GCSE

Computer Science

J277/01: Computer systems

General Certificate of Secondary Education

Mark Scheme for June 2023

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

© OCR 2023

MARKING INSTRUCTIONS

PREPARATION FOR MARKING
SCORIS

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to scoris and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

   YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the scoris messaging system, or by email.

5. **Crossed Out Responses**
   Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

   Rubric Error Responses – Optional Questions
   Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

   Multiple Choice Question Responses

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses
When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7.   Award No Response (NR) if:
   - there is nothing written in the answer space or no valid attempt at an answer (e.g. "I don't know")

   Award Zero '0' if:

   - there is an attempt at an answer that is not worthy of credit (this includes text and symbols).

   Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The scoris **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
    If you have any questions or comments for your team leader, use the phone, the scoris messaging system, or e-mail.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response: Not applicable in F501
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

11.   **Annotations**

Annotation	Meaning
^	Omission mark
BOD	Benefit of doubt (must be accompanied with a tick)
✖	Cross
FT	Follow through (must be accompanied with a tick)
NAQ	Not answered question
NBOD	Benefit of doubt not given
REP	Repeat
✔	Tick
TV	Too vague
SEEN	Blank pages, pages with no annotation, no attempt to answer the question, page seen on QER
L1	QER Level 1 mark awarded
L2	QER Level 2 mark awarded
L3	QER Level 3 mark awarded

12. Subject Specific Marking Instructions
Mark scheme conventions:

- Each mark point is worth 1 mark unless stated otherwise
- Each mark point can only be awarded once
- A word/phrase that is <u>underlined</u> needs to be exact in the answer to award the mark point
- A word/phrase that is **bold** needs that concept to be in the answer (but can be given in multiple ways) to award the mark point
- 3 dots at the end of one mark point and at the start of the next mark point mean that the second mark point cannot be awarded without the first being awarded, unless the mark scheme states otherwise (for example a reasonable attempt with some inaccuracies)
- 3 dots at the start of a mark point, without 3 dots at the end of the mark point above, means the sentence carries on and there is no dependency
- Any text in brackets is not required to gain the mark point
- Single / means alternative word
- Double // means an alternative statement that is acceptable for the same mark point
- Enlarged font is used for visibility reasons only

Annotating scripts:
- Blank pages at the start of the script need SEEN annotation
- Any questions answered elsewhere (e.g. on the first blank pages, separately on the page) need to be linked within RM Assessor and annotated with ticks/crosses/SEEN as appropriate
- 1 tick for every mark awarded, if a question is given 3 marks there must be 3 ticks (apart from QER question)
- A BOD or FT annotation needs to be accompanied by a tick
- QER question 6 – One annotation from: L1, L2 or L3, according to the level awarded, the page not annotated with the level needs a SEEN annotation. Do not include any ticks, crosses or other annotations on this question – other than SEEN and one from: L1, L2 or L3
- Any answers with no candidate response need a SEEN annotation and NR entered as the mark.
- Any questions where the candidate has not attempted the question e.g. answered 'don't know' need a SEEN annotation and NR entered as the mark.
- All questions must be annotated throughout the marking process.

Question			Answer	Mark	Guidance
1	a		1 mark for: • Binary is used because computers are made of switches that can only be on or off (box 3)	1	Accept cross or other indication as long as clear which one they intend. 2+ ticks = 0 marks
1	b		1 mark for each completed box	4	Must be 8-bits. Ignore case in hex. Ignore calculations in answer box.

Denary	8-bit binary	Hexadecimal
7	00000111	7
49	**00110001**	31
102	01100110	66
244	11110100	**F4**

Question			Answer	Mark	Guidance
1	c		1 mark for: • 200MB (box 3)	1	Accept cross or other indication as long as clear which one they intend. 2+ ticks = 0 marks
1	d		1 mark for both boxes: • 4 500 000 bytes (box 1) 4.5 MB (box 3)	1	Accept cross or other indication as long as clear which one they intend. 1/3+ ticks = 0 marks

1	e		1 mark each:
			 • Answer (1) 0 0 0 0 1 1 1 1
			 • Correct working e.g. carrying (might be above, below etc.)
			       0 1 1 1 0 0 0 1
			       <u>1 0 0 1 1 1 1 0</u>
			       0 0 0 0 1 1 1 1
			 carries: 1 1 1
				2	Do not award marking for converting each number to denary and adding them together. If the carries are present, and converting to denary is present – award the carries (conversion can be used to check their answer).
					 Marks are not dependent.

