GCE AS MARKING SCHEME

SUMMER 2019

**AS (NEW)
COMPUTER SCIENCE - UNIT 1
2500U10-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

**WJEC
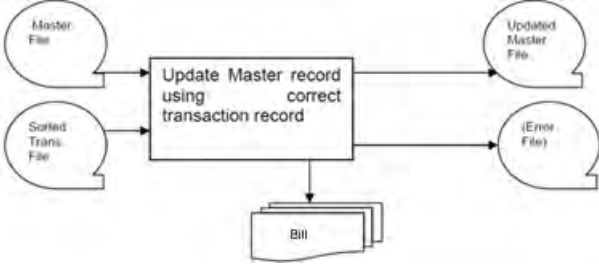GCE AS Computer Science - Unit 1**

Summer 2018 Mark Scheme

Q	Answer	Marks	AO1	AO2	AO3	Tot
1a	Award one mark for one of the following: • The Internet is a world-wide communications infrastructure • A network of networks	1	1.1a			1
1bi	Award one mark for one of the following: • Sending datagrams across a network with very few **error recovery** services. • Streaming multimedia	1	1.1b			1
1bii	• Assigning (dynamic) **IP addresses** to devices on a network.	1	1.1b			1
1biii	Award one mark for one of the following: • Sending an email across a network / internet • Used to send email to an email server.	1	1.1b			1
2a	• 0 • 1 Ignore 0 or NULL for c and d No marks awarded for 0,1,3,4	1 1		2.1b 2.1b		2
2b	• The algorithm will not output c / c = [blank]/ [Null] / Undefined / Random data / 0 • The algorithm will not output d / d = [blank] / [Null] / Undefined / Random data / 0 • This is because the scope of c and d lies within the function myFunction / c and d are local variables to myFunction • and the lifetime of the data stored in each variable end when myFunction ends / c and d are not available to the main program	1 1 1 1		2.1b 2.1b 2.1b 2.1b		4

Q	Answer	Marks	AO1	AO2	AO3	Tot
3	Award one mark for each name and one for each description of the following up to a maximum of six (3x2): Control Unit • Directs the flow of instructions and/or data • Coordinates the other parts of the CPU • Generates clock ticks or controls the clock Arithmetic Logic Unit • The ALU performs all the mathematical calculations and logical operations in the CPU. MDR • Register of a computer's control unit that contains the data to be stored in the computer storage (e.g. RAM), or the data after a fetch from the computer storage. MAR • Register that either stores the memory address from which data will be fetched to the CPU or the address to which data will be sent and stored. In other words, MAR holds the memory location of data that needs to be accessed. CIR • Register that holds the instruction currently being executed. PC • Processor register that indicates where a computer is in its program sequence. Cache memory • Smaller, faster memory, closer to a processor core • stores copies of the data from frequently used main memory locations • Most CPUs have different independent caches, including instruction and data caches, where the data cache is usually organized as a hierarchy of more cache levels (L1, L2, etc.) **Registers** • **A small amount of fast access storage**	3x2	1.1b			6

Q	Answer	Marks	AO1	AO2	AO3	Tot
	• **Normally used for a specific purpose where data or control information is temporarily stored.** **NOT** buses					

Q	Answer	Marks	AO1	AO2	AO3	Tot
4a	Award one mark for each of the following up to a maximum of five: • Hard drives have a fast transfer rate and a fairly fast access time. • Hard drives are a magnetic medium and store data on a hard drive platter • Data is read and saved using an arm that has a special read/write head at the end • As the disk spins, the arm travels across the disk • Each sector of the platter can store data and the movement of both the disk and the read/write head means that every sector on the hard drive can be reached • The faster the platter spins, the faster data can be read from the disk. (This speed is measured in revolutions per minute, or RPM) • A common speed for hard drives is 7200 RPM, but it can vary. CONDONE: Their speed does not come close to the speed of memory, the CPU or SSD because it has moving parts (must be qualified) CONDONE: HDD are less durable than other secondary storage devices as they have moving parts.	5	1.1b			5
4bi	Award one mark for each of the following up to a maximum of 3: • File B is fragmented • This mean that it is split and stored on different parts of the disk • When data is fragmented, it takes longer for the disk heads to move between parts of the file, • which slows the process of loading it.	3		2.1b		3
4bii	Award one mark for each of the following up to a maximum of two: • An SSD drive uses direct access to data (files) • There would be no deterioration in read times • as there is no physical read-head to move.	2		2.1b		2

