



GCSE
COMPUTER SCIENCE
8525/2

Paper 2 Computing concepts

Mark scheme

Specimen Assessment Materials

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

The following annotation is used in the mark scheme:

- ;** - means a single mark
- //** - means alternative response
- /** - means an alternative word or sub-phrase
- A** - means acceptable creditworthy answer. Also used to denote a valid answer that goes beyond the expectations of the GCSE syllabus.
- R** - means reject answer as not creditworthy
- NE** - means not enough
- I** - means ignore
- DPT** - in some questions a specific error made by a candidate, if repeated, could result in the candidate failing to gain more than one mark. The DPT label indicates that this mistake should only result in a candidate losing one mark on the first occasion that the error is made. Provided that the answer remains understandable, subsequent marks should be awarded as if the error was not being repeated.

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Qu	Part	Marking guidance	Total marks
01	1	<p>Mark is for AO2 (apply)</p> <p>78;</p>	1
01	2	<p>All marks AO2 (apply)</p> <p>4; (This must be the left hand digit to gain the mark) E; (This must be the right hand digit to gain the mark)</p> <p>Maximum 1 mark: If final answer not correct.</p>	2
01	3	<p>All marks AO1 (understanding)</p> <p>(The answer is incorrect because) the number will (still) be represented using binary in a computer's memory; so it will take up the same amount of memory space;</p>	2
01	4	<p>All marks AO1 (understanding)</p> <p>(Shifting the bit pattern) three places; to the left;</p> <p>Mark as follows: 1 mark: for correct direction of shift 1 mark: for correct number of times to shift</p>	2
01	5	<p>Mark is for AO2 (apply)</p> <p>B F;</p> <p>R. If more than one lozenge shaded</p>	1
01	6	<p>All marks AO1 (understanding)</p> <p>Advantages: Can represent a wider range of characters; Can represent characters from a wider range of languages; Can represent characters used in scientific / mathematical / technical / specialist documents;</p>	2

Qu	Part	Marking guidance	Total marks								
01	7	<p>All marks AO2 (apply)</p> <table border="1"> <thead> <tr> <th>Character</th> <th>Huffman coding</th> </tr> </thead> <tbody> <tr> <td>O</td> <td>111</td> </tr> <tr> <td>SPACE</td> <td>10</td> </tr> <tr> <td>B</td> <td>00110</td> </tr> </tbody> </table> <p>Mark as follows:</p> <p>1 mark per correct response</p>	Character	Huffman coding	O	111	SPACE	10	B	00110	3
Character	Huffman coding										
O	111										
SPACE	10										
B	00110										
01	8	<p>1 mark for AO1 (understanding) and 2 marks for AO2 (apply)</p> <p>7; * 26; = 182 182 – 83; = 99</p> <p>Mark as follows:</p> <p>1 mark for AO1: identifying number of bits (7) used to represent an ASCII character;</p> <p>1 mark for AO2: multiplying by 26;</p> <p>1 mark for AO2: subtracting 83 from their answer for the number of bits used to represent the ASCII version of the text; A. Incorrectly calculated number of bits used for ASCII version</p> <p>Maximum 1 mark: for correct answer with no working out shown</p>	3								
02	1	<p>1 mark for AO1 (recall) and 1 mark for AO2 (apply)</p> <p>1000 × 4 // 4000;;x</p> <p>1 mark for AO1: identifying that there are 1000 megabytes in a gigabyte;</p> <p>1 mark for AO2: multiplying by 4;</p> <p>A. 1024 × 4 // 4096;;</p> <p>Maximum 1 mark: If final answer not correct.</p>	2								

Qu	Part	Marking guidance	Total marks
02	2	<p>All marks AO1 (understanding)</p> <p>Lighter; Smaller; Uses less power; More robust; Generates less heat; Quieter;</p> <p>Max 2</p>	2
02	3	<p>2 marks for AO2 (apply)</p> <p>Using just solid state would cost much more; Can get higher storage capacity by including magnetic hard disk;</p>	2
02	4	<p>All marks AO1 (understanding)</p> <p>On a hard disk binary data represented by tiny magnetised regions; where the magnetic orientation in one direction represents 0, and the other direction represents 1; When reading data the read/write head is moved (to be over correct track); and the platter/disk spins round; A whole sector/block read in one go (by the read/write head);</p> <p>Max 4</p>	4

