GCE AS MARKING SCHEME

SUMMER 2025

AS
COMPUTER SCIENCE - UNIT 1
2500U10-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCE AS LEVEL COMPUTER SCIENCE - UNIT 1

SUMMER 2025 MARK SCHEME

<table>
<tr><th>Number</th><th>Answer</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>1.</td><td>Award two marks for each of the following:
• Description of the use of a different input device in the chosen application
• Advantage of the input device in the chosen application
• Disadvantage of the input device in the chosen application.

Indicative content

• Description: Touch screen ordering systems at fast food restaurants
• Advantage: When combined with a GUI they are very easy and intuitive to use, with little or no training required
• Disadvantage: They aren’t as accurate as a mouse pointer so user could choose the wrong item/ when in use the finger or hand blocks the user’s sight of the screen so they can't see what they are ordering.

• Description: Use a webcam to hold a video conferencing call with colleague at work
• Advantage: Allow users to see the faces and read the emotions of those who they are chatting to online
• Disadvantage: lower quality than digital cameras / they rely on a high bandwidth internet connection for a steady video stream / can be hacked if left connected to the internet, so a potential security and privacy threat.</td><td>6</td><td></td></tr>
<tr><td>2.</td><td>Award one mark for each correct column heading:
<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>A</td><td>B</td><td>C</td><td>$\overline{A}$</td><td>$\overline{C}$</td><td>$B \cdot 4$</td><td>$5 \oplus 6$</td></tr></table>
ACCEPT other expressions if correct.
ECF for columns 6 and 7 if columns 4 and 5 incorrect.</td><td>4</td><td></td></tr>
</table>

Number	Answer	Mark	Additional guidance
3.(a)	**Award one mark for each of the following advantages up to a maximum of two marks:** • Data is transmitted at a higher speed • Work well for short-distance communication • Set of bits are transferred simultaneously **Award one mark for each of the following disadvantages up to a maximum of two marks:** • It is a more expensive system due to the need for extra wires • In order to transmit the data over long ranges, the thickness of the wire has to be increased to diminish signal degradation • There are multiple communication channels required • Crosstalk can occur, especially when multiple data lines are used simultaneously	4	
(b)	**Award one mark for each of the following:** • A data collision occurs • Once detected, a computer waits for a short (random) time then sends again.	2	
(c)	**Award one mark for each of the following:** • Packets are given a 'packet number' to identify the order they are in • The packets will travel across the network, usually in different directions • taking the shortest route available • When the individual packets arrive at their destination they will be reassembled back together in the correct order • Once all of the packets have safely arrived a message will be sent to the original computer as confirmation • If a packet is missing or corrupted then the message will instead be sent asking for that particular packet to be resent.	5	

<table>
<tr><th>Number</th><th>Answer</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>4.(a)</td><td>Award one mark for each of the following:
• Correct carry bits (11110.000)
• Correct binary addition (11000.111)
• 24.875_{10}

<table><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>.</td><td>0</td><td>1</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>.</td><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>.</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>.</td><td>1</td><td>1</td><td>1</td></tr></table></td><td>3</td><td></td></tr>
<tr><td>(b)</td><td>Award one mark for each of the following:

Truncation
• 24.8
• Absolute error = 0.075
• Relative error = 0.003 (0.30%)

Rounding
• 24.9
• Absolute error = 0.025
• Relative error = 0.001 (0.10%)

No ECF</td><td>6</td><td></td></tr>
</table>

Number	Answer	Mark	Additional guidance
5.	**Award one mark for each simplification:** • $(C + B) \cdot (\overline{B} + C) + \overline{A}$ • $C \cdot \overline{B} + C \cdot C + B \cdot \overline{B} + B \cdot C + \overline{A}$ • $C \cdot \overline{B} + C \cdot C + B \cdot C + \overline{A}$ • $C \cdot \overline{B} + C + B \cdot C + \overline{A}$ • $C \cdot (\overline{B} + 1 + B) + \overline{A}$ • $C + \overline{A}$ **DO NOT** award credit for simplifications using a truth table.	**6**	
6.(a)	**Award one mark for identifying Payroll / Employee ID field in Master file** **Award one mark for identifying the above as a primary key** **Award one mark for carrying the primary key to the transaction file and identifying it as a key field.** **Award one mark for each suitable validation check up to a maximum of two marks** • Presence check • Range check • Format check • Length check • Type check • Look-up list.	**5**	
(b)	**Award one mark for the following.** • Batch processing **Award one mark for each of the following up to a maximum of three marks.** • 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 then processed in one single operation.	**4**	

Number	Answer	Mark	Additional guidance
(c)	**Award one mark for each of the following.** • Different relationships one-to-one and 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 • Quickly 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.	**6**	

Number	Answer	Mark	Additional guidance
7.	**Award one mark for each of the following:** • Consideration of an appropriate user interface e.g. GUI/Menus to assist Human Computer Interaction • Consideration of CLI • Voice input makes use of spoken language to allow interaction with a computer • Touch screens are a feature of most new devices and can take advantage of gestures • Force feedback offers haptic feedback to the user which is adding a new dimension to human-computer interactions • Virtual reality uses headsets to immerse the end user in an alternate world where they can interact by moving their bodies. Sensors track a user's movement and translate it into changes in the world the user is seeing • Augmented reality overlays details onto a live camera feed or projects onto glass. It will make use of sensors and other data to give the user amore immersive experience	**7**	
8.(a)	**Award one mark for each of the following:** • Variables and parameters are named memory locations • The values of both variables and parameters can change • A program can read from or write to a variable as the program is being executed • The value of a variable can change during the execution of the program • A parameter's value is set at the start of the execution of a subroutine / function • Parameters are passed to a subroutine / function • Parameters can be passed by value or by reference A parameter's value is not changed or updated while the subroutine / function is running.	**6**	
(b)	**Award one mark for each of the following:** • The scope of a variable refers to the areas or the sections of the program in which the variable can be accessed • The lifetime of a variable indicates how long the variable stays alive in the memory • For some variables, known as global variables, this could be the entire time the program is running • For others, known as local variables, this could be for a single function call.	**4**	