Q	Answer	Marks	AO1	AO2	AO3	Tot
5a	• $C = A.\overline{B}$ Accept **C = A AND NOT B**	1		2.1a		1
5b	Award one mark for one of the following • $R = \overline{P + Q}$ • $R = \overline{P}.\overline{Q}$ Accept **R = NOT(P OR Q)** **R= NOT P AND NOT Q**	1 1		2.1a 2.1a		1
5c	• $Z = \overline{X \oplus Y}$ Accept **Z = NOT (X XOR Y)**	1		2.1a		1
6a	Award one mark for each of the following: • A parameter is a variable / value that can be passed to / from the procedure • When passing by reference, the address of the required data is passed to the procedure (rather than the actual value of the data).	2	1.1b			2
6b	Award one mark for each of the following: • Another method is by value • where a local copy of the data is created for the procedure (discarded later).	2	1.1b			2
6c	• Passing by reference may lead to unintended side effects where the parameter has its value changed in the procedure (which then inappropriately affects its value in the main program).	1	1.1b			1

Q	Answer	Marks	AO1	AO2	AO3	Tot
7a	Award one mark for each of the following: • Two input files: old master file and **sorted** transaction file • Update process i.e. comparison transaction record by record with corresponding master record - update master record • New (updated) master file output • Document output, e.g. bill. **Indicative Content** 	4	1.1b			4
7b	**File organisation** Award one mark for any of the following: • Transaction files use serial organisation • are stored in no particular or chronological Award one mark for any of the following: • Master files use sequential organisation / records • are stored in order / by key field **Example data** Award one mark for each of the following up to a maximum of two marks: **Indicative content** • Payroll o **Transaction file** o Hours worked o **Master file** o Employee details / pay details to date • Utility bill o **Transaction file** o Meter reading o **Master file** o Customer details / utility usage to date	1 1 2	1.1b			4

Q	Answer	Marks	AO1	AO2	AO3	Tot
7c	• Batch processing	1	1.1b			3
	Award one mark for each of the following up to a maximum of two: • Process is carried out with no user interaction • Batch processing may avoid using computer resources at times when demand is high /off-peak • Errors are stored in a file for later use and not dealt with as they occur. • Data is collected, and processed in one single operation.	2	1.1b			

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Q	Answer	Marks	AO1	AO2	AO3	Tot
8	Award one mark for each of the following: $A.(B + C) + A.(0 + \overline{A}) + B.(1 + C)$ $A.B + A.C + A.0 + A.\overline{A} + B.1 + B.C$ $A.B + A.C + A.\overline{A} + B.1 + B.C$ $A.B + A.C + A.\overline{A} + B + B.C$ $A.B + A.C + B + B.C$ $B.(A + 1 + C) + A.C$ $B + A.C$ Do not accept only truth table	 1 1 1 1 1 1		 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b		6
9	Award one mark for each of the following up to a maximum of two marks for each method: File backup • A data backup is a copy or archive of files and folders for the purpose of being able to restore them in case of data loss. • Autosaving of files as you use them e.g. Word keeping backup copies. Generations of files • This involves storage of three of the most recent versions of master file. (grandfather – father - son) • Useful if one version is corrupted: the previous version(s) is still available • Data should be stored off site in case of a disaster. Transaction logs • This method is an incremental file security method, meaning that in order to restore a database to a certain point-in-time, all transaction log records are required to replay database changes up to that particular point-in-time • Only backs up data that has changed and writes over older back ups • Useful as it saves storage space and is faster than full backup. • Version control Access Rights • Users can be given rights to certain files or file structures that prevent them from accessing them / changing them / deleting them. • File attributes	6	1.1b			6

Q	Answer	Marks	AO1	AO2	AO3	Tot
10a	 myArray	1 1 1		2.1b 2.1b 2.1b		3

10b	**Indicative content**
	
	 ```1 declare myArray[1 to 5]```
	 ```2 searchValue is integer```
	 ```3 found is Boolean```
	 ```4 set found = FALSE```
	 ```5 set myArray = [45, 12, 98, 54, 56]```
	 ```6```
	 ```7 input searchValue```
	 ```8```
	 ```9 For i = 1 to 5```
	 ```10 if searchValue = myArray[i] then```
	 ```11 set found = TRUE```
	 ```12 output "SearchValue found at position ", i```
	 ```13 end if```
	 ```14 next i```
	 ```15```
	 ```16 if found = FALSE```
	 ```17 Output "SearchValue not found"```
	 ```18 end if```
	
	 Marking
	 • Declare and initialise variables
	 • Input `searchValue`
	 • Loop structure and increment
	 • Determine position if found
	 • Output position if found
	 • Correct terminating condition for loop
	 • Output message if not found
	 • Algorithm works as intended.
		1
		 1
		 1
		 1
		 1
		 1
		 1
		 1
					3.1b
					 3.1b
					 3.1b
					 3.1b
					 3.1b
					 3.1b
					 3.1b
					 3.1b
						8

