
AS-LEVEL

Computing

Unit 2 Computer Components, The Stored Program Concept and
the Internet

Mark scheme

2520
June 2016

Version: 1.0 Final

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.

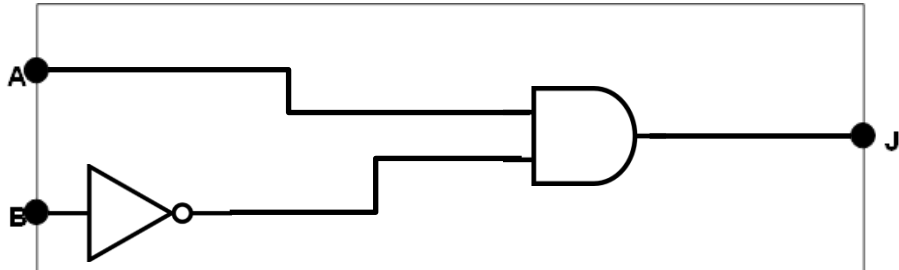
Further copies of this mark scheme are available from aqa.org.uk

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
- R** - means reject answer as not creditworthy
- NE** - means not enough
- I** - means ignore
- DPT** - means "Don't penalise twice". In some questions a specific error made by a candidate, if repeated, could result in the loss of 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.

Qu	Part	Sub-part	Marking Guidance	Marks
1	a	i	AND (gate);	1

1	a	ii	NOR (gate);	1
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1	b	i	 <p>1 mark - NOT gate on input B (before any other gate); 1 mark - AND gate with inputs from A and NOT B with output connected to J;</p> <p>A. 1 mark - for circuit with just AND gate with inputs from A and B connected to J</p>	2
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1	b	ii	<p>C.H + A. J̄</p> <p>1 mark - C. H; 1 mark - A. J̄; 1 mark for combining two previous with an OR/+ and at least one of LHS and RHS are correct;</p> <p>I. K= (or other letter)</p> <p>I. brackets if they will not affect expression evaluation</p>	3
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1	c	<p>$\overline{A \cdot B} + \overline{B + C}$</p> <p>$\overline{A} + \overline{B} + \overline{B} \cdot \overline{C}$ - use of De Morgan's (twice)</p> <p>$\overline{A} + \overline{B} \cdot (1 + \overline{C})$ - factorising</p> <p>$\overline{A} + \overline{B}$ - from use of $1+X=1$</p> <p>$\overline{A \cdot B}$ - final answer (from use of De Morgan's)</p> <p>Alternative answer:</p> <p>$\overline{A \cdot B} + \overline{B + C}$</p> <p>$\overline{A \cdot B} \cdot (\overline{B + C})$ - use of De Morgan's</p> <p>$\overline{A \cdot B} \cdot \overline{B} + \overline{A \cdot B} \cdot \overline{C}$ - expansion of bracket</p> <p>$\overline{A \cdot B} + \overline{A \cdot B} \cdot \overline{C}$ - from use of $B \cdot B=B$</p> <p>$\overline{A \cdot B} \cdot (1 + \overline{C})$ - factorising</p> <p>$\overline{A \cdot B}$ - final answer (from use of $1+C=1$)</p> <p>Mark as follows: The above examples show two methods of simplifying and identify the identities used – there are other ways of simplifying the expression</p> <p>3 marks should be awarded if the final answer is correct and there is evidence of good sound working. 2 marks should be awarded if the final answer is wrong/not achieved but evidence of good sound working. 2 marks should be awarded if the final answer is correct with some good working but the working also has incorrect use of identities 1 mark should be awarded if there is evidence of one correct use of an identity or simplification process 1 mark should be awarded if correct final answer on its own or with incorrect working</p>	3
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2	a	<p>Internet: The Internet is a global network of interconnected computers; using a globally unique address space; packet-switched network; using end-to-end communication protocol // Internet Protocol // TCP/IP;</p> <p>World wide web: The world wide web is a collection of hyperlinked documents; accessed via the Internet; using HTTP(S) protocol (to retrieve webpages);</p> <p>NOTE MAX 3 if no credit worthy point is made about the world wide web.</p>	MAX 4
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2	b	Code	Explanation	2
		<pre><title>High View Academy</title></pre>	Places the text 'High View Academy' into the top of the browser window / into a tab;	
		<pre><p style="text-size: 18pt; color: red;">Important Notice</p></pre>	<ul style="list-style-type: none"> • text 'Important Notice' displayed • text will be shown in red • text will be shown in a font size of 18 (pt) • blank line before and after the text <p>Award mark if 3 of the 4 points above are covered.</p>	

