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CAMBRIDGE
International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9618/13**

Paper 1 Theory Fundamentals **October/November 2025**

MARK SCHEME

Maximum Mark: 75

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

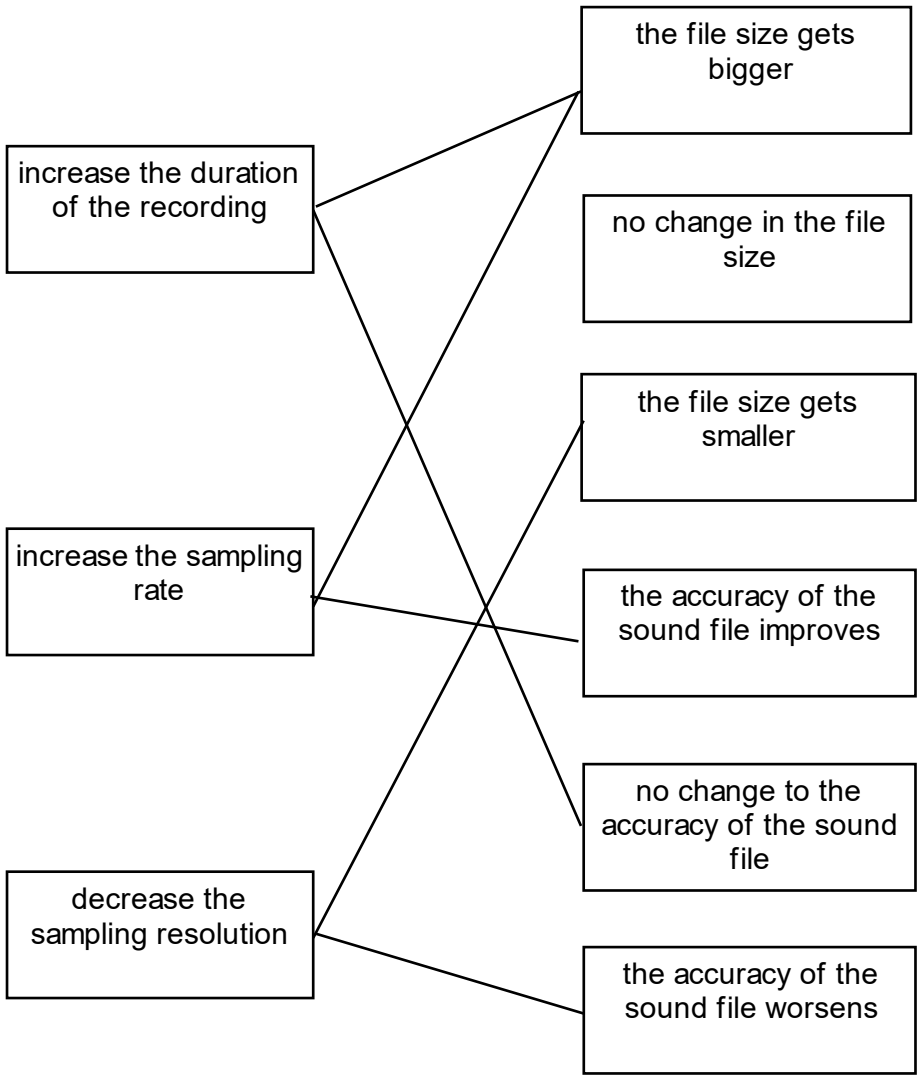
The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	Correct
	Incorrect
	To indicate where a key word/phrase/code is missing.
	Not relevant or used to separate parts of an answer.
	Indicates a part of the answer that is incorrect.
Highlighter	To draw attention to a particular aspect or to indicate where parts of an answer have been combined.
TV	Too vague.
REP	Repetition
NE	No examples or not enough.
BOD	Benefit of Doubt.
NAQ	Not Answered Question.
SEEN	Indicates that work or a page has been seen including blank answer spaces and blank pages.
FT	Follow through.
I	Ignore

