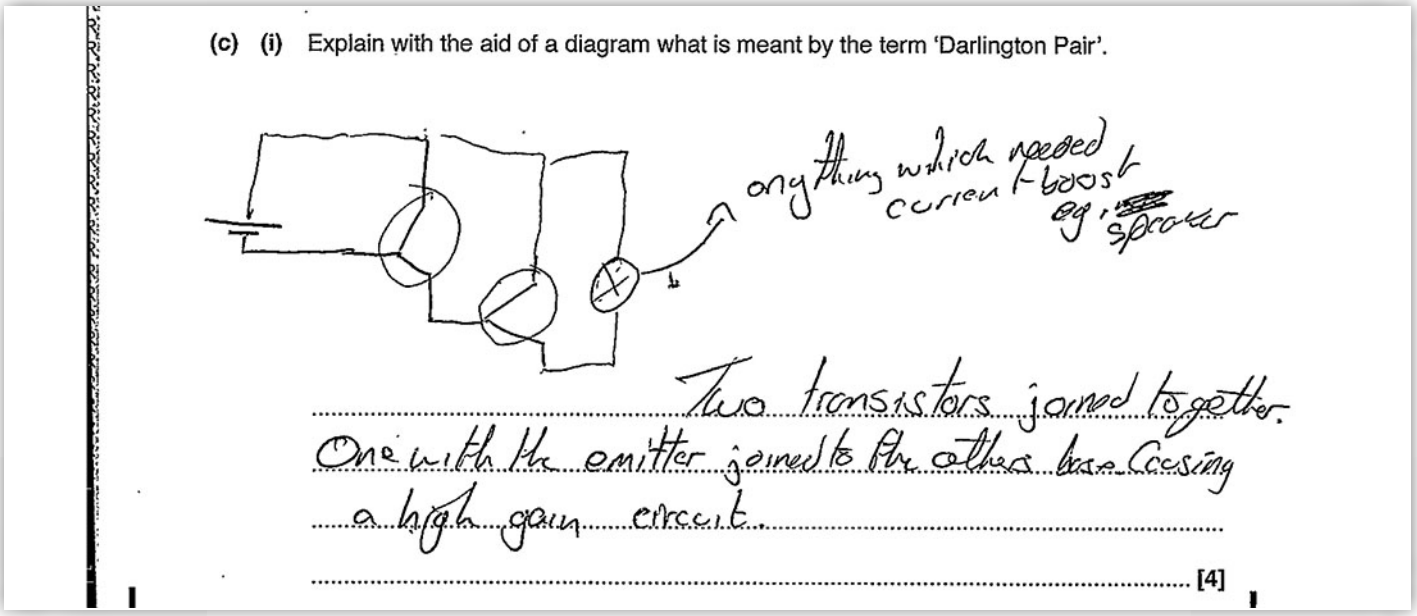
[4]

Commentary

The answer is low level because the candidate had no understanding of what was meant by a Darlington pair.

For a medium level answer the candidate needed to draw a correct diagram and understand that a Darlington pair is an arrangement of two bipolar transistors, either integrated or separated devices.

Question 2(c)(i) – High level answer



(c) (i) Explain with the aid of a diagram what is meant by the term 'Darlington Pair'.

anything which needed current boost eg: speaker

Two transistors joined together. One with the emitter joined to the other base causing a high gain circuit.

[4]

Commentary

This answer is high level because the candidate obtained marks by understanding that a Darlington pair is an arrangement of two bipolar transistors, either integrated or separated devices, connected in such a way that the current amplified by the first transistor is further amplified by the second transistor.

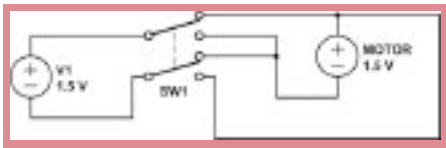
For a full mark high level answer the candidate needed to state that a much higher current gain is achieved than using individual transistors. Overall gain is the product of the two individual gains.

Question 3

3 (a) Describe, using **one** example, what is meant by the term 'latching switch'.

A latching switch is a switch that maintains its state after being activated.
A push-to-make, push-to-break switch is a latching switch – each time you actuate it, whichever state the switch is left in will continue until the switch is actuated again.
An example could be an alarm system.
Once alarms are triggered, they remain on indefinitely, until the whole system is disabled. This is the case for most alarms, including burglar alarms and fire alarms. **[2]**

(b) Draw a labelled circuit diagram to show how a Double Pole Double Throw (DPDT) switch can be used to control the direction of rotation of a DC motor.



[5]

(c) (i) State the meaning of the term 'Shape Memory Alloy (SMA)'.

A shape memory alloy is a material that can remember its original shape. **[1]**

(ii) Give the name of **two** Shape Memory Alloys.

1 Copper-aluminium-nickel.
Nickel-titanium (NiTi) alloys.
Nitinol

2 .....

[2]

Mark Scheme Guidance

Question 3(a):

Award 1 mark for reference to a switch that maintains its state after being activated.

Award 1 mark for a correct application.

Question 3(b):

DPDT switch symbol, [1].

Connections from the supply +V and 0V to each common terminal of the DPDT switch [1].

NC switch 1 connected to NO switch 2 [1].

NC switch 2 connected to NO switch 1 [1].

Connections from the DPDT switch to the motor [1].