2	c	<p>By using an external style sheet all pages of the web site can have the presentation/layout controlled;</p> <p>By using an external style sheet all pages of the web site using it will have a consistent look / theme;</p> <p>The style only needs to be edited in one place to affect an entire website;</p>	MAX 1
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2	d	<p>text should be <code>text-align</code>;</p> <p><code>scr</code> should be <code>src</code>;</p> <p><code>schoollogo</code> is missing a file extension;</p> <p><code>img</code> tag needs to be closed with a <code></></code> ; R. extra <code></code></p> <p><code>img</code> tag needs an alt section;</p> <p>missing a <code>
</code> tag to move text underneath the logo // 'High View Academy' needs to be inside <code><p>/<div></code> tags;</p> <p>A. <code>
</code></p> <p>A. missing a <code>border=</code> attribute or <code>style=</code> attribute including <code>border: ;</code></p> <p>Or any sensible error.</p>	MAX 3
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3	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Software</th> <th style="text-align: left;">Classification (number)</th> </tr> </thead> <tbody> <tr> <td>Virus scanner</td> <td style="text-align: center;">2 A. utilities</td> </tr> <tr> <td>Interpreter</td> <td style="text-align: center;">4 A. translators</td> </tr> <tr> <td>Spreadsheet</td> <td style="text-align: center;">1 A. general purpose (application software)</td> </tr> </tbody> </table> <p>1 mark for any two correct rows 2 marks for all 3 correct rows</p>	Software	Classification (number)	Virus scanner	2 A. utilities	Interpreter	4 A. translators	Spreadsheet	1 A. general purpose (application software)	2
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3	b	<p>To allow sharing of run-time code across programs;</p> <p>To save memory as routines are only loaded when needed;</p> <p>To provide access to procedures/functions/subroutines when writing a program;</p> <p>To reduce amount of programming required // time taken to write program // allow code to be re-used;</p>	MAX 1
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3	c	i	<p>imperative: Follows a sequence of instructions provided by a programmer // instructions specify how to solve the problem;</p> <p>high-level: A language that uses English-like keywords // one instruction maps to several machine code instructions // has structures/support for assignment/iteration/selection/subroutines // support for a variety of data structures;</p>	2
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3	c	ii	<p>To convert the source code/program into object/machine code which can be executed; Processor cannot directly execute source code; Interpret the statements of the source code/program/high level language and perform the actions they describe;</p>	MAX 1
3	d		<p>Software: Bespoke (software);</p> <p>Advantage (MAX 1): It is made to meet the requirements of the company; It can be made to fit in with existing software/hardware;</p> <p>Disadvantage (MAX 1): It takes time to develop; It is more expensive as the company has to cover all costs; NE more expensive It is more likely to contain bugs; There is a lack of third party support;</p>	3
4	a		<p>Processor: To (fetch, decode) and execute instructions // performs logical/arithmetical operations; A. executes instruction R. runs programs</p> <p>Main memory: MAX 1 To store currently running programs; To store data being used by programs;</p> <p>Control bus: To carry control signals (between components); A. example of a control signal</p>	3
4	b		<p>A - Visual Display Unit; B - Processor; C - Main Memory; D - Keyboard;</p>	4
5	a		<p>A numerical label/value assigned to a device; A series of four bytes // a 32 bit number;</p> <p>A. a series of 16 bytes // a 128 bit number; A. octet as an alternative to byte R. Internet Protocol</p>	MAX 1

5	b	i	A set of rules (for communication between devices);	1				
5	b	ii	<p>HTTP: HTTP is a protocol for accessing websites which are usually available to the general public;</p> <p>Telnet (MAX 1): The school does not wish people outside of the school network to remotely login to a school computer // open Telnet port is a security risk; A. Telnet is an insecure protocol;</p>	2				
5	c		<p>Client server model:</p> <ul style="list-style-type: none"> • User runs a client application to connect to the server/server application // client sends a request to the server • Server (performs processing and) sends result back to client <p>Steps to update server:</p> <ul style="list-style-type: none"> • Run the Telnet client on the laptop to connect to the company server • Login to the company server • Run the FTP client on the company server // use of FTP client to connect to FTP server • Login to the security update FTP server using username and password • Download/transfer the required file • Run the command to install the security update // apply the security update • Log off from the server // Disconnect from the server <p>Alternative steps:</p> <ul style="list-style-type: none"> • Run the FTP client on the laptop to connect to the security update Server using username and password • Download/transfer the required file • Connect to the company FTP server • Upload the required file from the laptop • Run the Telnet client to connect to the company server • Login to the remote server • Run the command to install the security update // apply update • Log off from the server // Disconnect from the server <p><u>HOW TO AWARD MARKS:</u></p> <table border="1"> <thead> <tr> <th colspan="2">Mark Bands and Description</th> </tr> </thead> <tbody> <tr> <td>5-6</td> <td>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and all 5 of the quality of written communication criteria (QWCx).</td> </tr> </tbody> </table>	Mark Bands and Description		5-6	To achieve a mark in this band, candidates must meet the subject criterion (SUB) and all 5 of the quality of written communication criteria (QWCx).	6
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				<p>SUB Candidate has made at least five mark-worthy points and covers both the client server model and the steps form a logical sequence to update the server.</p> <p>QWC1 Text is legible.</p> <p>QWC2 There are few, if any, errors of spelling, punctuation and grammar. Meaning is clear.</p> <p>QWC3 The candidate has selected and used a form and style of writing appropriate to the purpose and has expressed ideas clearly and fluently.</p> <p>QWC4 Sentences (and paragraphs) follow on from one another clearly and coherently.</p> <p>QWC5 Appropriate specialist vocabulary has been used.</p>		
			3-4	<p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of written communication criteria (QWCx).</i></p> <p>SUB Candidate has made at least three mark-worthy points.</p> <p>QWC1 Text is legible.</p> <p>QWC2 There may be occasional errors of spelling, punctuation and grammar. Meaning is clear.</p> <p>QWC3 The candidate has, in the main, used a form and style of writing appropriate to the purpose, with occasional lapses. The candidate has expressed ideas clearly and reasonably fluently.</p> <p>QWC4 The candidate has used well-linked sentences (and paragraphs).</p> <p>QWC5 Appropriate specialist vocabulary has been used.</p>		
			1-2	<p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 3 of the 5 quality of written communication criteria (QWCx).</i></p> <p>SUB Candidate has made a small number of relevant points.</p> <p>QWC1 Most of the text is legible.</p> <p>QWC2 There may be some errors of spelling, punctuation and grammar but it should still be possible to understand most of the response.</p> <p>QWC3 The candidate has used a form and style of writing which has many deficiencies. Ideas are not always clearly expressed.</p> <p>QWC4 Sentences (and paragraphs) may not always be well-connected.</p> <p>QWC5 Specialist vocabulary has been used inappropriately or not at all.</p>		
			0	Candidate has made no relevant points.		

