GCE

Computer Science

H046/01: Computing principles

Advanced Subsidiary GCE

Mark Scheme for November 2020

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

Annotations

Annotation	Meaning
∧	Omission mark
BOD	Benefit of the doubt
C	Subordinate clause / consequential error
✗	Incorrect point
E	Expansion of a point
FT	Follow through
NAQ	Not answered question
NBOD	No benefit of doubt given
P	Point being made
REP	Repeat
/	Slash / half-mark
✔	Correct point
TV	Too vague
0	Zero (big)
BP	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
L1	Level 1
L2	Level 2
L3	Level 3

Subject Specific Marking Instructions

INTRODUCTION
Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:
* the specification, especially the assessment objectives
* the question paper and its rubrics
* the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

USING THE MARK SCHEME
Please study this Mark Scheme carefully. The Mark Scheme is an integral part of the process that begins with the setting of the question paper and ends with the awarding of grades. Question papers and Mark Schemes are developed in association with each other so that issues of differentiation and positive achievement can be addressed from the very start.

This Mark Scheme is a working document; it is not exhaustive; it does not provide 'correct' answers. The Mark Scheme can only provide 'best guesses' about how the question will work out, and it is subject to revision after we have looked at a wide range of scripts.

The Examiners' Standardisation Meeting will ensure that the Mark Scheme covers the range of candidates' responses to the questions, and that all Examiners understand and apply the Mark Scheme in the same way. The Mark Scheme will be discussed and amended at the meeting, and administrative procedures will be confirmed. Co-ordination scripts will be issued at the meeting to exemplify aspects of candidates' responses and achievements; the co-ordination scripts then become part of this Mark Scheme.

Before the Standardisation Meeting, you should read and mark in pencil a number of scripts, in order to gain an impression of the range of responses and achievement that may be expected.

In your marking, you will encounter valid responses which are not covered by the Mark Scheme: these responses must be credited. You will encounter answers which fall outside the 'target range' of Bands for the paper which you are marking. Please mark these answers according to the marking criteria.

Please read carefully all the scripts in your allocation and make every effort to look positively for achievement throughout the ability range. Always be prepared to use the full range of marks.

LEVELS OF RESPONSE QUESTIONS:

The indicative content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance.

Using 'best-fit', decide first which set of BAND DESCRIPTORS best describes the overall quality of the answer. Once the band is located, adjust the mark concentrating on features of the answer which make it stronger or weaker following the guidelines for refinement.

- **Highest mark:** If clear evidence of all the qualities in the band descriptors is shown, the HIGHEST Mark should be awarded.

- **Lowest mark:** If the answer shows the candidate to be borderline (i.e. they have achieved all the qualities of the bands below and show limited evidence of meeting the criteria of the band in question) the LOWEST mark should be awarded.

- **Middle mark:** This mark should be used for candidates who are secure in the band. They are not 'borderline' but they have only achieved some of the qualities in the band descriptors.

Be prepared to use the full range of marks. Do not reserve (e.g.) high Band 3 marks 'in case' something turns up of a quality you have not yet seen. If an answer gives clear evidence of the qualities described in the band descriptors, reward appropriately.

	AO1	AO2	AO3
High (thorough)	Precision in the use of question terminology. Knowledge shown is consistent and well-developed. Clear appreciation of the question from a range of different perspectives making extensive use of acquired knowledge and understanding.	Knowledge and understanding shown is consistently applied to context enabling a logical and sustained argument to develop. Examples used enhance rather than detract from response.	Concerted effort is made to consider all aspects of a system / problem or weigh up both sides to an argument before forming an overall conclusion. Judgements made are based on appropriate and concise arguments that have been developed in response resulting in them being both supported and realistic.
Middle (reasonable)	Awareness of the meaning of the terms in the question. Knowledge is sound and effectively demonstrated. Demands of question understood although at times opportunities to make use of acquired knowledge and understanding not always taken.	Knowledge and understanding applied to context. Whilst clear evidence that an argument builds and develops through response there are times when opportunities are missed to use an example or relate an aspect of knowledge or understanding to the context provided.	There is a reasonable attempt to reach a conclusion considering aspects of a system / problem or weighing up both sides of an argument. However the impact of the conclusion is often lessened by a lack of supported judgements which accompany it. This inability to build on and develop lines ofargument as developed in the response can detract from the overall quality of the response.
Low (basic)	Confusion and inability to deconstruct terminology as used in the question. Knowledge partial and superficial. Focus on question narrow and often one-dimensional.	Inability to apply knowledge and understanding in any sustained way to context resulting in tenuous and unsupported statements being made. Examples if used are for the most part irrelevant and unsubstantiated.	Little or no attempt to prioritise or weigh up factors during course of answer. Conclusion is often dislocated from response and any judgements lack substance due in part to the basic level of argument that has been demonstrated throughout response.