Question 3(c)(i):

Award 1 mark for reference to 'can remember its original shape'. or 'return to its original shape'.

Question 3(c)(ii):

Award 1 mark for each correct response.

2 × 1 marks.

Accept other correct responses.

Examiner comments

Question 3(a) – The term 'latching switch' was not well known with a high proportion of candidates not giving an example of its use.

Question 3(b) – The circuit diagram showing a DPDT switch controlling the direction of rotation of a DC motor was not well known.

Question 3(c)(i) – The meaning of the term 'Shape Memory Alloy' was generally well known.

Question 3(c)(ii) – Most candidates could not name a Shape Memory Alloy.

Question 4

4 **(a)** Fig. 1 shows a logic gate circuit being used by a test technician.

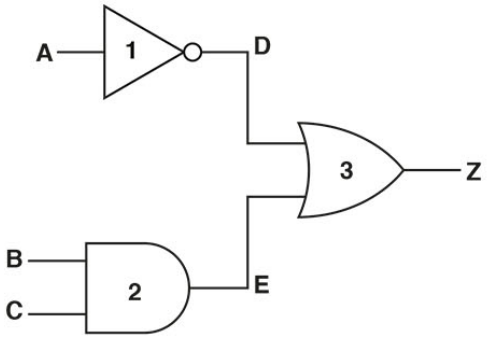


Fig. 1

(i) State the name of each of the logic gates in Fig. 1.

Gate **1** . **NOT** gate .....

Gate **2** . **AND** gate .....

Gate **3** . **OR** gate .....

[3]

(ii) Complete the table below with the test results the technician should obtain.

Input A	Input B	Input C	D	E	Z
0	0	0	1	0	1
0	0	1	1	0	1
0	1	0	1	0	1
0	1	1	1	1	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	1	1

[3]

(b) State **four** types of fault that are often found when a visual inspection of a completed printed circuit board (PCB) takes place.

1. Examples of faults:
2. • Fitting of incorrect components
3. • Incorrectly placed components
4. • Missing components
   • Badly soldered joints
   • Dry joints
   • Bridged PCB tracks
   • Damaged PCB tracks
   • Short circuits
   • Open circuits

[4]

Mark Scheme Guidance

Question 4(a)(i):

Award 1 mark for each correct response.

Question 4(a)(ii):

Award 1 mark for column D.

Award 1 mark for column E.

Award 1 mark for Output Z.

Question 4(b):

Award 1 mark for each correct response.

4 × 1 marks.

Examiner comments

Question 4(a)(i) – Generally well answered with a number of candidates achieving maximum marks.

Question 4(a)(ii) – In the main candidates seemed to have little or no understanding of how to complete the truth table from a given circuit diagram.

Question 4(b) – Generally well answered with a majority of candidates correctly stating four types of fault that are often found when visual inspection of a completed circuit board takes place.

Question 5

5 (a) Explain what is meant by the term 'Surface Mount Technology'.

- Surface-mount technology (SMT) is a method for producing electronic circuits.
- The components are mounted or placed directly onto the surface of printed circuit boards.
- SMT components are smaller than through hole components.

[2]

(b) State **three** benefits and **three** drawbacks of using surface mount components in commercial circuit construction.

Benefit 1 ..
.....
Benefit 2 ..
.....
Benefit 3 .....

.....

Drawback 1.
.....
Drawback 2.
.....
Drawback 3.
.....

Benefits:
- Fewer holes need to be drilled onto the circuit board
- Costs and budgets are reduced as the parts often cost less than their equivalent through-hole parts.
- Components can be placed on either side of the circuit boards.
- Better mechanical performance under shake and vibration conditions.
- The components of SMT are smaller.

Drawbacks:
- The manufacturing process for SMT however, requires positioning of parts of un-perforated boards instead of accurate drilling of many holes.
- Large, high-power or high-voltage parts are unsuitable for SMT.
- This requires the process of combining SMT and through hole construction.
- Manual prototype or component level repair is more difficult.
- Skilled operators are needed with expensive tools as the parts are much smaller.
- SMT is unsuitable as the sole attachment method for components that are subject to frequent mechanical stress.

[6]

(c) Complete the table with a tick (✓) to identify which **two** statements are correct for quality assurance methods used during commercial printed circuit board production.

Quality Assurance Method	tick (✓)
Half split method	
Visual inspection	✓
Automatic test	✓
Truth table test	

[2]

Mark Scheme Guidance

Question 5(a):

Award 1 mark for each relevant point.

2 × 1 marks.

Question 5(b):

Award 1 mark for each correct benefit.

3 × 1 marks.

Award 1 mark for each correct drawback.

3 × 1 marks

Question 5(c):

Award zero marks if there are more than two ticks.

Award 1 mark for each correct tick.

2 × 1 marks.

