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CAMBRIDGE
International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9618/11**

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.
	Too vague.
	Repetition
	No examples or not enough.
	Benefit of Doubt.
	Not Answered Question.
	Indicates that work or a page has been seen including blank answer spaces and blank pages.
	Follow through.
	Ignore

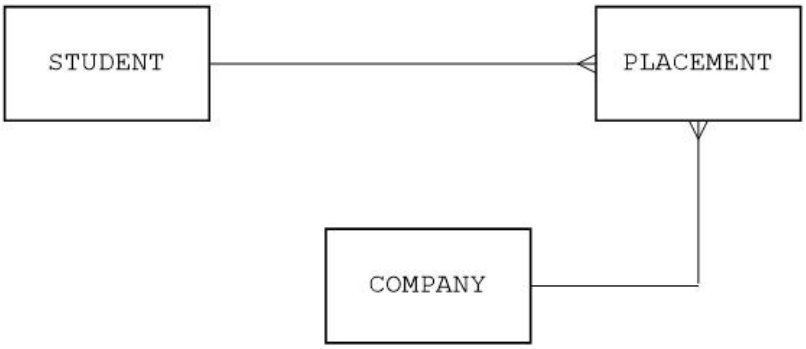
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Question	Answer	Marks
1(a)(i)	B3A	**1**
1(a)(ii)	0001 0000 1000	**1**
1(a)(iii)	**1 mark** for the working **1 mark** for the correct denary value **Working:** Method 1: 1111 1011 1100 Flip the bits 0000 0100 0011 Add 1 0000 0000 0001 + 0000 0100 0100 Method 2: -2048 + 1024 + 512 + 256 + 128 + 32 + 16 + 8 + 4 // -128 + 32 + 16 + 8 + 4 **Denary value:** -68	**2**
1(b)(i)	(1) 00101011	**1**
1(b)(ii)	**1 mark** per bullet point, **max 2 marks** • An overflow error occurs • The answer cannot be represented in the number of bits available // The answer is larger than the maximum positive number that can be stored in the register // The answer is smaller than the most negative number that can be stored in the register	**2**

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Question	Answer	Marks
2(a)	**1 mark** for each correct relationship, **max 2** marks  	**2**
2(b)	**1 mark** per bullet point, **max 2 marks** • There are no repeating groups of attributes • There are no many-to-many relationships • There are no partial key dependencies // no non-key dependencies // no transitive dependencies	**2**

2(c)(i)	**1 mark** per bullet point, **max 2 marks**
	• DELETE FROM and correct table
	• Correct condition
	Example answer:
	`DELETE FROM PLACEMENT`
	`WHERE Complete = TRUE;`
		2

2(c)(ii)	**1 mark** per bullet point, **max 4 marks**
	• SELECT COUNT any appropriate field
	• AS and an appropriate name
	• FROM and correct table and WHERE and one correct condition
	• Two AND clauses with the other two correct conditions
	Example answer:
	`SELECT COUNT (CompanyID)`
	`AS TotalPlacements`
	`FROM PLACEMENT`
	`WHERE CompanyID = "NEAM"`
	`AND StudentID = "LDEA01"`
	`AND Complete = TRUE;`
		4

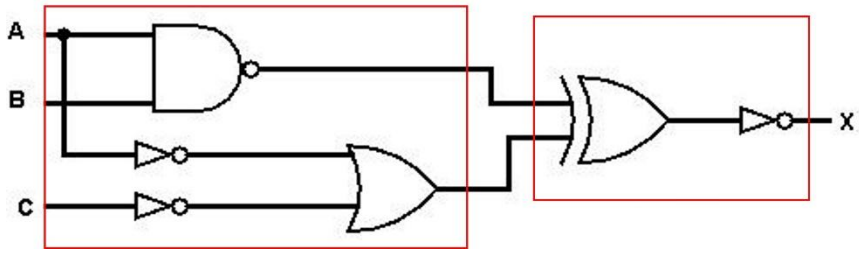
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Question	Answer	Marks
2(d)	**1 mark** per bullet point, **max 3 marks** Generic mark points **(max 2)** • Referential integrity ensures that related data is consistent • Referential integrity ensures that every foreign key has a corresponding primary key • Referential integrity provides for cascading update / delete • Referential integrity ensures that if a primary key is deleted or modified all linked records in foreign table will be deleted or modified // Referential integrity stops "orphaned records"—records in a table that point to an entry in another table that no longer exists Specific mark points **(max 2)** for good examples e.g. • CompanyID is a foreign key in PLACEMENT table and is dependent on the primary key CompanyID in COMPANY table • If a record is deleted from the STUDENT table, then all records with the same StudentID will be deleted from the PLACEMENT table • If a CompanyID is modified in the company table, all records with that CompanyID in the placement table will also be modified	**3**