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Question	Answer	Marks
1(a)	**1 mark** for each correctly connected change box, **max 3** marks 	**3**
1(b)	**1 mark** per bullet point, **max 2** marks • Each character has a **unique** code • Each character in the text is replaced **sequentially / in order** by its code	**2**
1(c)	**1 mark** per bullet point, **max 2** marks • ASCII uses 7 / 8 bits Unicode can use many more / up to 32 bits • Unicode can represent a wider range of characters including different languages	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>3 marks for 6 correct ticks
2 mark for 4 or 5 correct ticks
1 mark for 2 or 3 correct ticks

<table>
<tr><th rowspan="2">Example of data</th><th colspan="7">Number of bits</th></tr>
<tr><th>4</th><th>8</th><th>16</th><th>24</th><th>32</th><th>64</th><th>128</th></tr>
<tr><td>the hexadecimal value F139</td><td></td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>16 000 000 unique amplitude values</td><td></td><td></td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>an IPv4 address</td><td></td><td></td><td></td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>256 unique colours</td><td></td><td>✓</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>an IPv6 address</td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td></tr>
<tr><td>the denary value 65 000</td><td></td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr>
</table></td><td>3</td></tr>
<tr><td>2(b)</td><td>1 mark

1111 1001 0100</td><td>1</td></tr>
<tr><td>2(c)</td><td>1 mark

1111 0010</td><td>1</td></tr>
<tr><td>2(d)</td><td>1 mark

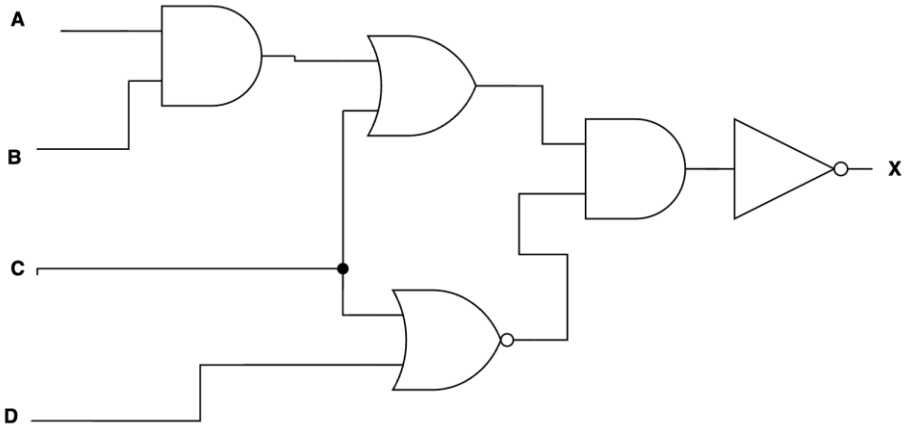
E33B</td><td>1</td></tr>
</table>

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Question	Answer	Marks
3(a)	**1 mark** per shaded area, **max 2** marks	**2**

A	B	C		X
0	0	0		1
0	0	1		0
0	1	0		1
0	1	1		1
1	0	0		1
1	0	1		1
1	1	0		1
1	1	1		1

3(b)	**1 mark** per bullet point, **max 2** marks • A AND B OR C • C NOR D and final two gates  	**2**

Question	Answer	Marks
4(a)	**1 mark** for each benefit, **max 3** • Devices can be more mobile as no physical connection is required • No cabling is needed so easier to set up • Easier to add additional devices • Multiple different device types can be connected	**3**