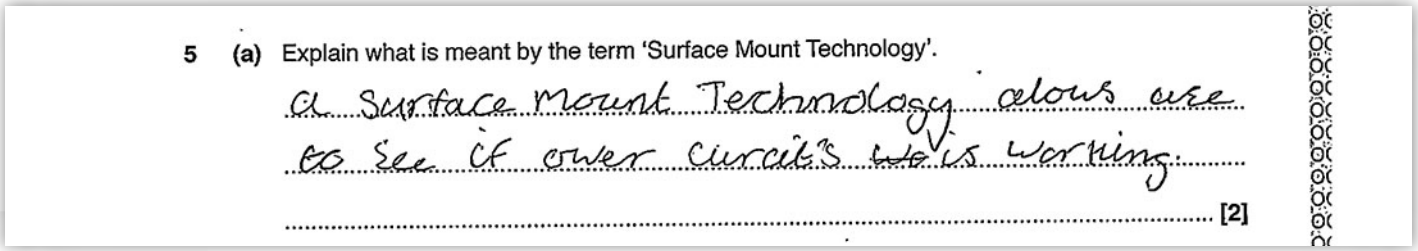
Examiner comments

Question 5(a) – The term 'Surface Mount Technology' was not well known with a high proportion of candidates giving confused and incorrect responses.

Question 5(b) – Mixed responses seen to this question with some candidates giving imaginary benefits and drawbacks for the use of surface mounted components in commercial use.

Question 5(c) – Generally well answered with a majority of candidates correctly ticking the two correct statements for quality assurance methods used during the production of printed circuit boards.

Exemplar candidate work
Question 5(a) – Low level answer



5 (a) Explain what is meant by the term 'Surface Mount Technology'.

A Surface Mount Technology allows one to see if ower circuits is is working.

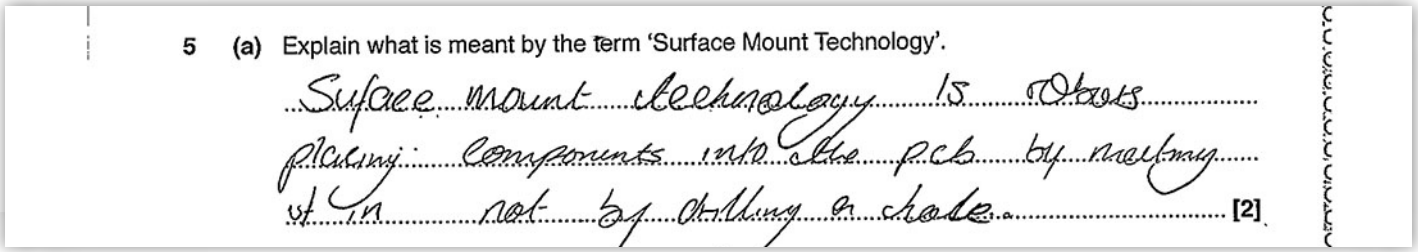
[2]

Commentary

The answer is low level because the candidate had no understanding of what was meant by surface-mount technology.

For a medium level answer the candidate needed to state that surface mount technology (SMT) is a method for producing electronic circuits.

Question 5(a) – High level answer



5 (a) Explain what is meant by the term 'Surface Mount Technology'.

Suface mount technology is Otors placing components into the pcb by melting it in not by drilling a hole. [2]

Commentary

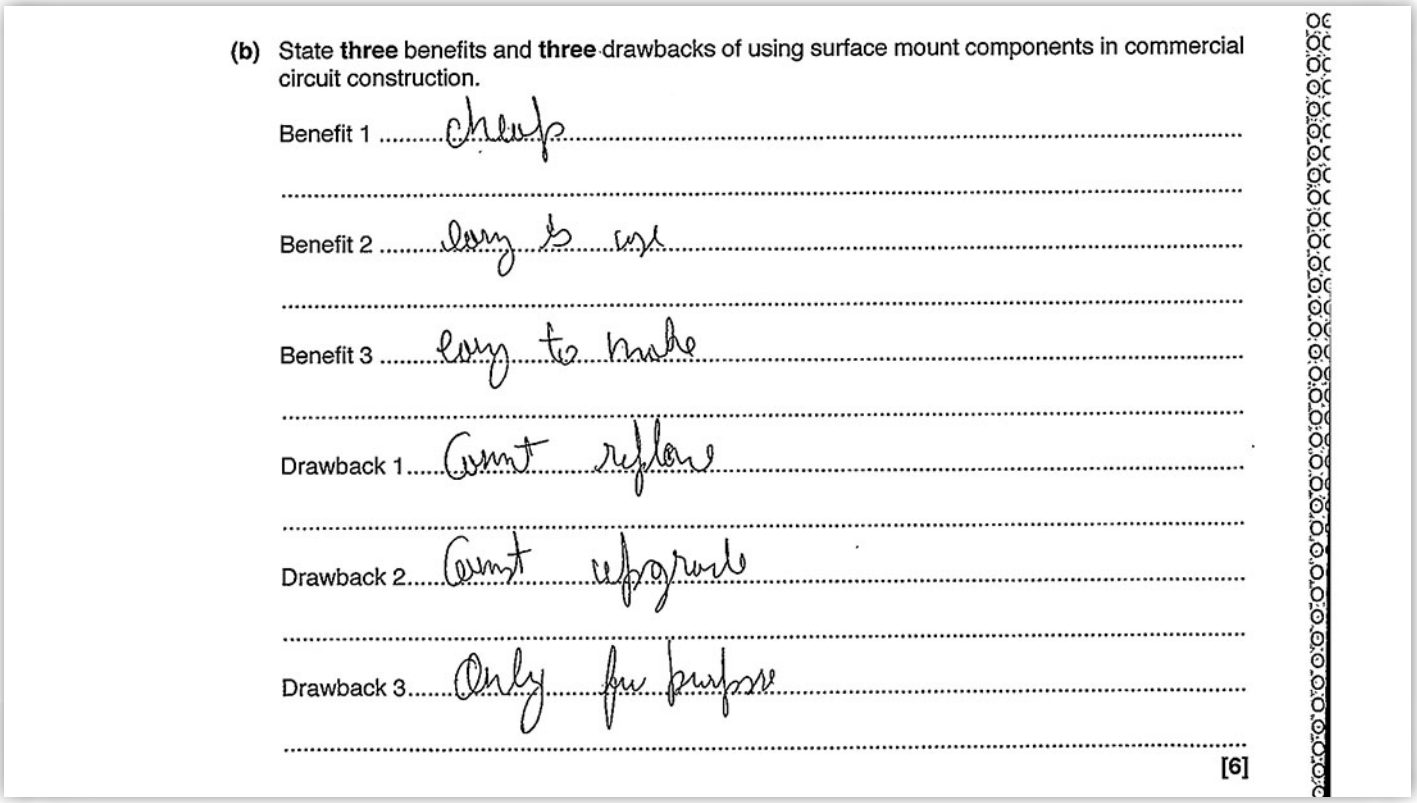
This answer is a full mark high level answer because the candidate obtained marks by understanding that