Qu	Part	Marking guidance	Total marks															
02	5	<p>All marks AO2 (apply)</p> <table border="1" data-bbox="320 421 1254 1727"> <thead> <tr> <th data-bbox="320 421 443 454">Level</th> <th data-bbox="443 421 1054 454">Description</th> <th data-bbox="1054 421 1254 454">Mark Range</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 454 443 925">3</td> <td data-bbox="443 454 1054 925"> <p>Answer demonstrates a sustained line of reasoning with a substantiated explanation for the recent large growth in the use of cloud storage that includes both technological and social reasons.</p> <p>There is a logically structured consideration of the advantages and the disadvantages associated with the use of cloud storage - including relevant points covering at least two of legal, ethical and environmental issues.</p> </td> <td data-bbox="1054 454 1254 925">7-9</td> </tr> <tr> <td data-bbox="320 925 443 1373">2</td> <td data-bbox="443 925 1054 1373"> <p>Answer includes an explanation for the recent large growth in the use of cloud storage that includes both technological and social reasons.</p> <p>There is a logically structured consideration of the advantages and the disadvantages associated with the use of cloud storage - including one or two relevant points related to legal, ethical and environmental issues.</p> </td> <td data-bbox="1054 925 1254 1373">4-6</td> </tr> <tr> <td data-bbox="320 1373 443 1686">1</td> <td data-bbox="443 1373 1054 1686"> <p>The answer includes either a description of some of the reasons for the recent large growth in the use of cloud computing and/or brief consideration of the advantages and/or disadvantages associated with using cloud storage.</p> </td> <td data-bbox="1054 1373 1254 1686">1-3</td> </tr> <tr> <td colspan="2" data-bbox="320 1686 1054 1727">No creditworthy answer</td> <td data-bbox="1054 1686 1254 1727">0</td> </tr> </tbody> </table>	Level	Description	Mark Range	3	<p>Answer demonstrates a sustained line of reasoning with a substantiated explanation for the recent large growth in the use of cloud storage that includes both technological and social reasons.</p> <p>There is a logically structured consideration of the advantages and the disadvantages associated with the use of cloud storage - including relevant points covering at least two of legal, ethical and environmental issues.</p>	7-9	2	<p>Answer includes an explanation for the recent large growth in the use of cloud storage that includes both technological and social reasons.</p> <p>There is a logically structured consideration of the advantages and the disadvantages associated with the use of cloud storage - including one or two relevant points related to legal, ethical and environmental issues.</p>	4-6	1	<p>The answer includes either a description of some of the reasons for the recent large growth in the use of cloud computing and/or brief consideration of the advantages and/or disadvantages associated with using cloud storage.</p>	1-3	No creditworthy answer		0	9
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	<p>Guidance - Indicative Response (reasons for growth) Higher bandwidth mobile networks (eg 4G); Increased availability of mobile devices; Reduction in cost of large capacity storage devices; Improvements in network security; People have a higher level of trust in cloud storage; Improvements in web browser software; Increased availability of supercomputers (for cloud processing); Companies have managed to develop business models based on cloud computing that allow them to make a profit;</p> <p>Guidance - Indicative Response (advantages of cloud storage) Enables user to access their data from more places/devices; Enables user to more easily share data with others (can make parts of their cloud storage publically available); Increases the amount of storage available; Reduced cost of computing devices for users as no need for as much built-in secondary storage;</p> <p>Guidance - Indicative Response (disadvantages of cloud storage) Increased security risks; Relies on access to high-bandwidth network connection; Could potentially cost more due to ongoing costs; Reliance on company providing the cloud service; Increased chance of others accessing personal data (data privacy issues);</p>	
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Qu	Part	Marking guidance	Total marks
03	1	<p>All marks AO1 (understanding)</p> <p>Reasons for allowing: Teachers can access resources on the school network to allow them to plan lessons at home; Teachers can teach lessons from home (using videoconferencing) if they are not able to get into work (eg travel difficulties); Teachers can access electronic copies of student work so that they do not have to carry marking home;</p> <p>Reasons for not allowing: Data protection issues – schools may not want potentially sensitive student information to be accessed outside of school; To try to help teachers have a work-life balance; Increased security risks as teachers may not have fully-protected computers at home (eg if a teacher does not have anti-virus software on their home computer this may cause problems when they connect their computer to the school network);</p> <p>Max 1 mark: if only described reasons for allowing access Max 1 mark: if only described reasons for not allowing access</p>	2
03	2	<p>All marks AO1 (understanding)</p> <p>Share hardware; A. by example Share data/files; Easier to work collaboratively; Use of communication tools Central management for machines A. by example: centralised software deployment, centralised back-ups; Files not stored on local machine so can be accessed from multiple machines; Can monitor computer users; Increase available storage;</p> <p>Max 3 marks</p>	3