Question			Answer	Mark	Guidance
1	**(a)**		1 mark per bullet up to a maximum of 2 marks, e.g. • Uses the same memory for data and instructions • Uses the same bus for data and instructions • Can only fetch either data or instructions at one time/follows FDE	2 AO1.1 (1) AO2.1 (1)	Allow: • ALU for arithmetic Logic Unit • CPU contains an Arithmetic Logic Unit • CPU contains a single Control Unit. Same (Memory) **location** is not acceptable for BP1
1	**(b)**	**(i)**	1 mark per bullet up to a maximum of 4 marks, e.g.: • Data/address is copied from PC to MAR • PC is incremented (by 1) (this can be in any location from here down) • Data in MAR is passed onto the Address Bus • Read signal is sent onto the control bus • RAM copies the data from the location specified by the address bus onto the data bus • Data on the data bus is passed into the MDR • Data is copied from the MDR to the CIR	4 AO1.1 (2) AO2.1 (2)	The bullets must be in the correct order, except BP2, which can come anywhere from BP2 onwards
		(ii)	• C	1 AO1.2 (1)	
2	**(a)**		1 mark per bullet up to a maximum of 3 marks, e.g.: • Peripheral management • Handle interrupts • File management • Provides a user interface • Provides platform to install and run software. • Provides utilities for system maintenance. • Allows multi-tasking • Provides security	2 AO1.1 (2)	Do not accept memory management or processor scheduling.
2	**(b)**		1 mark per bullet up to a maximum of 2 marks, e.g: • Programs/data can be held in non-contiguous memory locations (using virtual addressing)… • …making it easier to make best use of remaining storage/ to avoid having to move content around to fit in new programs.	2 AO1.2 (2)	

			• It allows pages to be transferred to and from secondary storage (i.e. virtual memory). • As random access there is no performance drop vs sequential storage		
2	**(c)**		1 mark for stating an initial reason and 1 mark for suitable expansion for each (4 marks total), e.g.: • Faster read/write times… • … allows Julie to complete her work quicker • More portable/durable… • … allows Julie to be mobile between home and university • Lower power consumption… • … Allows Julie to use all through the day without recharge • Quieter running … • … Allows Julie to use her laptop during lectures without disturbing people/lecturer	4 AO2.1 (4)	Maximum of 2 marks for each reason. Expansion points must be relevant to the scenario stated in the question. Accept reliable for durable on BP3
2	**(d)**		1 mark for any of the following bullet points: e.g. • Disk Defragmentation • System Clean-up • Anti-Virus/Malware • Firewall • File management • Disk Drivers	1 AO1.1 (1)	

Question	Answer	Mark	Guidance
3	**Mark Band 3–High Level** **(7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of relevant data collection methods. They have covered a range of ethical issues and relevant legislation; the material is generally accurate and detailed across all three. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate has used a range of ethical implications and laws to justify their conclusion *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2-Mid Level** **(4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of relevant data collection methods. They have covered ethical issues and relevant legislation; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate has either good consideration of ethical issues or legal issues or a weaker consideration of both. These are used to come to some justification although it may not be completely justifiable.	9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	**AO1.1** • Automatic Number Plate Recognition (ANPR) could be used. This makes use of OCRto turn number plates on camera into digital characters. • Use of a token/ticket could be used when cars enter the car park which is time stamped. • Staff could be employed to manually record the time cars enter the car park and then again when cars leave. • Sensor could be used to detect cars entering / leaving the car park. • Photographs of vehicles can be taken when cars enter / leave the car park. These can be time stamped. **AO2.1** • Data will be input into an algorithm that will work out the price based on amount of time car has spent in car park. • If the car park is considering storing videos / photographs of the cars then they will need to follow current data protection legislation as these may contain faces of people. • Car park users may see this as an invasion of privacy. Civil liberty issues as movements are being tracked / monitored. • Automated systems are likely to be more reliable and will produce statistical data that can be analysed better. Manual methods may be prone to human error. Automatic methods will allow for quicker processing than if a human was doing it. • Lower overheads as no human to employ.