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Question	Answer	Marks
3(a)	**One mark** per bullet point, **max 2** marks • (A NAND B) **and** (NOT A OR NOT C) • XOR and NOT 	**2**
3(b)	**1 mark** per bullet point, **max 2** marks • One correct term: (R AND S AND NOT T) // (NOT R AND NOT S AND T) • Second correct term **plus** the OR in correct place Answer: Q = (R AND S AND NOT T) OR (NOT R AND NOT S AND T)	**2**
4(a)	**1 mark** for: LSL #2	**1**
4(b)	1 1 1 1 0 0 0 1	**1**
4(c)	0 0 1 0 0 0 1 1	**1**
4(d)	1 1 1 1 0 0 1 1	**1**

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Question	Answer	Marks
5(a)(i)	**1 mark** per bullet point, **max 2** marks • Installs driver software for devices connected to external ports • Manages communication between devices • Manages hardware interrupts	**2**
5(a)(ii)	**1 mark** per bullet point, **max 2 marks** • Prevents unauthorised access • ... by providing authentication // by validating users and processes • Implements access rights and permissions • Makes provision for recovery of lost data • Carries out Operating System security updates as available • Carries out auditing and keeps logs of activity	**2**
5(b)(i)	**One mark** for benefit**, one mark** for appropriate matching expansion e.g. • Less code needs to be developed as code is pre-written • … thereby reducing the time to write a program • The library routine will be pre-tested and documented • ... reducing the time taken to test a program // giving confidence that the routine works as it should • The code for the library routine can written in a different programming language • … which allows the use of special features of that language • The user's source code is more readable • ... as the library routine is simply called in the source code rather than being written out in full • The library could contain the code for complex routines • ... thus allowing the programmer to include modules they might not be able to code	**2**
5(b)(ii)	**1 mark** for drawback, **1 mark** for appropriate matching expansion e.g. • Compatibility issues • … the library routine may not work with current program • Not guaranteed to be thoroughly tested • ... there could be unexpected problems (bugs/virus) • The library routine may not match needs exactly // The library routine may give unexpected results • … so it will need to be edited and tested • If the library routine is later edited or changed (by someone else) • … there could be unexpected errors or results	**2**

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Question	Answer	Marks
5(c)	**1 mark** per bullet point, **max 2** marks • Prettyprint • Expanding and collapsing code blocks • Automatic / smart indentation / formatting	**2**

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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 description, max 2 marks

<table><tr><th>Register</th><th>Role</th></tr><tr><td>ACC</td><td>stores the intermediate results of arithmetic and logical operations
// holds the result of a calculation</td></tr><tr><td>CIR</td><td>holds the instruction currently being decoded and/or executed</td></tr></table></td><td>2</td></tr>
<tr><td>6(b)</td><td>1 mark per bullet point, max 2 marks

e.g.

• Latency may be increased
• … because the cores must communicate with one another

• There is a potential for dead-lock situations
• … where one core may wait for information from other cores which in turn are waiting for the first one

• Not all software is designed to use multi-cores
• ... so some of the additional cores would be idle

• Increased heat generation
• ... which could cause damage to other components</td><td>2</td></tr>
<tr><td>6(c)</td><td>1 mark per bullet point, max 3 marks

• DRAM requires to be refreshed/charged SRAM does not request a refresh
• DRAM stores each bit as charge SRAM uses flip-flop to store each bit
• DRAM is less expensive to manufacture SRAM is more expensive to manufacture
• DRAM has slower access speeds SRAM has faster access times
• DRAM has higher <u>storage/bit/data density</u> SRAM has lower storage/bit/data density
• DRAM is used in main memory SRAM is used in cache</td><td>3</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>7(a)</td><td>1 mark for each correct description, max 2 marks

<table><tr><th>Type of IP address</th><th>Description</th></tr><tr><td>Static</td><td>IP address that does not change each time a device connects to the network</td></tr><tr><td>Public</td><td>IP address assigned to a device on a network to allow the device to be visible on the internet</td></tr></table></td><td>2</td></tr>
<tr><td>7(b)</td><td>1 mark per bullet point for justification, max 2 marks

Choice: Invalid (no mark for the choice)

Justification:

• It is not IPv4 because the maximum denary value should be 255, this uses 256

• It is not IPv6 because it uses a full stop to separate sections and not colon // It is not IPv6 because there are not enough groups</td><td>2</td></tr>
<tr><td>7(c)</td><td>1 mark per bullet point, max 4 marks

• The browser checks its cache for the URL
• The browser parses the URL and splits it into its component parts
• The browser finds the IP address for the domain name by querying a DNS server
• The browser receives the matching IP address from the DNS server
• The browser creates connection with the web server with the matching IP address
• A request for the resource is sent to the web server with that IP address
• The browser renders and displays the result
• The IP address is stored in the browser cache for future use</td><td>4</td></tr>
<tr><td>7(d)(i)</td><td>1 mark for the working
1 mark for the correct answer

Working:
(512 * 2048 * 8) / (8 * 1024) // (512 * 2048) / 1024
// (2^9 * 2^{11} * 2^3) / (2^3 * 2^{10}) // (2^9 * 2^{11}) / 2^{10}

Answer: 1024 kibibytes // 2^{10} kibibytes</td><td>2</td></tr>
<tr><td>7(d)(ii)</td><td>1 mark per bullet point, max 2 marks

• The file will contain metadata
• The file will have a header</td><td>2</td></tr>
</table>

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Question	Answer	Marks
7(d)(iii)	**1 mark** per bullet point, **max 2** marks • Sequences of consecutive identical colours / pixels • ... are stored as the colour value and the number of times it occurs consecutively	**2**

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Question	Answer	Marks
8(a)	**1 mark** for each correct explanation, **max 2 marks** Virus: **Malicious** program/software that replicates/copies itself and deletes/alters files/data stored on a computer Pharming: Malicious code/software installed on a computer which redirects user to a fake website to obtain personal data	**2**
8(b)	**1 mark** per bullet point, **max 3** marks e. g. • Students should consider privacy issues • Students should not make inappropriate use of social networking // Students should not engage in cyberbullying • Students should not copy work that is not their own • Students should abide by the school rules/guidelines for accessing the network • Students should only use the school network for legitimate purposes • Students should not hack / crack other computers	**3**
8(c)	**1 mark** per bullet point, **max 4** marks e. g. **Negative Impacts** • If students use AI to shortcut learning, they may miss out on developing reasoning and problem-solving skills // Students may not be learning anything // It could lead to a decline in specific skills • It could have negative impacts on student communication // heavy reliance on AI may limit opportunities for collaboration, teamwork, and face-to-face communication • Emphasises the digital divide// some students may not have access to the technology • The AI answer might not be correct leading to mis-information • Increased screen time and isolation could contribute to anxiety or loneliness **Positive Impacts** • Students given additional support may do better • Pupils who struggle in traditional settings may gain self-esteem through AI-assisted learning at their own pace **Long-Term Impacts** • Protection of intellectual property // ethical issues and considerations • Schools may need to redesign curricula and/or assessment to integrate AI	**4**

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Question	Answer	Marks
9	**1 mark** per bullet point, **max 3** marks • Monitoring systems do not take any action whereas control systems act autonomously to change the environment if the values are out of a prescribed range • Control systems use actuators monitoring systems do not have any actuators • Control systems make use of feedback monitoring systems do not make use of feedback • The output from a monitoring system does not affect the subsequent input whereas output from a control system affects the next input.	**3**

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Question	Answer	Marks

10(a)	**1 mark** per bullet point, **max 3** marks
	
	Generic mark points: (max 3)
	
	• Additive manufacturing
	• Uses a digital file created from 3D modelling software or Computer Aided Design (CAD) software
	• The printer builds up the model one layer at a time
	• The process is repeated for each layer
	• Some materials may need time to cool and set or UV curing using LEDs for photopolymer resins
	
	Specific mark points: (max 1)
	
	e.g.
	
	• Fused Deposition Modelling (FDM) // Material is heated and pushed through nozzle / extruder
	• Stereolithography (SLA) // Photosensitive liquid resin is exposed to a UV-laser beam
	• Digital Light Processing (DLP) // Photosensitive liquid resin is exposed to a UV projected image of the layer to cure the resin
	• Selective Laser Sintering (SLS) // Uses a laser to form objects from powdered material, the material can be plastics or metals
		3

10(b)	**1 mark** • To free up the processor to carry out other tasks as the rate data is received by the printer is different from the rate at which it can be processed • To manage the mismatch in speed between the processor and the peripheral / 3D printer	**1**

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