Number	Answer	Mark	Additional guidance
9.	**Indicative content** 1. Start Procedure 2. declare binaryNo [0 to 7] as string 3. denaryNo is integer 4. multiplier is integer 5. 6. multiplier = 128 7. 8. input binaryNo 9. 10. if len(binaryNo) <> 8 then 11. output "error message" 12. else 13. for i = 0 to 7 14. denaryNo = denaryNo + (int(binary[i]) * multiplier) 15. multiplier = multiplier / 2 16. next i 17. 18. output denaryNo 19. end if 20. 21. end Procedure **Award one mark for each of the following:** • Initialise variables / declare array • Input binaryNo • Validation check on binaryNo • Loop • Correct terminating condition • Correctly calculate each bit / multiplier • Correct running total for denaryNo • Output denaryNo	8	

Number	Answer	Mark	Additional guidance
10.	**Award one mark for each of the following:** Alpha testing • Alpha testing is the first end-to-end testing of a product to ensure it meets the business requirements and functions correctly. • Alpha builds tend not to be stable and may lack functionality or even not work in all circumstances • It is important that an alpha build is not given to the customer or users, as they may feel that this is the level of quality they will get once the system is complete • Alpha tests are always carried out by the developer or by their in-house testing team. Beta testing • Beta testing is the final round of testing before a product is finally released to a wide audience • Beta builds are more complete and are created later in the development cycle • They should be more stable than alpha builds, since all of the main functionality has been already tested, but may contain bugs and problems • Beta builds are stable enough to give to the customer for beta testing. The customer carries out beta testing as if they were using the code in a live situation • All faults found are returned to the development team for correcting.	**6**	
11.	**Award one mark for naming and one mark for describing each of the following:** • Trace: this is a facility which displays the order in which the lines of a program are executed, and possibly the values of variables as the program is being run • Break point: this is a facility which interrupts a program on a specific line of code, allowing the programmer to compare the values of variables against expected values • Step through: this is a facility that allows the programmer to continue execution one line at a time. • Variable watch: this is a facility which displays the current value of any variable. The value can be 'watched' as the program code is single stepped to see the effects of the code on the variable • Memory inspector: this is a facility which will display the contents of a section of memory. • Warning dialogue/debugging errors: Messages that alert the user to potential issues/errors in their code.	**6**	

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<tr><td>12.</td><td>
Indicative content

Lexical analysis
• Comments and unneeded spaces are removed
• Keywords, constants and identifiers are replaced by 'tokens'
• A symbol table is created which holds the addresses of variables, labels and subroutines
• Example:
○ Line 8 is split into tokens and all whitespace is removed:
<table>
<tr><th>Token</th></tr>
<tr><td>total</td></tr>
<tr><td>=</td></tr>
<tr><td>total</td></tr>
<tr><td>+</td></tr>
<tr><td>number</td></tr>
</table>
Syntax analysis
• Tokens are checked to see if they match the spelling and grammar expected, using standard language definitions
• This is done by parsing each token to determine if it uses the correct syntax for the programming language
• If syntax errors are found, error messages are produced
• Example:
○ Line 6 includes a syntax error in the code
○ ouptut should be output

Semantic analysis
• Variables are checked to ensure that they have been properly declared and used
• Variables are checked to ensure that they are of the correct data type, e.g. real values are not being assigned to integers
• Operations are checked to ensure that they are legal for the type of variable being used, e.g. you would not try to store the result of a division operation as an integer
• Example:
○ Line 11 uses the variable grandTotal which has not been declared

Code generation and optimisation
• Machine code is generated
• Code optimisation may be employed to make it more efficient/faster/less resource intense
• Example:
○ Line 11 is an inefficient use of memory
○ Use either grandTotal or total throughout the program as both are not needed.
</td><td>12</td><td></td></tr>
</table>

Mark Band	AO1.1b (max 12 marks)
3	**11 - 12 marks** The candidate has: • shown clear understanding of the compilation process when applied to the given program. Clear knowledge is defined as a response that provides four relevant detailed examples from the indicative content. • written an extended response that has a sustained line of reasoning which is coherent, relevant, and logically structured • shown strong understanding and understanding of the requirements of the question and a clear knowledge. Clear knowledge is defined as a response that provides six to eight relevant detailed points from 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	**5 - 10 marks** The candidate has: • shown satisfactory understanding of the compilation process when applied to the given program. Satisfactory knowledge is defined as a response that provides two to three relevant detailed examples from the indicative content. • 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 seven points form the indicative content • has presented a discussion with limited examples • used appropriate technical terminology referring to the indicative content.
1	**1 - 4 marks** The candidate has: • shown superficial understanding of the compilation process when applied to the given program. Superficial knowledge is defined as a response that provides one relevant detailed example from the indicative content. • 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 • used limited technical terminology referring to the indicative content.
0	• Response not credit worthy or not attempted.