(a) Surface-mount technology (SMT) is a method for producing electronic circuits.

(b) The components are mounted or placed directly onto the surface of printed circuit boards.

(c) SMT components are smaller than through hole components.

Exemplar candidate work
Question 5(b) – Low level answer



(b) State **three** benefits and **three** drawbacks of using surface mount components in commercial circuit construction.

Benefit 1 ..... cheap .....

.....

Benefit 2 ..... easy to use .....

.....

Benefit 3 ..... easy to make .....

.....

Drawback 1 ..... cant reflow .....

.....

Drawback 2 ..... cant upgrade .....

.....

Drawback 3 ..... only for purpose .....

..... [6]

Commentary

The answer is low level because the candidate had little understanding of the benefits and drawbacks of using surface-mount components in commercial circuit construction.

For a medium level answer the candidate needed to state any two benefits and any two drawbacks from the following list.

Benefits:

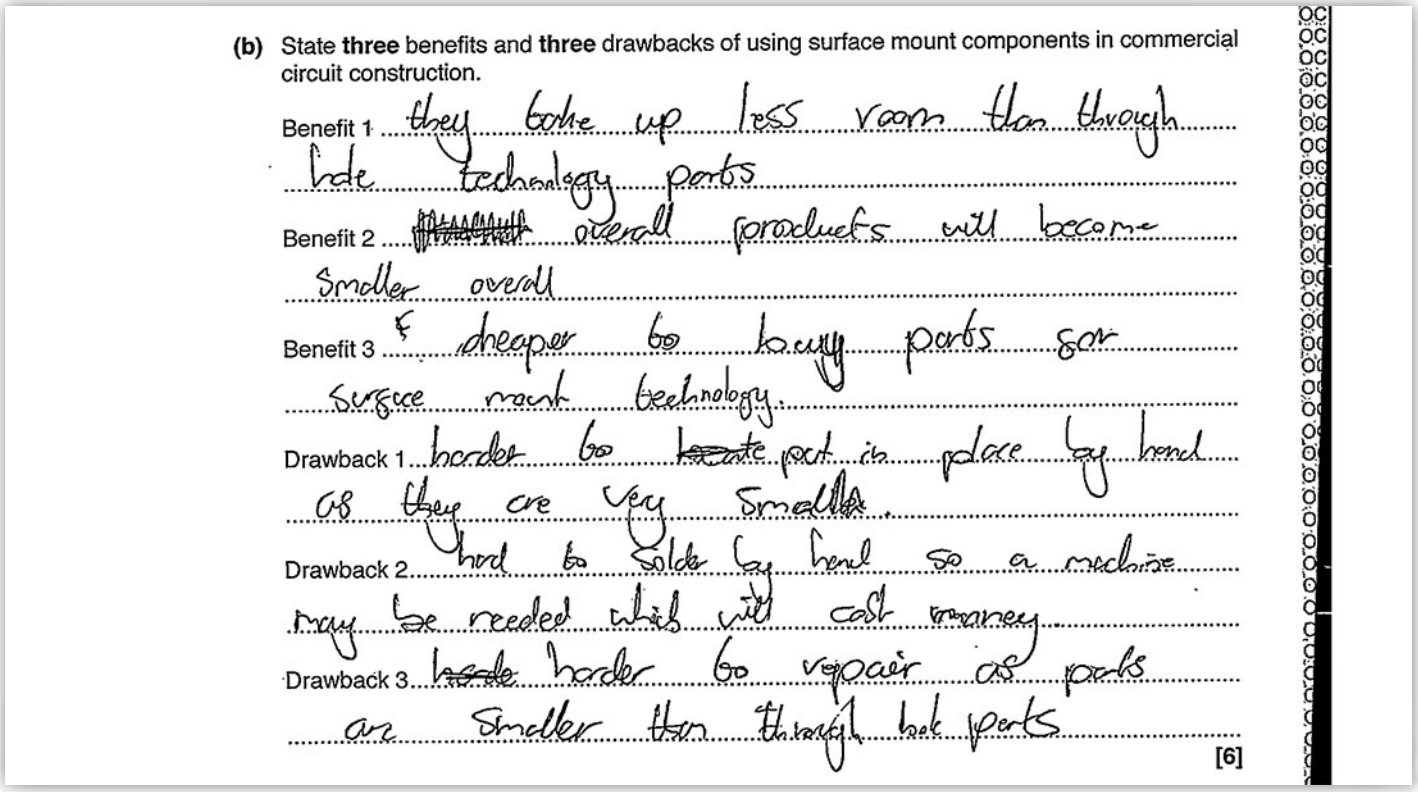
- Fewer holes need to be drilled onto the circuit board
- Costs and budgets are reduced as the parts often cost less than their equivalent through-hole parts.
- Components can be placed on either side of the circuit boards.
- Better mechanical performance under shake and vibration conditions.
- The components of SMT are smaller.