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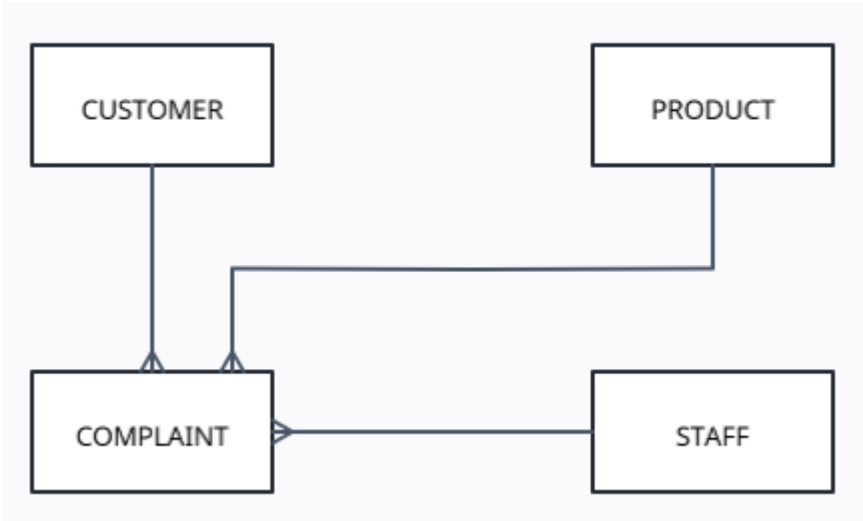
<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(b)</td><td>1 mark for a drawback

• Can be less secure
• Transmission speed can be slow
• Interference is possible
• The signal degrades quickly without repeaters/boosters</td><td>1</td></tr>
<tr><td>4(c)</td><td>One mark for each correct row

<table><tr><th>Description</th><th>Memory Technology</th></tr><tr><td>A read only memory where the contents can be erased using a voltage pulse. The contents can be changed multiple times without physically removing the memory.</td><td>EEPROM</td></tr><tr><td>A read only memory where the contents are erased using ultraviolet (UV) light. The memory must be physically removed to be reprogrammed.</td><td>EPROM</td></tr><tr><td>A read only memory where the contents can be written only once after manufacture.</td><td>PROM</td></tr></table></td><td>3</td></tr>
</table>

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Question	Answer	Marks
5(a)	**1 mark** for each correct relationship, **max 3** marks 	**3**

5(b)	**1 mark** per bullet point, **max 4** marks
	• Create table with opening and closing brackets and commas separating the attributes
	• Appropriate data types for StaffFirstName, StaffLastName and Department
	• Appropriate data types for StaffID and RemoteWorker
	• Primary key correctly defined
	Example Answer 1:
	`CREATE TABLE STAFF(`
	`StaffID INTEGER,`
	`StaffFirstName VARCHAR,`
	`StaffLastName VARCHAR,`
	`Department CHAR,`
	`RemoteWorker BOOLEAN,`
	`PRIMARY KEY (StaffID)`
	`);`
	Example Answer 2:
	`CREATE TABLE STAFF(`
	`StaffID INTEGER NOT NULL PRIMARY KEY,`
	`StaffFirstName VARCHAR,`
	`StaffLastName VARCHAR,`
	`Department CHAR,`
	`RemoteWorker BOOLEAN`
	`);`
		4

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Question	Answer	Marks

5(c)	**1 mark** per bullet point, **max 5** marks
	
	• SELECT and the correct attributes
	• FROM and the correct tables
	• Tables joined correctly
	• Correct condition for the rating
	• Correct ORDER BY clause
	
	Example Answer 1
	`SELECT PRODUCT.ProductID, ProductName, ComplaintDetails`
	`FROM PRODUCT, COMPLAINT`
	`WHERE PRODUCT.ProductID = COMPLAINT.ProductID`
	`AND Rating <=5`
	`ORDER BY Rating DESC;`
	
	Example Answer 2
	`SELECT PRODUCT.ProductID, ProductName, ComplaintDetails`
	`FROM PRODUCT INNER JOIN COMPLAINT`
	`ON PRODUCT.ProductID = COMPLAINT.ProductID`
	`WHERE Rating <=5`
	`ORDER BY Rating DESC;`
		5

5(d)	**One mark** for identification of method **one mark** for corresponding description **max 4** marks • Authentication methods / passwords / biometrics / 2-factor authentication can be implemented • ... which prevents unauthorised access to the customer's data • Access rights / privileges can be set • ... so that only those with correct permissions can read / edit customer's data • Regular backups can be scheduled • ... so that a second copy of the customer's data is available in case of loss/damage • The data can be encrypted • ... so that the customer's data cannot be understood by anyone who gains unauthorized access • Different views can be created • ... so that not everyone can see the customer's data	**4**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>6(a)</td><td>1 mark for each correct row