1	f		1 mark each: • Left shift • 3 places	2	

Question			Answer	Mark	Guidance
2	a	i	1 mark for each protocol <table><tr><th>Task</th><th>Protocol</th></tr><tr><td>Requesting a webpage from a web server</td><td>HTTP // HTTPS</td></tr><tr><td>Entering a username and password to access their bank account</td><td>HTTPS</td></tr><tr><td>Downloading a text document from a web server</td><td>FTP // HTTP // HTTPS</td></tr><tr><td>Checking for new emails in their inbox</td><td>IMAP // POP</td></tr></table>	4	Mark first answer in each box. Allow full name to be written e.g. file transfer (protocol). Accept POP3 or any other version
2	a	ii	1 mark each to max 2: • Each layer is independent // layers are not reliant on other layers • One layer can be changed without affecting the others // a layer can function without needing/changing/impacting any other layer // self-contained • Separates tasks so they can be developed independently • A developer can focus on only one layer // developer can specialise • Allows for standards for individual tasks/layers to be developed // for compatibility • Manufacturers can develop hardware to fit into one particular layer • To group together similar protocols	2	Max 1 in each answer space

2	b	i	1 mark from:
			• Uses dedicated/own/internal hardware
			  // no external/third party hardware/infrastructure
			  // computers use MAC addresses to communicate within the LAN
				1	

| 2 | b | ii | 1 mark each to max 4:
e.g.
 • Allows **more** devices to connect …
 • …for example televisions, mobile phones
 • Easy to connect (devices) // Easier to setup (wireless connections) // By example e.g. easier for guests to connect their devices
 • Home is likely small area
 • … so short distance wireless is sufficient
 • Devices can move around // can use devices in different areas // can connect from anywhere in the house // can use where wires don't reach // can access from a larger area (than wired)
 • … by example e.g. student is using a laptop so does not need to be tied to one place // by example e.g. they don't have to disconnect before moving // e.g. they can stay connected whilst moving
 • Cheaper to **purchase**/**install**/**setup** for new devices // no cost for (new/replacement) wires/hardware
 • …because no **additional**/**fewer** wires are needed
 • Fewer trip hazards from trailing wires // reduce risk of damage to cables // fewer cables to damage
 • More compatible // some devices only have wireless connections | 4 | Easier/cheaper on their own is NE |
| 2 | b | iii | 1 mark each to max 2:
e.g.
 • Prone to interference // by example
 • Limited range of signal
 • Slower rate of transmission // less bandwidth // reduced network performance// increased latency // BOD slower connection // more users reduces rate of transmission / bandwidth /performance etc.
 • Increased risk of **security** concerns // by example e.g. A hacker could connect to the wireless connection
 • Less stable connection
 • Higher chance of collisions // Higher error rate | 2 | MP3 needs to say what is slower / decreased e.g. It's slower, is NE

Mark first drawback in each answer space.

Less reliable is TV on its own for MP 5 |

Question			Answer	Mark	Guidance
3	a		1 mark for each completed space A character set stores **all** of the characters that the computer can represent. Each character is given a **unique/different** binary code. Lower-case and upper-case letters in a character set are given **unique/different/similar** binary codes. One example of a character set is ASCII. This character set uses **8** bits for each character. If the ASCII value for the character 'F' is 70 Then the ASCII value for the character "L" is **76**.	5	Award the same term used multiple times if used correctly
3	b	i	1 mark: • **Data** about the data/image/file	1	Question is for a definition, not an example. If the definition is not clear, for example details about the image, information about the image – this is NE, but read the example to see if it clarifies. For example: 'Information about the image, such as the number of pixels' give a BOD. Data could be properties/characteristics.
3	b	ii	1 mark each: • First row: red red purple • Remainder correct and in correct order <table><tr><td>red</td><td>red</td><td>purple</td></tr><tr><td>blue</td><td>green</td><td>blue</td></tr><tr><td>purple</td><td>purple</td><td>purple</td></tr><tr><td>red</td><td>green</td><td>blue</td></tr></table>	2	Ignore case/spelling as long as legible. If a candidate has completed the table in the incorrect layout e.g. right to left, or bottom to top, then award MP2 as a FT if they have done it all correctly.
3	b	iii	16	1	Accept any calculation that equates to 16 i.e. 2^4

