AQA

Level 3 Technical Level

IT: CYBER SECURITY

IT: NETWORKING

IT: PROGRAMMING

IT: USER SUPPORT

Y/507/6424

Unit 1 Fundamental principles of computing

Mark scheme
January 2018

Version: 1.0 Final

1 8 1 A Y / 5 0 7 / 6 4 2 4 / M S

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

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.

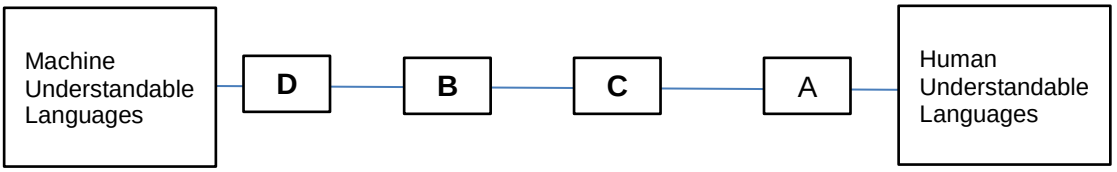
Step 2 Determine a mark

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.

Question	Guidance	Mark
1	**B**	**1**
2	**B**	**1**
3	**D**	**1**
4	**B**	**1**
5	**B**	**1**
6	**Write the corresponding letter for each type of programming language listed in the correct box on the line below. One has been done for you.**  	**3**
7.1	**Describe what main memory does.** Main memory holds data (**1 mark**) and instructions (**1 mark**) for as long as they are required by the CPU for the processing that is being carried out (**1 mark**).	**3**
7.2	**How does the Central Processing Unit (CPU) communicate with the main memory?** Using the data bus or memory bus or address bus (**1 mark**) Allow bus lines, memory address bus DNA serial bus	**1**

Question	Guidance	Mark

8 **A Graphical User Interface (GUI) and a Command Line Interface (CLI) both allow computer users to interact with computer systems. Compare and contrast the two interfaces with reference to the user experience.**

	GUI	CLI
Ease of use	Intuitive, easier to learn. May change substantially with new versions of OS. Similarities across OS's.	Requires higher degree of memorisation and familiarity. Unlikely to change with new versions of OS. Different commands with different OS eg Windows Command Prompt and Unix.
Control/management	Easy access to file management and operating system. More advanced options may not be so easily found for a novice.	Good control over file management and OS. Multiple options available in one command. May be more efficient for an expert.
Multitasking	Many tasks may be performed and on-screen at one time. Easy to view, control, manipulate, toggle between tasks.	Generally, only one task on screen at one time, though multitasking is possible.
Speed	Tends to be slower because keyboard and mouse are required.	Often faster to complete a task because only the keyboard is required.
Resources	Environment that requires loading takes many resources before task is carried out.	Limited resources required as only keyboard required.
Remote access	Possible and easy to navigate.	Possible but requires more expert knowledge of commands.
Physical effort	Requires use of mouse and keyboard or touch screen.	Requires only keyboard. More likely to cause injuries such as RSI because of lack of variety in movement.

Band	Descriptor	Marks
4	The comparison of GUI and CLI covers several areas of difference that clearly shows how this affects the user experience.	5 – 6
3	A comparison of GUI **and** CLI that covers some areas of difference with a description of how this affects the user experience.	3 – 4
2	A limited description of GUI **or** CLI with some indication of difference in user experience.	1 – 2
1	No creditworthy response.	0

6

Question	Guidance	Mark
9.1	**State what actions occur in the Input-Process-Output cycle when accessing a website using a web browser.** INPUT: the website address is entered into the browser address bar (**1 mark**). **Acceptable alternatives** - clicking on a search result (**1 mark**) **OR** clicking on a link to a website (**1 mark**) PROCESS: the browser connects to the web server (**1 mark**) **OR** communicates with the web server (**1 mark**) OUTPUT: the relevant web-page appears on the computer screen (**1 mark**) DNA 'type in URL or website address without indication of where entered	**3**
9.2	**Describe one way the input phase and one way the output phase of the cycle could be adapted for a visually impaired person.** Input Phase Adaptations might include (**1 mark** for example, **1 mark** for expansion): • speech recognition software (**1 mark**) which allows the user to give voice commands to the browser (**1 mark**) • Braille keyboard (**1 mark**) which allows the user to recognise keys by Braille symbols (**1 mark**). Output Phase Adaptations might include (**1 mark** for example, **1 mark** for expansion): • refreshable Braille display (**1 mark**) which allows screen text to be output in Braille (**1 mark**) • screen magnifier (**1 mark**) which allows parts of the screen to be increased in size (**1 mark**) • screen reader (**1 mark**) which converts the text on the screen as speech output (**1 mark**). Allow sensible alternatives DNA 'bigger monitor' without reasonable explanation of what effect this will have	**4**

<table>
<tr><th>Question</th><th>Guidance</th><th>Mark</th></tr>
<tr><td>10.1</td><td>Suggest two questions you would ask to help you determine the best choice of computer system. Explain why you would ask each question.