There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.

Mark Band 1-Low Level
(1-3 marks)
The candidate demonstrates a basic knowledge of relevant data collection methods. They have covered ethical issues or relevant legislation; the material is basic and contains some inaccuracies.
The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided.
The candidate provides comes to a conclusion though there may be little considerations of legal or ethical issues to back it up.

The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

0 marks
No attempt to answer the question or response is not worthy of credit.

- They could connect to the other databases (e.g. police and DVLA) to check that cars are genuine (e.g. can check if cars have been stolen)
- If connecting the cameras over the internet, then this would make them susceptible to hackers and therefore security methods would need to be put in place.

AO3.3
- If automated systems are used then this can lead to improved customer satisfaction and lower costs due to streamlined system. However this could lead to less employment in the local area as computer systems taking over jobs.
- Some people may be afraid of using carpark due to cameras.
- Data protection laws should mean consumers are protected
    - System secure
    - Data only stored for a short time
    - Only relevant data stored

Question			Answer	Mark	Guidance
4	**(a)**	**(i)**	Lossy	1 AO2.1 (1)	
	(a)	**(ii)**	1 mark per bullet up to a maximum of 2 marks, e.g.: • Reduces the size of the image file • Uses lower bandwidth in transmission • Takes up less storage (on the HTTP server)	2 AO2.1 (2)	
4	**b**		1 mark per bullet up to a maximum of 4 marks • DNS is used to resolve IP corresponding to URL • Request sent to DNS resolver. • Resolver checks its cache and if it doesn't hold the URL, it passes it in to the TLD Name server which checks its cache and returns the answer or passes on to the.. • Authoritative Name Server. • The IP address is returned back up to the requesting client. • Or an error if no resolution can be found.	4 AO1.1 (2) AO1.2 (2)	Award the mark for checking of cache at any of the stages but limit to one mark for this aspect.

4	**c**		1 mark per bullet up to a maximum of 6 marks:
			• Correct syntax for css class for "model"(including opening and closing curly brackets)
			• Correct syntax for css id for "beeb" (including opening and closing curly brackets)
			• Correct syntax for setting the font family to arial for class "model"
			• Correct syntax for setting the font colour to red on class "model"
			• Correct syntax for setting colour to green for id "beeb"
			• Correct syntax for setting font family to times for id "beeb"
				6 AO3.1 (6)	Example:
					``
					li.model {
					          color: red;
					          font-family: arial;
					}
					#Beeb {
					     color: green;
					     font-family: times;
					}
					``
					Ignore if `li` is not put in front of `.model`
					Reject if any other tag is put in front of `.model`
					
					Responses written in HTML mark as NAQ

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Question			Answer	Mark	Guidance
5	**(a)**		236	1 AO2.1 (1)	
	(b)		B3	1 AO2.1 (1)	
	(c)		-101	1 AO2.1 (1)	
	(d)		1 mark per bullet up to a maximum of 2 marks, e.g: • 0101 1010 • Suitable working out	2 AO2.1 (2)	Allow any suitable method of working out, e.g. the carry method or using two's complement.

Question			Answer	Mark	Guidance
6	**(a)**		• Assembler	1 AO1.1 (1)	
6	**(b)**	**i**	• Iteration	1 AO2.2 (1)	
		ii	• 5	1 AO2.2 (1)	

		iii	1 mark per bullet up to a maximum of 4 marks, e.g:
			• Initialise Y and Z AND set X
			• Correct use of IF
			• Correct condition (e.g. if X >= Y then)
			• Assignment of Z in correct places
				4 AO3.1 (2) AO3.3 (2)	X Y Z variable alternatives are acceptable
					Solution:
					`X = input()`
					`Y = 5`
					`Z = 0`
					`if X >= Y then`
					`    Z = Y`
					`else`
					`    Z = X`
					`Endif`

6	**(c)**		1 mark per bullet up to a maximum of 2 marks, e.g: • Some instructions in CISC will rarely get used … • … In RISC instructions are used regularly • In assembly for CISC, a statement that takes one mnemonic … • … (may) take multiple mnemonics in RISC • Compilers for RISC need to be more complex … • … than compilers for CISC • CISC architecture has complex circuitry and is therefore more expensive to manufacture... • ...RISC architecture has simple circuitry minimising manufacture cost.	2 AO1.1 (1) AO1.2 (1)	Accept More than one clock cycle for each instruction in CISC ... ...one clock cycle for each instruction in RISC For BP's 3 and 4

Question	Answer	Mark	Guidance
7	(table below)	4 AO2.2 (4)	Award 1 mark for each group of 4 1's / 0's.