3	b	iv	1 mark each to max 2: • The **quality** of the image can be improved • The **file** size will increase // takes up more **storage** space // image has/requires/takes up more data • The number of colours that can be represented/used will increase // BOD more colourful	2	Do not award higher resolution, image size increases, clearer image (NBOD) more detailed image (NBOD). Closer to original is NE on its own because there is not an original image in this context. Mark first answer in each answer space.

3	c	i	1 mark for lossless
			
			1 mark each to max 2 for justification:
			e.g.
			• Lossless will not remove any **data**
			// No **data** is lost with lossless
			// **File**/**data** can be fully reconstructed back to the original
			• Text files require all data to open/be used/work
			// text files will not work if any data is lost
			// lossy cannot (usually) be used on text files
			// none of the required characters / words / spaces / case / formatting / information would be lost
			// the text will remain accurate
			// the text will not have changed meaning
			// the text will still make sense
				3	Do not award an example of lossless for 1st mark (e.g. RLE), but FT for justification.
					
					Do not FT for lossy.
					
					Accept reverse for answers e.g. Lossy will remove data.
					
					If compression type is missing, read justification and if clearly stated which type is used then award justification.
					
					MP1 requires reference to the data (or equivalent) not information.
					MP2 requires reference to the text file context and information is allowed.
					
					If not valid compression – 0 marks.

| 3 | c | ii | 1 mark for lossy

1 mark each to max 2 for justification e.g.:
• Will reduce the **file size more/significantly** (than lossless)
• Image will only lose **quality** // changes may **not be noticed** by the user // remove **unnoticeable/unnecessary** detail/content | 3 | Do not award an example of lossy for 1st mark (e.g. reduce resolution), but FT justification.

Do not award lossless but FT for justification for lossless: e.g.
• Quality/detail of the image can be retained
• No data will be lost (permanently)
• File size may still be a substantial reduction

If compression type is missing, read justification and if clearly stated which type is used then award justification.

Do not award how the file can be compressed e.g. reduce number of colours – unless they also state that this change will not be noticed.

MP1 it compresses the file more is NE – compression is in the question, the candidate needs to explain what this means.

If not valid compression – 0 marks. |

Question			Answer	Mark	Guidance
4	**a**		1 mark for each row <table><tr><th>Threat</th><th>Anti-malware</th><th>Penetration testing</th><th>Encryption</th><th>Firewall</th></tr><tr><td>Spyware</td><td>✓</td><td></td><td></td><td>(✓)</td></tr><tr><td>Brute-force attack</td><td></td><td>(✓)</td><td></td><td>✓</td></tr><tr><td>Data interception</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>SQL injection</td><td></td><td>✓</td><td></td><td>(✓)</td></tr></table>	4	(✓) can be present, or not
4	**b**		1 mark for threat 1 mark each to max 2 for description e.g. • Threat: Social engineering • Using deception to manipulate users • …to gain personal data • Threat: Shoulder surfing (threat or expansion) • Watching a person entering a password • …and using it to access an account • Threat: Phishing • Fake emails sent to person // click on link from fake email • Person sends personal data // gives away personal data • Threat: Pharming • Software that redirects user to fake website // use of a fake website • Person enters personal data // gives away personal data • Threat: Denial of service // DOS // DDOS • Multiple requests sent to a **server** (simultaneously) // **server** is flooded with requests • More requests than the server can process // uses all of the bandwidth available • Server cannot respond // server crashes/denies access // stops access to a network // slows access to a network • Threat: Hacker • Person gaining unauthorised access to a system/account	3	If threat is clearly wrong do not FT. If no threat given, read description for name of threat. If no name, do not award. If threat is vague award matching description. Allow social engineering as the threat – naming and description of phishing/pharming/shoulder surfing in the description. Ransomware – MP3 cannot be awarded for 'ransom' on its own without reference to it being paid. For actions that the malware/virus etc. can carry out – award any feasible action.