Drawbacks

- The manufacturing process for SMT however, requires positioning of parts of un-perforated boards instead of accurate drilling of many holes.
- Large, high-power or high-voltage parts are unsuitable for SMT.
- This requires the process of combining SMT and through hole construction.
- Manual prototype or component level repair is more difficult.
- Skilled operators are needed with expensive tools as the parts are much smaller.

Other correct answers would be awarded marks.

Exemplar candidate work
Question 5(b) – High level answer



(b) State **three** benefits and **three** drawbacks of using surface mount components in commercial circuit construction.

Benefit 1 they take up less room than through hole technology parts

Benefit 2 overall products will become smaller overall

Benefit 3 & cheaper to buy parts for surface mount technology.

Drawback 1 harder to ~~locate~~ put in place by hand as they are very small.

Drawback 2 had to solder by hand so a machine may be needed which will cost money.

Drawback 3 ~~locate~~ harder to repair as parts are smaller than through hole parts

[6]

Commentary

This answer is high level because all three candidates gave four correct answers out of six.

For a full mark high level answer the candidates needed to state six correct answers. The additional answer can be found in the following list:

Benefits

- Fewer holes need to be drilled onto the circuit board
- Costs and budgets are reduced as the parts often cost less than their equivalent through-hole parts.
- Components can be placed on either side of the circuit boards.
- Better mechanical performance under shake and vibration conditions.
- The components of SMT are smaller.

Drawbacks

- The manufacturing process for SMT however, requires positioning of parts of un-perforated boards instead of accurate drilling of many holes.
- Large, high-power or high-voltage parts are unsuitable for SMT.
- This requires the process of combining SMT and through hole construction.
- Manual prototype or component level repair is more difficult.
- Skilled operators are needed with expensive tools as the parts are much smaller.

Other correct answers would be awarded marks.

Question 6(a)

6 A cable of resistance 0.05 Ω carries a current of 2 A.

(a) (i) Calculate the power in watts absorbed by the cable.

$P = I^2R = 2^2 \times 0.05 = 0.2$ W

..... **[3]**

(ii) Calculate the energy in watt hours consumed by the cable if it is in use for **three** hours.

$W = Pt = 0.2^* \times 3 = 0.6$ Wh

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

Question 6(b)

(b)* Discuss the applications of solid core cables, multi-core cables and ribbon cables.

The following statements could form the basis of a discussion.

Solid core cables

- Single solid core ideal for plate-wiring (running wires across a chassis with all wires straight or at right-angles to one another) because wire stays exactly in formed shape without ties.
- Solid wire is the wire of choice for outdoor or rugged-duty applications which may expose the wire to corrosive elements, adverse weather condition or frequent movement.
- Solid wire cables are helpful in certain situations, such as wiring breadboards. One of the reasons that some choose to use single core in certain applications is that the cost is lower than that of the braided and stranded wire.
- A solid core cable is not very flexible but one of its benefits is that it tends to be more rugged and durable so it is useful for locations where the environment or corrosion could cause damage to the wiring.

Multi-core cables.

- Multi-core cables are versatile and are used for all kind of applications, especially those which would otherwise call for a high volume of cables.
- Multi-core cables are often used in electronic equipment and for applications where space is limited, such as aircraft and medical equipment.
- Multi-core cables are used extensively in entertainment, with concert venues and theatres often utilising cables combining power to avoid a tangled mass of cables running across the stage.
- Multi-core cables often split off at the end to form a mass of different connectors. This design is often referred to as a 'snake cable'.
- The term snake cable is frequently used in the professional audio recording industry to refer to an audio multi-core cable. Multi-core cables are used with professional video cameras. In television studios, 26-pin cables are used to connect "cameras" to camera control units.
- Outside of media uses, multi-core cable is found in many places. Apartment buildings will often have multi-core coaxial cables that deliver cable television to the apartments. These cables often lead to a single floor or subsection and every hook-up in that area runs through the same multi-core cable.
- Buildings will sometimes bundle other cables as well, depending on use and load. This same process is common in city infrastructure where power, coaxial and telephone cables are placed together into a single main line.

Ribbon Cable

- Ribbon cables are usually used as interconnects for internal peripherals in computers, such as hard drives, CD drives, and floppy drives.
- Ribbon cables are also commonly used as internal wiring for other electronics and appliances.
- They can be found in test and measuring equipment, automated termination equipment, robotics, and pick and place equipment.

Accept other correct discussion points.

[6]

Mark Scheme Guidance

Question 6(a)(i):

Award 1 mark for $P = I^2R$ or $2^2 \times 0.05$.