10c	One mark for linear, one mark for binary: Linear • It can also be used on any set of data regardless of type and whether or not it is sorted • When the number of data items is low Binary • When the data is always sorted • When the number of data items is high No marks awarded for opposites	1 1 1	1.1b 1.1b			2

Q	Answer	Marks	AO1	AO2	AO3	Tot
11a	$6C_{16} = 01101100_2$ $AF_{16} = \underline{10101111_2}$ $\overline{100011011_2}$	1 1 1		2.1a 2.1a 2.1a		3
11b	**Unsigned exponent** **Minimum** • Mantissa: 0.100 • Exponent: 0000 • Denary value: $0.5 \times 2^0 = 0.5_{10}$ **Maximum** • Mantissa: 0.111 • Exponent: 1111 • Denary value: $0.875 \times 2^{15} = 28,672_{10}$ **Signed exponent** **Minimum** • Mantissa: 0.100 • Exponent: 0000 • Denary value: $0.5 \times 2^0 = 0.5_{10}$ **Maximum** • Mantissa: 0.111 • Exponent: 0111 • Denary value: $0.875 \times 2^7 = 112_{10}$	 1 1 1 1 1 1 1 1 1 1 1 1		 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b 2.1b		6
11c	Award one mark for each of the following up to a maximum of two marks for each: Advantages of integers: • Numbers are stored accurately • Less complex processing • Exact representation of zero • Less storage space Advantages of floating-point: • Very large / small numbers can be stored • Larger range of numbers can be represented • Fractions / decimal places can be represented.	 2 2	 1.1b 1.1b			4

Q	Answer	Marks	AO1	AO2	AO3	Tot
12	Award one mark for each of the following: • Consulting current documentation o to investigate current data storage requirements or data flow • Carry out a questionnaire of staff / customers o because they may be spread over a wide geographical area and there are many of them • Interview staff / customers / employees o suitable when analyst requires a lot of information from a small number of people such as selected staff • Observing current system in practice o suitable for gathering information first hand and not having to rely on what people tell you what they think is happening • Research similar systems o Desktop research looking at existing similar systems that are available.	6	1.1b			6

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Q	Answer	Marks	AO1	AO2	AO3	Tot
13	**Indicative content** Award one mark for each of the following: • Relational database: o One-to-one o One-to-many • Data is normalised • Uses a primary key in each table which is a unique identifier • Uses a foreign key, which is a primary key from another table, forming a link between the tables • Avoids data duplication • Minimised data inconsistency • Easier to change data • Easier to change data format • Data can be added and removed easily • Easier to maintain security • Easier to back-up data • Easier to restore / recover from disasters • Carry out queries / searches • Sort data • Forms for data entry • Generate reports • Perform calculations using calculated fields • Can ensure the reasonableness of data using validation • Can ensure data consistency using verification Security • User can have different views • Standard clerical procedures • Passwords for access • Write-protect mechanisms.	11	1.1b			11

Q		Answer	Marks	AO1	AO2	AO3	Tot
Band		**AO1.1b** **Max 11 marks**					
3		**9 - 11 marks** The candidate has: • written an extended response that has a sustained line of reasoning which is coherent, relevant, and logically structured • shown clear understanding of the requirements of the question and a clear knowledge of the indicative content. Clear knowledge is defined as a response that provides nine to eleven relevant detailed points, which relate to an extensive amount of the indicative content • addressed the question appropriately with minimal repetition and no irrelevant material • has presented a balanced discussion and justified their answer with examples • used appropriate technical terminology referring to the indicative content confidently and accurately.					
2		**4 - 8 marks** The candidate has: • written a response that has an adequate line of reasoning with elements of coherence, relevance, and logical structure • shown adequate understanding of the requirements of the question and a satisfactory knowledge as specified in the indicative content. Satisfactory knowledge is defined as a response that provides four to eight points as signalled in the indicative content • has presented a discussion with limited examples • used appropriate technical terminology referring to the indicative content.					
1		**1 - 3 marks** The candidate has: • written a response that that lacks sufficient reasoning and structure • produced a discussion which is not well developed • attempted to address the question but has demonstrated superficial knowledge of the topics specified in the indicative content. Superficial knowledge is defined as a response that provides one to three points as signalled in the indicative content • used limited technical terminology referring to the indicative content.					
0		**0 marks** • Response not credit worthy or not attempted.					
		Total	100	60	32	8	100

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2500U10-1 WJEC GCE AS German - Unit 1 MS S19/DM