1 mark for each sensible question (to a max of 2 marks) and 1 mark for each sensible reason (to a maximum of 2 marks).

Questions may cover budget, experience, intended uses, preferences etc.

Note to examiners:

These are questions that will help to determine what computer system will be most suitable.</td><td>4</td></tr>
<tr><td>10.2</td><td>Summarise the advantages and disadvantages of recommending a tablet, a laptop or a desktop PC.
<table>
<tr><th></th><th>ADVANTAGES</th><th>DISADVANTAGES</th></tr>
<tr><td>Laptop</td><td>• Designed to be portable
• Wireless
• Can connect to the internet anywhere</td><td>• Peripherals needed if intended as full desktop replacement / portability then becomes an issue
• More limitations on memory
• Battery life may be an issue if extended use required</td></tr>
<tr><td>PC</td><td>• More memory
• More easily expandable / upgradeable / more easily future-proof</td><td>• Fixed location
• Typically requires multiple plugs and sockets and cabling
• Take up more space</td></tr>
<tr><td>Tablet</td><td>• Typically the lightest and most portable of the three options
• No connections required, other than for recharging
• Customisable touch screens/apps</td><td>• Often more limited software options
• Touchscreen can be challenging, present difficulties
• More limited storage
• Easily stolen</td></tr>
</table>
<table>
<tr><th>Band</th><th>Descriptor</th><th>Marks</th></tr>
<tr><td>4</td><td>The advantages and disadvantages are comprehensive and cover all types of computer.</td><td>5 – 6</td></tr>
<tr><td>3</td><td>The advantages and/or disadvantages cover two or more types of computer.</td><td>3 – 4</td></tr>
<tr><td>2</td><td>A limited set of advantages and/or disadvantages which cover one or two types of computer.</td><td>1 – 2</td></tr>
<tr><td>1</td><td>No creditworthy response.</td><td>0</td></tr>
</table></td><td>6</td></tr>
</table>

10.3	**Describe two security measures you would put in place on the chosen system.** **1 mark** for each security measure stated (to a **maximum of 2 marks**) and **1 mark** for each expansion (to a **maximum of 2 marks**). Security measures such as anti-virus software, anti-malware software, user authentication, differentiated access for individual staff members, accepting regular software updates. DNA physical systems that prevent access to room in which system resides	**4**
Question	**Guidance**	**Mark**

10.4	**The system that you have recommended will eventually reach the end of its useful life. At this point it is important that it is disposed of correctly. Describe measures that should be taken to ensure that disposal complies with relevant legislation.** **1 mark** for each relevant point up to a **maximum of 3 marks**. Maximum of 1 mark if **only** legislation is named. The DPA (**1 mark**) means that data must be protected, so it is necessary to delete data before disposal (**1 mark**). This can be done by overwriting all data (**1 mark**). Simple reformatting or deleting will not remove data (**1 mark**). HDDs can also be destroyed physically (**1 mark**). The WEEE regulations (**1 mark**) mean that you must dispose of electronic equipment through a registered waste disposal operative (**1 mark**). You need to check that the operative has a proper licence (**1 mark**). The ROHS directive (**1 mark**) is intended to stop hazardous substances getting into the supply chain (**1 mark**) so you must check whether the computer system is ROHS compliant before selling it on to someone else (**1 mark**). Accept other similar.	**3**

11	**State one graphical method of conveying information to the user of a computer system.** Any sensible answer. Might include icon, graph, picture, table or any variation on these. Do **not** accept any answer that is purely textual or numeric.	**1**

12	**From the values in Table 1 write one sentence that logically states what will cause the alarm to sound.** The alarm will sound if the pressure mat is pressed, OR the movement sensor is activated, OR the magnetic catch is broken (**1 mark**).	**1**

	OR The alarm will sound if any of the sensors is activated (**1 mark**). **OR** A OR B OR C (**1 mark**)	