Award 1 mark for 0.2.

Award 1 mark for correct unit W.

Award 3 marks if the correct answer is seen without workings with or without units.

Question 6(a)(ii):

Accept error carried forward from 6(a)(i).

Award 1 mark for numerical value and the unit Wh.

Question 6(b):

Levels of response

Level 3 (5–6 marks)

- Detailed discussion showing a thorough understanding of the applications of solid core cables, multi-core cables and ribbon cables.
- Information is presented clearly and accurately, with correct use of appropriate technical language and engineering terminology.
- Accurate use of spelling, punctuation and grammar.

Level 2 (3–4 marks)

- Adequate discussion showing some understanding of the applications of solid core cables, multi-core cables and ribbon cables.
- Information is presented clearly and with some accuracy.
- Appropriate technical language and engineering terminology is used on some occasions.
- Occasional errors in spelling, punctuation and grammar.

Level 1 (1–2 marks)

- Basic discussion showing limited understanding of the applications of solid core cables, multi-core cables and ribbon cables.
- Information presented is basic and may be ambiguous or badly presented.
- There will be little or no use of technical language and engineering terminology.
- Errors of spelling, punctuation and grammar may be intrusive.

Level 0 (0 marks)

- A response that is irrelevant and/or not worthy of a mark.
- Annotate with 'Seen' at end of response.

NB. Award up to a maximum of 2 marks for each type of cable.

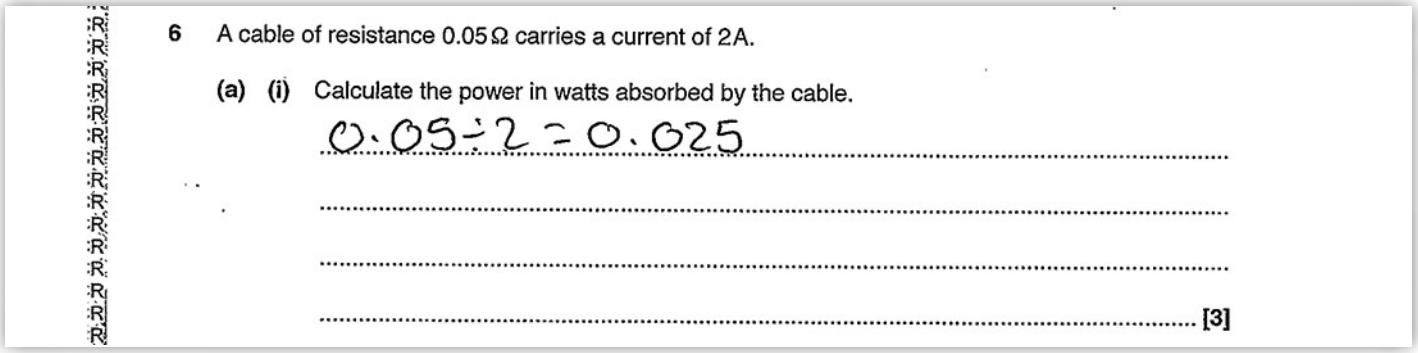
Examiner comments

Question 6(a)(i) – The formula for calculating power was well known with a majority of candidates achieving maximum marks.

Question 6(a)(ii) – A number of candidates are still confused that energy W = Pt. Lots of candidates confused the unit of energy even though it was given in the question.

Question 6(b) – A high proportion of candidates seemed to have not read the question carefully enough. The question states 'Discuss the **applications** of solid core cables, multi-core cables and ribbon cables but many responses did not discuss **the applications** of these three types of cable.

Exemplar candidate work
Question 6(a)(i) – Low level answer



6 A cable of resistance 0.05 Ω carries a current of 2A.

(a) (i) Calculate the power in watts absorbed by the cable.

0.05÷2=0.025

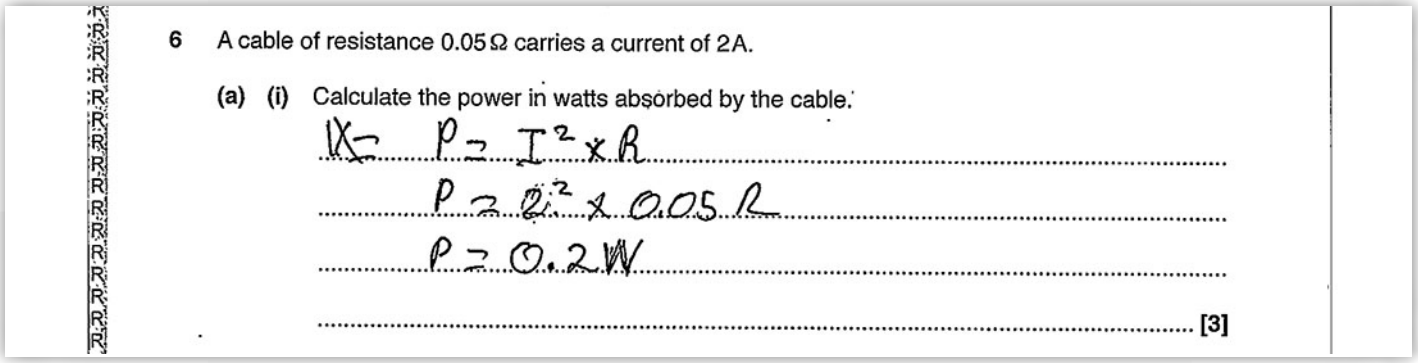
[3]

Commentary

The answer is low level because the candidate could not recall the correct formula for power.