Qu	Part	Marking guidance	Total marks
03	3	<p>1 mark for AO1 (understanding) PANs are centred around one person, LANs cover a limited geographical area / LANs cover a larger area; PANs have one user, LANs (normally) have more than one user; PAN uses Bluetooth, LAN uses alternative protocols / connection methods (A. by example);</p> <p>Note: answer must cover both PAN and LAN to be awarded a mark</p> <p>Max 1</p>	1
03	4	<p>1 mark for AO1 (understanding) Wearable computing devices; Connecting headphones to a music player; Connecting pedometer to a mobile phone;</p> <p>A. any suitable example</p> <p>Max 1</p>	1
03	5	<p>All marks AO1 (recall) a set of rules; that allow two devices to communicate;</p>	2
03	6	<p>Mark is for AO1 (recall) E IMAP; R. If more than one lozenge shaded</p>	1
03	7	<p>Mark is for AO1 (recall) B HTTPS; R. If more than one lozenge shaded</p>	1

Qu	Part	Marking guidance	Total marks										
03	8	<p>Mark is for AO1 (recall)</p> <p>D SMTP;</p> <p>R. If more than one lozenge shaded</p>	1										
03	9	<p>All marks AO1 (recall)</p> <table border="1" data-bbox="386 674 995 947"> <thead> <tr> <th data-bbox="386 674 727 730">Layer</th> <th data-bbox="727 674 995 730">Order (1-4)</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 730 727 786">Transport</td> <td data-bbox="727 730 995 786">2</td> </tr> <tr> <td data-bbox="386 786 727 842">Link</td> <td data-bbox="727 786 995 842">4</td> </tr> <tr> <td data-bbox="386 842 727 898">Network</td> <td data-bbox="727 842 995 898">3</td> </tr> <tr> <td data-bbox="386 898 727 947">Application</td> <td data-bbox="727 898 995 947">1</td> </tr> </tbody> </table> <p>Mark as follows: 1 mark: any row correct; 2 marks: any two rows correct; 3 marks: all four rows correct;</p>	Layer	Order (1-4)	Transport	2	Link	4	Network	3	Application	1	3
Layer	Order (1-4)												
Transport	2												
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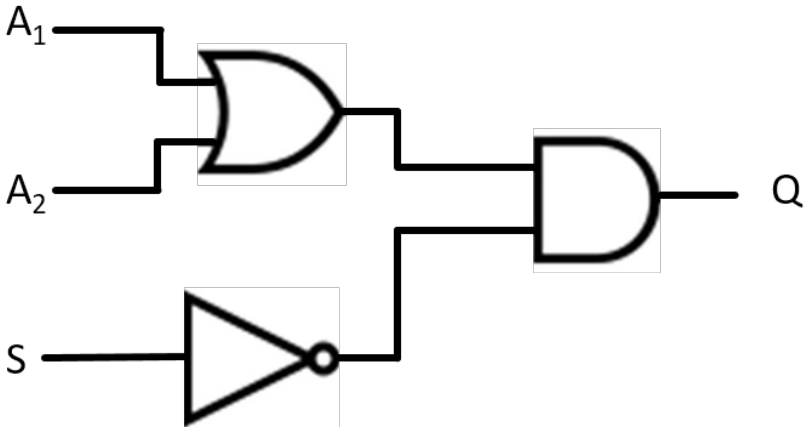
Qu	Part	Marking guidance	Total marks								
04	1	<p>1 marks for AO1 (understanding)</p> <p>C Data and instructions;</p> <p>R. If more than one lozenge shaded</p>	1								
04	2	<p>3 marks for AO1 (understanding)</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>Sends a continuous series of electronic pulses</td> <td>D;</td> </tr> <tr> <td>Decodes the current instruction</td> <td>C;</td> </tr> <tr> <td>Completes calculations</td> <td>B;</td> </tr> </tbody> </table> <p>Mark as follows: 1 mark: one row correct; 2 marks: two rows correct; 3 marks: all rows correct;</p>	Description	Letter	Sends a continuous series of electronic pulses	D;	Decodes the current instruction	C;	Completes calculations	B;	3
Description	Letter										
Sends a continuous series of electronic pulses	D;										
Decodes the current instruction	C;										
Completes calculations	B;										
5		<p>3 marks for AO1 (understanding)</p> <p>1 mark each for describing the social engineering technique.</p> <p>Blagging This is where a victim is tricked/persuaded by a fraudster to give their details or payment information for a false reason/purpose;</p> <p>Phishing Is where the victim receives and responds to a communication that appears to be from a valid or known source but is in fact fraudulent. (It allows the fraudster to capture private information before the victim realises);</p> <p>Shouldering This is where someone watches and records/remembers a victim entering their pin or security information such as passwords. (They can then use this information to gain access to a system);</p>	3								