			• To delete/damage/access data • Threat: Virus/malware • Software that replicates/spreads • Fills disk space • Deletes/corrupts data // allows unauthorised access • Threat: Trojan • Malware disguised as legitimate software • Once installed acts as a virus // by example of action e.g. deleting files / allows unauthorised access • Threat: Worm • Software that replicates across a network • Uses up all the bandwidth • Threat: Ransomware • Encrypts/corrupts/locks access to data • Cannot access data without **paying** a fee**/**money // **pay** fee/money to get them back/decrypted // Cannot access data without meeting demands • Threat: Physical threat // by example • Damage to hardware • Deletes/corrupts data		

5	**a**	**i**	1 mark each
			Primary
			• to store (active) **data/instructions/software/OS** that the **processor** needs to **access**
			   // without primary the computer won't be able to start up/work
			   // (ROM) so the start-up instructions are not deleted when the computer turns off
			   // (RAM) to store the **currently** running **data**/**software**/**instructions**
			   // (Cache) to store **frequently** used **data/instructions**
			
			Secondary
			• to store **data**/**files long-term**/**permanently**
			   // without secondary the user's files will not be stored when the power is turned off
			   // store **data** not currently being used
				2	Question is not what they store, but why they are needed.
					
					Secondary NBOD 'to backup data' without reference to the long-term/permanence

| 5 | a | ii | 1 mark for device, 1 mark for data
• Hard drive // SSD // USB (memory) stick // Flash memory card // CD // DVD etc.
• E.g. Images created // documents // software // files // data moved from RAM to virtual memory | 2 | Allow any secondary device. BOD 'optical disc'

Question asks for device not type of device e.g. magnetic/optical/solid state is NE.

Award example even if incorrect secondary storage.

USB on its own is NE |

5	a	iii	1 mark for each row.	4	Allow a description of the error in column 2, e.g. in row 1: 'primary should be secondary'

Statement	True (✓)	False - correct the statement
A section of primary storage is partitioned to act as virtual memory		A section of **secondary** storage is partitioned to act as virtual memory
Data from ROM is transferred into VM		Data from **RAM** is transferred into VM
VM is needed when RAM is full, or nearly full	✔	
Data from VM is transferred back to secondary storage when needed		Data from VM is transferred back to **RAM** when needed

Accept HDD/SSD for secondary storage for the 1st row.

Do not accept primary for RAM (rows 2 and 4).

5	b		1 mark from: • Performs housekeeping actions • Monitor / manage / maintain a computer system • Help the computer run smoothly/efficiently • To diagnose/fix/identify problems with a computer system	1	Do not award example on its own

| 5 | c | i | 1 mark for identification:

• Artist's computer // computer uploading the images // BOD The artist

1 mark each for justification to max 2:
e.g.
• Sends the files/data for storage/to the **host**/web **server** // the files are stored on the web **server**
• Performs the user's actions …
• .. and sends the results to the web **server**
• Sends a **request** to the web **server**…
• … to **store**/**upload** its files
• It does not store data for others to access
• Confirmation of upload/error is received (from server) for display | 3 | Incorrect computer, do not award justification.

Be careful the justification is talking about the upload of images to the web server, not the download.

Accept host for web server.

If 'user's computer' is given for identification, this is NE – read on for justification.
If 'user viewing the website' or similar is given this is incorrect. |
| 5 | c | ii | 1 mark for identification:

• Web server

1 mark each for justification to max 2:
e.g.
• The images/data are stored on / uploaded to / sent to / hosted on the web server
• Web server receives a request (from the artist's computer to upload the images)
• Web server executes/responds to the request // Web server is doing the processing/handling the (request to) upload
• Web server returns confirmation/error of the processing/upload | 3 | If computer is incomplete or inaccurate e.g. server/website instead of web server. Do not award computer, but award justification.
Allow FT in justification if the same inaccurate term is used, for example 'website' is given as computer (NE), but justification is: 'images are sent to the website' (FT for website instead of web server).