A	B	C	D	X	Marking Guidance
0	0	0	**0**	**0**	**1 Mark**
0	0	1	**0**	**1**	
0	1	0	**0**	**0**	**1 Mark**
0	1	1	**0**	**1**	
1	0	0	**0**	**0**	**1 Mark**
1	0	1	**0**	**1**	
1	1	0	**1**	**1**	**1 Mark**
1	1	1	**1**	**0**	

Question	Answer	Mark	Guidance
8	1 mark per bullet up to a maximum of 5 marks, e.g.: • Suitable logic for inputting the telephone number • Suitable logic for ensuring the telephone number starts with a 0 • Suitable logic for passing the telephone number into the function `checkLength` • If `true`, suitable logic for opening and closing `winner.txt` • …suitable logic for writing the telephone number to `winner.txt` • Suitable logic for printing "Needs To Start With 0" and "Not Long Enough"	5 AO3.1 (2) AO3.2 (3)	Example Solution: (code below)

```
procedure competitionWinner()
telNum = input("Enter Telephone Number")
if telNum[0] == "0" then
length = checkLength(telNum)
    if length == true then
myfile = openWrite("winner.txt")
myfile.writeLine(telNum)
myfile.close()
    else
      print ("Not Long Enough")
    endif
    else
        print ("Needs To Start With 0")
    endif
endprocedure()
```

Question	Answer	Mark	Guidance
9	**Mark Band 3–High Level** **(7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of networking methods and cost and security implications. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate is able to evaluate different methods of network and how they would be beneficial to the business and come to a reasoned conclusion. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2-Mid Level** **(4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of networking methods and cost and security implications and is able to talk about some of the attributes of each; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate makes a reasonable attempt to explain how different aspects of networks would be beneficial to the business however they may not always be accurate. They will come to a conclusion although their justifications may not be clear.	9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	**Knowledge** • As firm is on multiple sites it will need to be connected via a WAN • Each office would have its own LAN • Use of Client/Server network which will allow o Centralised security o Centralised back up o Shared resources such as file/print/internet are not tied to a peer computer o Extra hardware for client/server would incur extra expense • VPN would allow secure access to server in one site from another • Cloud computing would allow remote storage of data o Would allow sharing of data between sites and client locations o Provide extendable storage o Built in back up o Strong security, but out of firms control • Network would allow data and resources such as printers to be shared o Sharing resources would allow solicitors easier access to client files o Even with strong security, networks bring vulnerability to sensitive data being held **Application** • As a solicitor's firm will deal with sensitive data security concerns would be paramount to clients who have data stored with them o Use of VPN may be necessary to provide secure links between offices o Data would need to be encrypted o Clients may be unhappy with external services such as cloud

| | | | *There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.*

Mark Band 1-Low Level
(1-3 marks)
The candidate demonstrates a basic knowledge of networking methods and cost and security implications and may be able to recall the attributes of one or more with limited understanding shown; the material is basic and contains some inaccuracies.
The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided.
The candidate has some explanation of the benefits or drawbacks to the business although the accuracy may be limited and their conclusions not clear

The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

0 marks
No attempt to answer the question or response is not worthy of credit. | | Strong security measures would bring extra cost, which could push fee's up Client server set up would require extra equipment Switches/routers/gateways/servers/NIC/cabling/WAP Extra costs may push fee's up A network would give solicitors quicker/immediate access to client files Allows solicitor to quickly switch between clients Allow solicitors to collaborate and help colleagues Allows clients to be seen by solicitors at either office and they would sill have access to their case files Allows solicitors to research old cases from either office **Evaluation**
The candidate could come to either a conclusion of the network being an overall drawback or benefit. However, their reasoning must clearly lead to that conclusion with clear justification. |

OCR (Oxford Cambridge and RSA Examinations)
The Triangle Building
Shaftesbury Road
Cambridge
CB2 8EA

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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