Qu	Part	Marking guidance	Total marks
06	1	<p>2 marks for AO1 (understanding)</p> <p>Maximum of 2 from:</p> <p>Computer systems use binary/ones and zeros/voltage on or off; Sound is analogue/continuous; Computers use digital data/discrete values;</p>	2
06	2	<p>4 marks for AO2 (apply)</p> <p>4 marks if answer is correct</p> <p>5,000 bytes/5,000B;;;</p> <p>A. 5,000</p> <p>If answer given is not 5,000 bytes then award working marks as follows:</p> <p>Mark A for multiplying any two of 2,000, 4 and 5 even if the result is incorrect; Mark B for multiplying all of 2,000, 4 and 5 even if the result is incorrect; Mark C for attempting to divide the result of a multiplication by 8;</p> <p>Partially correct examples:</p> <p>Example 1 2,000 * 4 = 8,000; (Mark A) 8,000 / 8 = 1,000; (Mark C)</p> <p>Example 2 2,000 * 4 * 5 = 20,000;; (Mark A and Mark B, note result is incorrect) 20,000 / 8 = 2,000; (Mark C, note result is incorrect)</p>	4

Qu	Part	Marking guidance	Total marks
06	3	<p>Mark is for AO2 (apply)</p> <p>B 5 bits;</p> <p>R. If more than one lozenge shaded</p>	1
06	4	<p>Mark is for AO2 (apply)</p> <p>D Improves the quality of the recording and increases the file size;</p> <p>R. If more than one lozenge shaded</p>	1
07	1	<p>Mark is for AO1 (understanding)</p> <p>C Only two of the examples of code are in low-level languages;</p> <p>R. If more than one lozenge shaded</p>	1
07	2	<p>4 marks for AO1 (understanding)</p> <p>Maximum four marks from:</p> <ul style="list-style-type: none"> • High-level languages have built-in functions; • High-level languages have built-in libraries; • High-level languages have more support/help; • High-level languages have structures (such as selection and iteration); • High-level languages can be less machine dependent/more portable; • It (usually) requires fewer lines of code to be written; • It is (usually) quicker to develop code in high-level languages; • It is easier to find mistakes in code; • The code is easier to maintain//understand; • It is easier to structure code in high-level languages; <p>NE. references to efficiency or speed unless correctly qualified;</p> <p>A. Easier to read in place of easier to understand on this occasion;</p> <p>R. Answers relating to programmer expertise;</p>	4
07	3	<p>2 marks for AO1 (understanding)</p> <p>[Statement A:] compiler;</p> <p>[Statement B:] assembler;</p>	2