For a medium level answer the candidate needed to state the correct formula for power and use the given numbers $2^2 \times 0.05$.

Question 6(a)(i) – High level answer



6 A cable of resistance 0.05 Ω carries a current of 2A.

(a) (i) Calculate the power in watts absorbed by the cable.

✗ $P = I^2 \times R$

$P = 2^2 \times 0.05 R$

$P = 0.2W$

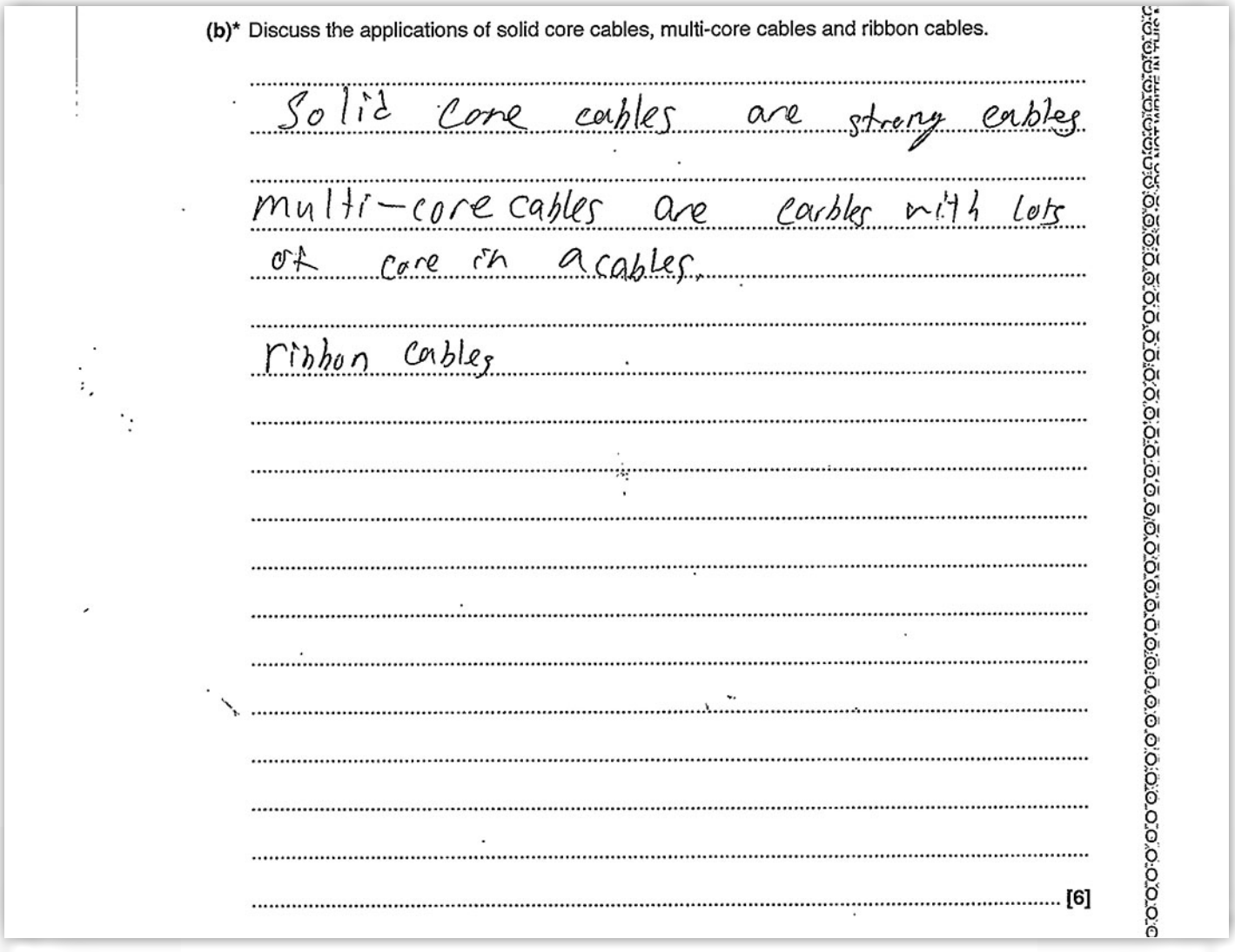
[3]

Commentary

This answer is a full mark high level answer because

- the candidate stated the correct power formula
- gave the correct substitution $2^2 \times 0.05$ giving a correct answer of 0.2 W
- the unit of power was stated correctly as the watt W.

Exemplar candidate work
Question 6(b) – Low level answer



(b)* Discuss the applications of solid core cables, multi-core cables and ribbon cables.

Solid core cables are strong cables

multi-core cables are cables with lots of core in a cables.

ribbon cables

[6]

Commentary

The answer is low level because the candidate had no understanding of the applications of solid core cables, multi-core cables or ribbon cables.