6	a		<table border="1"> <thead> <tr> <th>Situation</th> <th>Device (number)</th> </tr> </thead> <tbody> <tr> <td>Storing a small file (50KB) which is to be transferred from one computer to another</td> <td>5;</td> </tr> <tr> <td>Distributing the contents of a sound library (3GB) to 2000 owners of a piece of music software</td> <td>4; A. 5</td> </tr> <tr> <td>Storing a backup of a server (2 TB)</td> <td>2;</td> </tr> </tbody> </table>	Situation	Device (number)	Storing a small file (50KB) which is to be transferred from one computer to another	5;	Distributing the contents of a sound library (3GB) to 2000 owners of a piece of music software	4; A. 5	Storing a backup of a server (2 TB)	2;	3
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<p>Note: If a number is used more than once accept and award mark in the location it is correct. Reject if more than one number is entered into an answer cell. Accept if name is used rather than number.</p>												
6	b		<p>MAX 1 mark from each section (reading, writing, general)</p> <p>Reading: low power laser is used to read data back from the disk;</p> <p>Writing: To write data a high powered/high frequency laser makes sections less reflective; A. burns a pit;</p> <p>General: The difference between reflective and non-reflective parts / pits and lands indicates the 1s and 0s; The data is stored as a continuous spiral track;</p>	MAX 3								
7	a		<p>One site to administer rather than relying on (physical) access to school servers // security of all servers easier as in one place; Maintenance/backup handled by company B for all servers rather than individually for each school; Updates to MIS software can be rolled out to all schools quickly by updating remote servers; (Renting a group of servers means that) if an individual server fails data can be transferred to another with little or no downtime // easier to add in server redundancy/replication; Less expensive to rent (a powerful bank) of servers than place one server into each school; No one at the school has physical access to the servers;</p>	MAX 2								
7	b	i	Data should be kept secure // data should be protected against unauthorised/unlawful processing;	1								

7	b	ii	<p>Example of insecure location with explanation that this would breach the principle that data must be kept secure; Personal data shall not be transferred to a country or territory (outside the EEA) if the country or territory cannot ensure an adequate level of protection of personal data // different countries may have different Data Protection laws;</p>	<p>MAX 1</p>
7	c		<p>Advantages: Files can be accessed by any device (as we move to more mobile devices); Files can be accessed (more easily) from home / from other locations; Reduced need for (school) to employ IT support staff // reduced requirement to maintain service; No more one-off purchase costs for storage devices; Service may offer automatic backup/versioning facilities // if local computer fails files are still available from remote service; Files can be shared more easily; Company could have better security expertise/practices; Files can be stored remotely to free up local storage space; Remote storage has potential to be unlimited;</p> <p>Disadvantages: Personal files <u>are online</u> and could be hacked into; Reliance on another company to look after files rather than yourself; Governments/people could be watching/reading your files; Becoming more dependent on the Internet // reliance on Internet connection; Ongoing fee to pay for storage services; Local storage offers quicker access time;</p> <p>Note Full marks can only be awarded if student has covered both advantages and disadvantages.</p> <p style="text-align: center;"><i>Refer queries to your team leader</i></p>	<p>MAX 3</p>