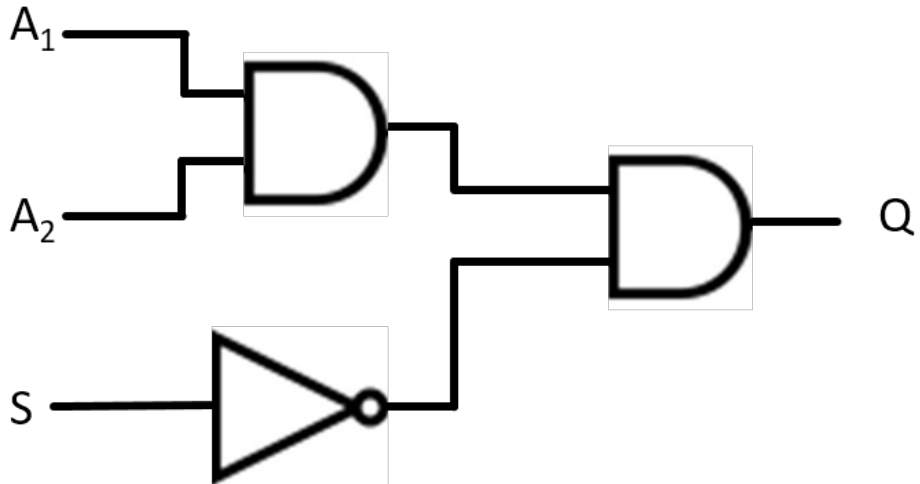
Qu	Part	Marking guidance	Total marks
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08	1	<p>Mark is for AO1 (understanding)</p> <p>Only reward if column A AND B is completely correct;</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>A AND B</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	A AND B	0	0	0	0	1	0	1	0	0	1	1	1	1
A	B	A AND B																
0	0	0																
0	1	0																
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1	1	1																

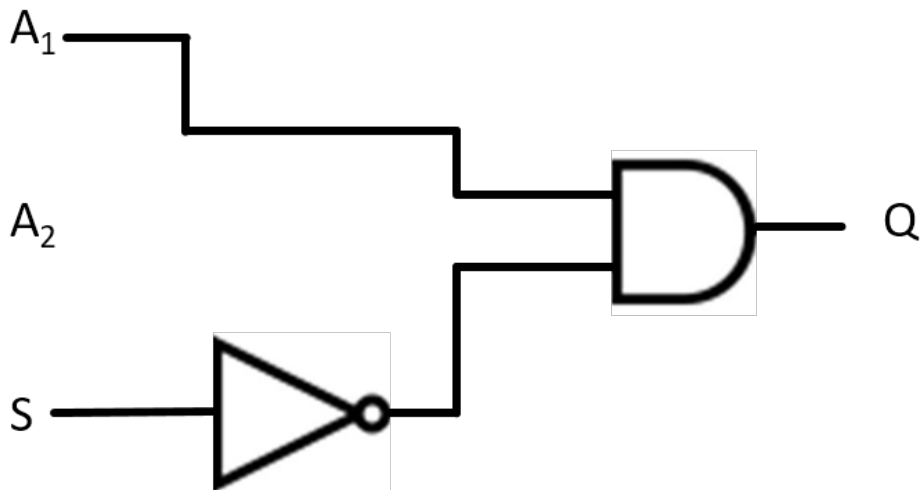
08	2	<p>3 marks for AO2 (apply)</p> <p>Max 2 marks if not fully correct (the fully correct answer is given in example 1).</p> <p>Mark A if A_1 and A_2 are the inputs to an OR gate; Mark B if S is the input to a NOT gate; Mark C if the output from an AND gate is Q;</p> <p>Example 1 (Fully correct answer)</p>  <p>The diagram shows a logic circuit. On the left, there are three input lines labeled A_1, A_2, and S. A_1 and A_2 are connected to the two inputs of an OR gate. The output of the OR gate is connected to the top input of an AND gate. Input S is connected to the input of a NOT gate. The output of the NOT gate is connected to the bottom input of the same AND gate. The output of the AND gate is labeled Q.</p>	3
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See next page for partially correct answers