Question	Guidance	Mark
13	**What function does a power supply unit perform and why is it needed?** A PSU converts (**1 mark**) Alternating Current power into Direct Current power (**1 mark**). It is necessary because computers use low-voltage DC power (**1 mark**) Allow surge protection	**3**
14	**Explain why it is sometimes necessary to install expansion cards, such as a graphics card, in a computer.** **1 mark** per point made up to a maximum of **3 marks**. Max **1 mark** if only examples of expansions cards are given • An expansion card is designed to fulfil a particular purpose and do it well (**1 mark**). • A graphics card might be installed in a computer because the graphics chip that is built into the motherboard has failed or is not very good (**1 mark**). • The new graphics card will provide better quality graphics processing (**1 mark**). • The expansion card replaces the on-board processor (**1 mark**) because the chipset on it is specifically designed to process graphical data (**1 mark**) Note to examiners: Only allow 'additional features' if explanation of features is given	**3**
15.1	**List the expected contents of the inventory and explain its role in managing software assets.** Indicative content: • Product details, eg manufacturer, product name, version, language • Quantity of software or apps installed • Date of software installation • Software licence expiry/renewal dates • File details, eg name, path, size, modified date, description, version, tracking software issues, meeting maintenance targets • Software version; identify range of updates and patches installed which may impact on stability and security, licensing compliance • File collection, collect from clients and store at primary site server for propagation to clients • Maintenance activity undertaken; log of installations, patches, updates, issues • Assistance in providing costings for software purchase • Allows software recovery from hardware assets	**9**

	Band	**Descriptor**	**Marks**
	4	A full description that explains the role of the software inventory.	7 – 9
	3	A description that contains some explanation of the role of the software inventory.	4 – 6
	2	Some aspects of the role of the software inventory is included with little description.	1 – 3
	1	No creditworthy response.	0

Question	**Guidance**	**Mark**
15.2	**Describe two tasks other than software inventory that this software might carry out.** **1 mark** for each correct task (to a **maximum of 2**), **1 mark** for expansion/example of each (to a **maximum of 2**). Might include: • Hardware inventory • Network capacity and monitoring • Anti-virus or malware management • Fault reporting • User authentication/user profile management • Software distribution and upgrading • Software licence control • Backup and recovery • Printer spooling • Job scheduling • Software version control • Capacity planning	**4**
15.3	**The off-the-shelf software requires customisation in order to meet the organisation's needs better. What is this type of software called?** **1 mark** for the correct answer. Tailored software	**1**
15.4	**Discuss the advantages and disadvantages to the organisation of customising the software in this way.** Indicative content: • Cost • Efficiency • Productivity • Exactly meets needs	**6**

- Possible security implications
- Time to customise
- Maintenance
- Required training
- Introduced vulnerabilities

Band	Descriptor	Marks
4	Advantages and disadvantages are discussed with reference to organisational needs.	7 – 9
3	Some advantages and disadvantages are included. There is some reference to organisational needs.	4 – 6
2	Some advantages **or** disadvantages are stated. There may be no reference to organisational needs.	1 – 3
1	No creditworthy response.	0

<table>
<tr><th>Question</th><th>Guidance</th><th>Mark</th></tr>
<tr><td>16.1</td><td>Describe how computer systems enable large numbers of volunteers to collaborate on citizen science projects.

Indicative content:

• Breaking data sets into smaller units
• Power of many computers combined
• Using spare capacity on personal computers
• Data collection from many devices such as mobile phones
• Connection to networks such as the Internet
• Easy dissemination to large groups of people
• Easy collection of data from large groups of people
• Facilities on devices, such as cameras, GPS location and tracking

<table><tr><th>Band</th><th>Descriptor</th><th>Marks</th></tr><tr><td>3</td><td>Many features of computers and applications are included. These features are relevant to the topic</td><td>4 – 6</td></tr><tr><td>2</td><td>A few features of computers or applications are included. There may be some relevance to the topic</td><td>1 – 3</td></tr><tr><td>1</td><td>No creditworthy response</td><td>0</td></tr></table></td><td>6</td></tr>
<tr><td>16.2</td><td>Describe two characteristics of information that might affect the quality of the results of a citizen science project.

Accuracy (1 mark) – if the data is not recorded or analysed accurately then the whole project is affected (1 mark). Example, if a bird is recorded with the wrong name (1 mark). Example, a person counts the number of stars in a picture wrongly (1 mark).

Timeliness (1 mark) – if it takes too long to collect the data it will be out of date by the time it is analysed (1 mark) or if it takes too long to analyse it will be out of date by the time it is published (1 mark).

Objectivity (1 mark) – the project may have an ‘agenda’ and this could skew the results (1 mark).

Accept validity (1 mark) and authority (1 mark), plus additional marks if relevant expansions given.

Accept answers which give an indication that the student understands some of the above concepts.</td><td>4</td></tr>
</table>