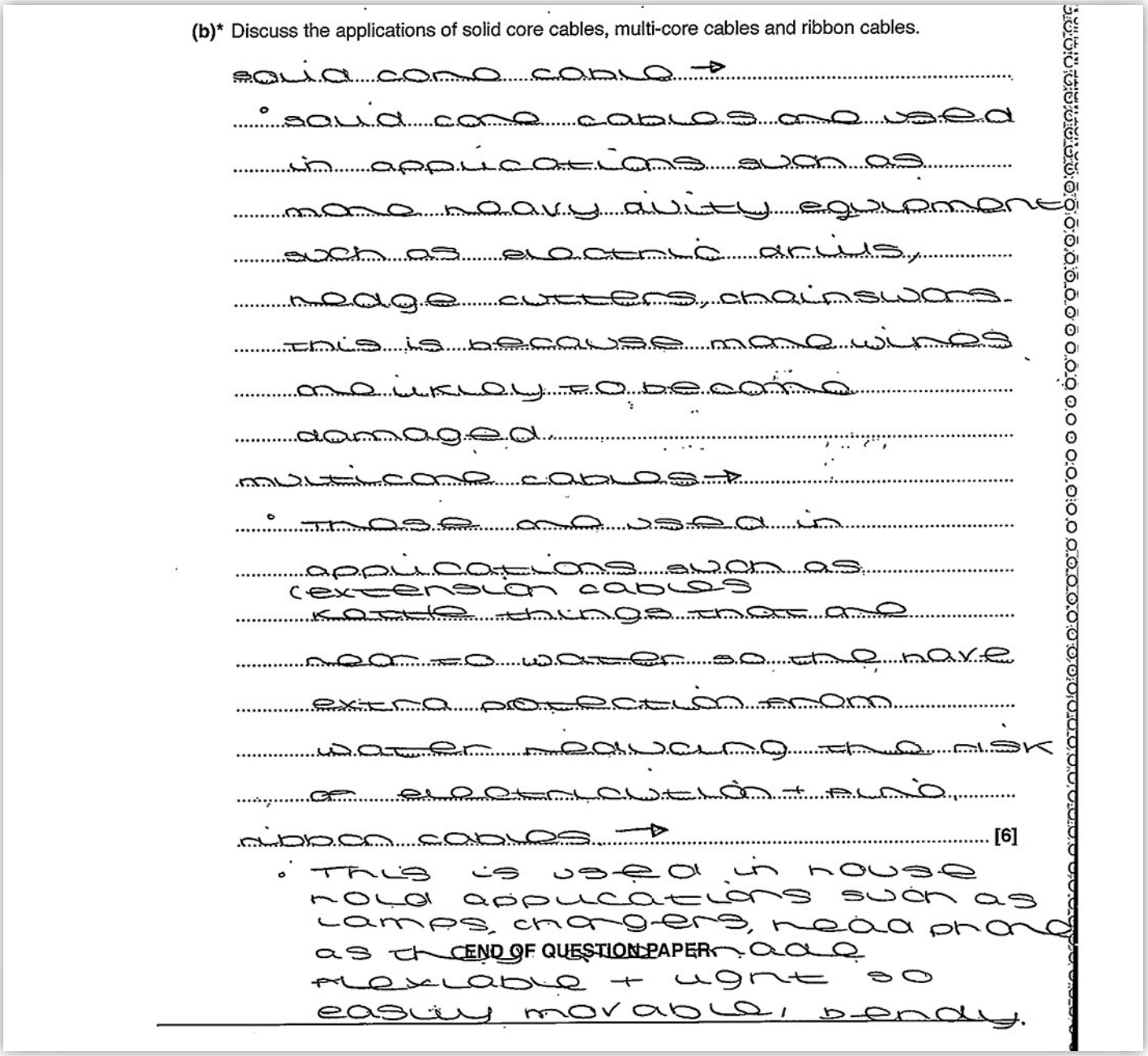
For a medium level answer the candidate needed to give two applications from any two of the types of cable listed. For example:

(a) Solid core cables in fixed installations such as household wiring

(b) Multiple core cables in domestic appliances

(c) Ribbon cables in computer disk drives

Exemplar candidate work
Question 6(b) – High level answer



(b)* Discuss the applications of solid core cables, multi-core cables and ribbon cables.

solid core cable →

° solid core cables are used in applications such as mane heavy duity equipment such as electric drills, hedge cutters, chainsaws. this is because mane wires are likely to become damaged.

multicore cables →

° these are used in applications such as (extension cables kettle things that are near to water so the have extra protection from water reducing the risk of electricution + ribbon cables. → [6]

° this is used in house hold applications such as lamps, chargers, head phone as they are made flexable + light so easily movable, bendy.

END OF QUESTION PAPER

Commentary

This answer is high level because the candidate obtained marks by discussing correctly at least four points about the application of the cables listed.

For a full mark high level answer the candidates needed to discuss correctly six points about the application of the cables listed. There are three cables, so ideally a discussion on two points from each cable would be appropriate.

In addition to the points made in the 'low level box' the discussion could have included that:

(a) A solid core cable uses one solid copper wire per conductor and is for permanent infrastructure links between two wiring sources or between a wiring centre and a wall box

(b) A multicore cable consists of several strands of wire twisted around each other giving flexibility and reshaping. This type of cable is best used over short distances because of the reduction in signal strength. It can also be used in electronic equipment for applications where space is limited such as medical equipment and aircraft. In some cases a power cable is combined with coaxial cables and audio-visual cables

(c) Ribbon cables are used for data transmission and communications such as internal wiring for computer hard drives, CD drives and selected appliances.

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