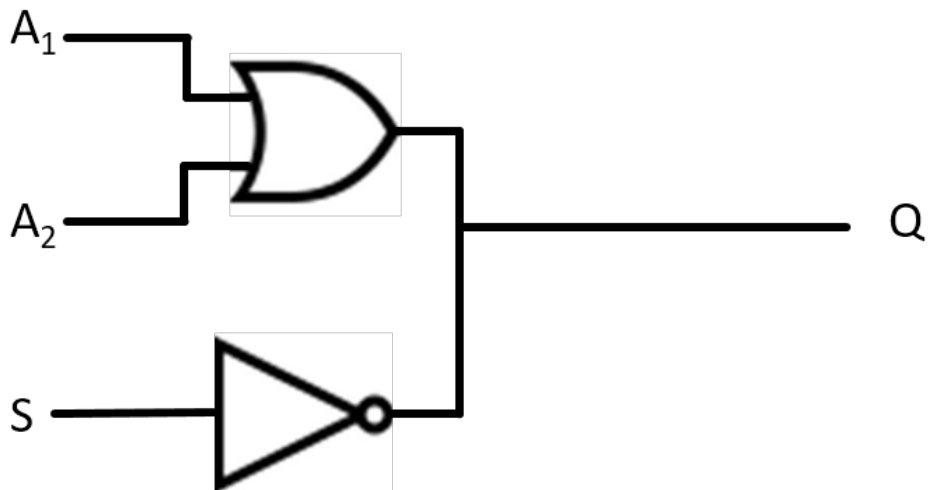
Example 2 (Marks B and C)



Example 3 (Marks B and C)



Example 4 (Marks A and B)



Qu	Part	Marking guidance	Total marks
09	1	<p>1 mark for AO2 (apply)</p> <p>Name;</p>	1
09	2	<p>1 mark for AO2 (apply)</p> <p>Real // Float // Decimal;</p>	1
09	3	<p>6 marks for AO3 (program)</p> <p>1 mark: correct fields in SELECT clause 1 mark: one correct table in FROM clause 1 mark: second correct table in FROM clause 1 mark: a correct condition in WHERE clause 1 mark: correct conditions and correct usage of AND in WHERE clause // correct conditions and correct usage of AND in WHERE clause and correct usage of ON with INNER JOIN 1 mark: ORDER BY clause</p> <p>Max 5 if any errors</p> <p>Sample answer</p> <pre>SELECT Customer, Date, Time FROM Booking, Game WHERE Booking.Name = Game.Name AND MaxPlayers >= 4 AND GameTableID = 2 ORDER BY Date</pre> <p>I. the inclusion of ASC, DESC in ORDER BY clause</p> <p>Alternative answer</p> <pre>SELECT Customer, Date, Time FROM Booking INNER JOIN Game ON Booking.Name = Game.Name WHERE MaxPlayers >= 4 AND GameTableID = 2 ORDER BY Date</pre>	6

Qu	Part	Marking guidance	Total marks
09	4	<p>2 marks for AO3 (refine)</p> <p>1 mark: changing +9 to +10; 1 mark: changing <=3 to >3</p> <p>UPDATE Game</p> <p>SET LengthOfGame = LengthOfGame + 10</p> <p>WHERE Complexity > 3</p>	2
10	1	<p>All marks AO2 (apply)</p> <p>Staff could forget their password // staff can't forget biometric measure; Shouldering risk when staff entering their password // no risk of shouldering when using biometric data; Lower risk of hacking;</p> <p>Max 2</p>	2
10	2	<p>All marks AO2 (apply)</p> <p>Network is made available to members of the public; Won't know the MAC addresses for (most) of the devices connecting to the network;</p>	2

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