CAMBRIDGE
International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/11**

Paper 1 Computer Systems **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.

PUBLISHED

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.

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 standard isation 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 point
	Incorrect point
	Unclear response
FT	Follow through
REP	Repetition
I	Ignore
BOD	Benefit of doubt given
TV	Content of response too vague
NAQ	Not answered question
	Omission

Annotation	Meaning
	Section not relevant
	Section incorrect
Highlighter	Information copied from the text
	Page or response seen by examiner

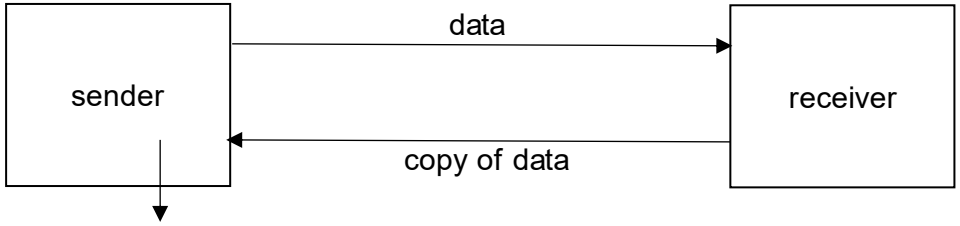
Mark scheme abbreviations

/	separates alternative words / phrases within a marking point
//	separates alternative answers within a marking point
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be awarded
( )	the word / phrase in brackets is not required, but sets the context

Note: No marks are awarded for using brand names of software packages or hardware.

Question	Answer	Marks
1(a)	255	**1**
1(b)	00010111 10101000	**2**
1(c)	11	**1**
1(d)	66	**1**
1(e)	**One** mark for each correct nibble. **One** mark for a correct method of working, for example carries. 1 1 1 0 1 1 1 0 1 1 0 + 0 0 1 1 0 0 0 0 1 0 1 0 0 1 1 0	**3**
1(f)	Using two's complement	**1**
1(g)	Any **two** from: • It has a single/limited function • It has dedicated hardware • It has a microprocessor • Its function is not easily changed	**2**

Question	Answer	Marks
2(a)	Any **two** from: • Resolution // number of pixels • Colour depth // bit depth • Quality // detail • Metadata	**2**
2(b)(i)	Router	**1**
2(b)(ii)	(Packet) header	**1**
2(c)	Any **three** from: • It has 128 bits • Hexadecimal • Separated by colons • 8 groups of digits • Each group is 4 digits • Consecutive groups of 0s can be represented by :: once	**3**

Question	Answer	Marks
2(d)	Any **three** from: The diagram shows: • (Data being sent to the receiver) and a copy sent back from the receiver to the sender • Sending device comparing the original data and the copy • If original data and copy don't match an error is detected  Compares original data with the copy sent back and if they don't match an error is detected	**3**
2(e)(i)	C	**1**
2(e)(ii)	Asymmetric	**1**

Question	Answer	Marks
3(a)	Any **three** from: • A character set is used • … such as ASCII/Unicode • Each character has a unique binary value that it is converted to	**3**
3(b)(i)	4096	**1**
3(b)(ii)	0.004 // 0.0039(0625)	**1**
3(c)	Any **three** from: • To **store** data/instructions that are **currently in use** • To **store** software/programs that are **currently in use** • For volatile storage // to store data **temporarily** • To allow data to be **accessed directly** by the **CPU/processor** // To allow data to be **stored closer** to the **CPU/processor**	**3**
3(d)	• Authentication • Biometric • Input device	**3**

Question	Answer	Marks
4(a)	Any **four** from: • A legitimate looking email is sent to the user • The user clicks a **link** in the email // the user **replies** to the email • The user is **directed** to a fake website • The user **enters** their **personal** data … • … that is stolen/used by a third party (for malicious purposes)	**4**

Question	Answer	Marks
4(b)	Any **two** from: • Check the email address that the email has been sent from • Check the tone/spelling of the email • Check the URL that is attached to the link	**2**
4(c)	Any **three** from: For example: • Virus • Worm • Trojan horse • Spyware // keylogger • Ransomware • Adware	**3**
4(d)(i)	Any **one** from: • A language that uses English-like statements • It is a language that needs to be converted to machine code (to be processed by a computer) • It is a portable language (that can be used on any computer)	**1**
4(d)(ii)	Any **two** from: • Easy/quick to read/write/understand • Machine independent • Less likely to make errors • Programmer can focus on the problem instead of the manipulation of memory/hardware	**2**

Question	Answer	Marks
4(d)(iii)	Any **one** from: • Cannot directly manipulate the hardware • Takes **longer** to convert (than low level-language) • Cannot use specialised hardware • Uses more **memory** // less efficient **memory** use	**1**
4(d)(iv)	Any **three** from: • The code is translated and executed line by line • … stopping when an error is found (showing the error location) • … meaning errors can be corrected in real time • No need to retranslate each time an error is fixed • … making it easier to debug • Sections of code can be easily tested • … meaning the whole program doesn't need to be written for testing	**3**

Question	Answer	Marks
5(a)	Any **three** from: • A mechanical structure/framework • Electrical components • … such as sensors/microprocessor/actuators • Programmable • Has the ability to move	**3**

Question	Answer	Marks
5(b)	**Two** from (one for benefit and one for matching explanation): For example: • Supermarket may gain more customers • … as elderly people who could not previously make it to the store can now shop there • … which will increase their sales/profits • Supermarket can serve customers more efficiently • … as multiple orders can be delivered at the same time	**2**
5(c)	**Two** from (one for drawback and one for matching explanation): For example: • They may get less exercise • … as they no longer need to walk to/round the store to get their shopping • … that could negatively affect their health • They may struggle to use technology // may mistrust technology // would prefer an employee/person to deliver it • … and this may cause additional stress/anxiety • … leading to making mistakes in receiving the delivery	**2**
5(d)	A	**1**
5(e)	Any **three** from: For example: • It could learn the route to a customer's house • It could learn where there are obstacles on a route • It could learn to deal with obstacles more effectively • It could reason which parts of the route are paths and which are roads • It can use machine learning • To identify patterns in the route data	**3**

Question	Answer	Marks
6(a)	**One** mark for each correct term in the correct place. The **program counter** stores the address of the next instruction to be processed. This address is then sent to the **memory address register**. This address is the location in RAM where the instruction can be found. The instruction is retrieved from RAM and immediately stored in the **memory data register**. The instruction is then sent to the **current instruction register** where it is decoded by the **control unit**. The instruction is decoded using an **instruction set**.	**6**
6(b)(i)	Hardware (interrupt)	**1**
6(b)(ii)	Interrupt handler // Interrupt service routine	**1**
6(b)(iii)	Any **one** from: • managing files • providing an interface • managing peripherals and drivers • managing memory • managing multitasking • providing a platform for running applications • providing system security • managing user accounts	**1**

Question	Answer	Marks
7	**One** mark for each correct data transmission method. • Serial • Simplex Any **three** from: Serial • Data will need to travel long distances • One wire is used // bits are sent in order // sent one bit at a time • Less chance of data being skewed // less chance of error • Transmission speed would be adequate Simplex • Data **only** needs to be sent in **one direction** • Data does not need to be **sent back** from the **speakers** to the microphone	**5**