<table>
<tr><th>Current contents of the ACC</th><th>Instruction</th><th>Contents of the ACC after the execution of the instruction</th></tr>
<tr><td>0000 1111</td><td>AND 101</td><td>0000 1110</td></tr>
<tr><td>0000 0000</td><td>LDM #100</td><td>0110 0100</td></tr>
<tr><td>0000 0001</td><td>XOR &F1</td><td>1111 0000</td></tr>
<tr><td>0001 0001</td><td>CMP 101</td><td>0001 0001</td></tr>
</table></td><td>4</td></tr>
<tr><td>6(b)</td><td>1 mark for each bullet point, max 4 marks

• MAR stores the address of the next instruction / data to be read from / or written to memory
• The address is received from the Program Counter (PC)

• The MDR stores the data / instruction in the address stored in the MAR which has been read / written
• The instruction passes to the CIR for decoding and executing</td><td>4</td></tr>
<tr><td>6(c)</td><td>1 mark for each bullet point, max 3 marks

• Data movement
• Arithmetic operations
• Conditional and unconditional (jump) instructions</td><td>3</td></tr>
</table>

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Question	Answer	Marks
7(a)	**1 mark** per point, **max 2** marks e.g. • The learning experience could be improved • … by identifying students who are struggling • …. and employing more personalised learning • There could be early Intervention • … to determine which students require extra support • • Teachers and students could understand the challenges better • …and identify optimal times for learning • There could be privacy concerns • …. students / teachers could be uncomfortable with constant surveillance • ... students might not want their data / actions passed to third parties • There could be Mental Health concerns • …. due to constant monitoring and pressure • …. contributing to student stress and anxiety	**2**
7(b)	**1 mark** for the working **1 mark** for the correct answer Working: (4000*3000*30*16) / (8*1000*1000*1000) //(4000*3000*30*2) / (1000*1000*1000) Answer: 0.72 gigabytes	**2**
7(c)	**1 mark** for the name **2 marks** for the matching description, **max 3** marks • Parity Byte Check • a parity bit is added to each byte to make the number of 1s match the parity, odd or even • each byte can be checked on receipt and request to be resent if the byte does not match parity • Parity Block Check • a bit is added to each byte, but a parity byte is also set for each block • the location of an error can be found using vertical and horizontal parity • Checksum • A calculation is made from the data and transmitted with the data • The receiver performs the same calculation and compares with received checksum to see if they match	**3**

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Question	Answer	Marks
7(d)	**1 mark** per reason, **1 mark** for corresponding justification **x2** **max 4** marks • Lower cost per unit of storage • ... so the high capacity of storage required for large number of video files will be less costly • A large number of read/write operations are being performed continuously • ... and magnetic storage is likely to have a longer life span compared with solid state	**4**
7(e)	**1 mark** for each validation check correctly identified, **max 3** marks Range Check Existence Check Format Check	**3**

Question	Answer	Marks
8(a)	**1 mark** per bullet point, **max 2** • Large amounts of source code take time to compile • It can be slower to produce the object code than an interpreter • The code must be recompiled when it is changed • The program cannot run if there are errors • It is not possible to correct errors in real-time • One error can cause false reporting of multiple further errors • Sections of code / unfinished code cannot easily be tested	**2**
8(b)	**1 mark** per bullet point**, max 3** marks • Programming time is saved as code does not have to written from scratch • Testing time is saved as code is already tested / documented • A library routine is more likely to work, as code is already tested • Library routines automatically update if they are changed / improved • The programmer can use library routines to perform complex functions / procedures that they may not be able to write themselves	**3**
8(c)	**1 mark** per bullet point**, max 2** marks • Open Source (Initiative) • Free Software (Foundation)	**2**
8(d)	**1 mark** for each bullet point, **max 3** marks • File management • Security management • Hardware / peripheral management // input / output management • Process management	**3**

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