Incorrect computer, do not award justification. |

5	d	i	1 mark each: e.g. - Authors can earn money …by selling for a fee // using licences to stop unauthorised use - No-one can see the code …users cannot edit/change the software // by example inserting malware …so it cannot be copied/resold/shared - More **control** over intellectual property // by example e.g. restrict users, restrict what can be done with the software without permission	4	Benefit is to artist and programmer – not user. Mark the answer as a whole. Do not award reference to ownership/copyright because both allow copyright of the code/program.
5	d	ii	1 mark for point, 1 for expansion: e.g. - Users can **view**/**edit** the (source) code // Users can **edit** the program/software …to **tailor**/**improve**/**adapt** it to do what they need/want …so errors can be fixed (by anyone) …users can learn how the software works - Freely accessible …do not have to pay …can redistribute … …with changes	2	Benefit to users not artist and programmer
6			**Mark Band 3–High Level** **(6-8 marks)** The candidate demonstrates a thorough knowledge and understanding of a wide range of considerations in relation to the question; the material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate is able to weigh up both sides of the discussion and includes reference to the impact on all areas showing thorough recognition of influencing factors. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2-Mid Level** **(3-5 marks)** The candidate demonstrates reasonable knowledge and understanding of a range of considerations in relation to the question; the material is generally accurate but at times underdeveloped.	8 AO2 1a (4) AO2 1b (4)	The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: **Indicative Content:** Some points may cover more than one 'issue'. Legal issues: DPA needs to be followed or company could be fined e.g. Customers informed the system is used Data held for specified

The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation.

The candidate makes a reasonable attempt to discuss the impact and most are showing reasonable recognition of influencing factors.

There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.

Mark Band 1-Low Level
(1-2 marks)
The candidate demonstrates a basic knowledge of considerations with limited understanding shown; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided.

The candidate provides nothing more than an unsupported assertion.

The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

0 marks
No attempt to answer the question or response is not worthy of credit

time/reasons
Data kept secure

- Centre is private property so customers can choose not to enter
- Can be used to identify people committing crimes e.g. theft, used as evidence, make sure the correct people are caught.

Ethical issues:

- Users feel safer because they know any actions are being monitored and help/action will be taken if needed
- If users have not done anything then there is no reason to be tracked/recorded so should not impact them
- Users feels unsafe because they are being watched
- Users may be unaware they are being recorded - need to be informed, give consent
- Users do not know where the videos/data about them and their movements is stored/how it is used - DPA reference

Privacy issues:

				- Users may feel it is an invasion of privacy - Users are in a public place and can be legally recorded by anyone anyway - Users may feel like they are being watched all the time - Users have not given their permission to be tracked - Users may not know the system exists

	Question			Answer	Mark	Guidance
7				1 mark for example: e.g. • Auto lights • Auto window wipers • Sat nav // GPS • Airconditioning // climate control • Radio/entertainment/infotainment system/media system • Lane assist • Engine management system • Auto-park • Cruise control • Auto-brake • Follow-me • Dashcam 1 mark each to max 2 for explanation. • **Limited** functions // by example e.g. the system **only** checks the light and turns lights on/off • **Dedicated** microprocessor // by example e.g. there is a microprocessor that is only checking the lights • Hard to change function // by example e.g. the user cannot make the light system do any other role	3	Allow anything that could be reasonably within a car. If example is not clear if it's an embedded system, read explanation for justification e.g. hazard lights – could be embedded if they are activated automatically when the car crashes. Award the example in the explanation if this occurs. If justification is generic features of an embedded system max 1 for explanation. Do not award 'built into the car/larger machine' because this is in the question.

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on

01223 553998

Alternatively, you can email us on

support@ocr.org.uk

For more information visit

ocr.org.uk/qualifications/resource-finder

ocr.org.uk

Twitter/ocrexams

/ocrexams

/company/ocr

/ocrexams