A-LEVEL
Information and Communication Technology
Paper 3  The Use of ICT in the Digital World
Mark scheme

2520
June 2017

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
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.
General guidance notes for examiners

Overall guidelines

1. All examples accepted should be clearly related to the subject area and should not be “generalised” examples.
2. Attention should be paid to ensure that marks are not awarded for simple restating of the question or the stem, often involving the exact same terms.
3. It should be remembered that scripts could be seen after they are marked and so consistency of approach and correct mechanics of marking are essential.
4. Rules on positioning of ticks and marks are to aid in checking and remarking of scripts.
5. Do not expect the candidate to use the exact wording given in the mark scheme. If you are in doubt as to the correctness of an answer given by the candidate, consult your Team Leader.
6. The answers given in the mark scheme are exemplars. Credit must be given for other correct answers not given in the mark scheme. Please refer to Team Leaders where there is any doubt.
7. One-word answers, where acceptable, will be indicated on the question paper.
8. The meaning of ICT-specific words and phrases are generally as defined by BCS Glossary of Computing and ICT (current edition).

Specific marking guidelines

9. The basic rule is one mark one tick. The tick to be positioned at the point where the mark is gained in the answer and definitely not in the margin.
10. The only figures in the margin should be sub-totals for parts of questions and a final total for the whole question in the box provided.
11. All writing must be marked as read, either by the presence of ticks or by striking through the script with a vertical line.
12. Where candidates have added extra to their answers on additional pages, the total mark should be indicated as ‘including x marks from supplementary page y’. The total mark should be written in the appropriate printed box on the question paper.
13. The use of the following symbols/marks is acceptable:
   a. BOD – where the benefit of the doubt is given for the point the candidate is making. This is generally where poor writing or English is an issue. Its widespread use should be avoided.
b. An omission sign ^ should be used where the candidate has given insufficient information to gain a mark. This is particularly useful when a teacher or student looks at scripts against a mark scheme.

c. It may be appropriate to indicate where the same point has been covered more than once by an arrow or where a point has been covered in several lines of prose by the use of brackets.

d. For questions where candidates’ answers are assessed for QWC, no individual ticks should be written on the script as it should be marked holistically.

14. Markers are responsible for checking:
   a. The transposition of marks to the front cover
   b. That all work has been marked on each script
   c. That all marks for individual questions are totalled correctly
   d. That the script total is transferred to the box at the top right of the script.
   e. That they clearly initial the script, under the total at the top right, so it is possible for the Principal Examiner to identify each markers work.
### 1 (a) Define the term client/server system. [3 marks]

- **Purpose of the question**
  To assess understanding of client/server systems.

- **Guidance for examiners on how to mark this question**
  One mark for understanding the concept of a computing task being split between devices. One mark for understanding the function of a server. One mark for understanding the function of a client.

- **Example answer**
  Client/server systems split systems activities (1) between the providers (servers) of a service (1) and those requesting the service (the clients). (1)

- **Area of the specification and AOs this question covers**
  3.3.2.8, AO1 [3 marks], AO2 [0 mark]

### 1 (b) State one advantage and one disadvantage of using client/server systems. [2 marks]

- **Purpose of the question**
  To assess the candidate’s understanding of the applicability of client/server systems.

- **Guidance for examiners on how to mark this question**
  One mark for an advantage. One mark for a disadvantage. Note that the disadvantage cannot be the inverse of the advantage given.

- **Example answer**
  One advantage is that data and application software is stored centrally. (1) One disadvantage is that the system cannot be used if the server or network fails. (1)

- **Area of the specification and AOs this question covers**
  3.3.2.8, AO1 [2 marks], AO [0 mark]
Kirsty is to be involved in the installation of hardware for the new client/server system and has been advised by Des to make appropriate plans.

Describe the likely content of a hardware installation plan.

<table>
<thead>
<tr>
<th>2</th>
<th>[9 marks]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose of the question</strong></td>
<td>To test the candidate’s skill and understanding of the actions required to implement an ICT-related system.</td>
</tr>
<tr>
<td><strong>Guidance for examiners on how to mark this question</strong></td>
<td>One mark for each valid action, plus up to two extension marks for a description or reason for the action. Maximum 5 marks for just a list. This is a breadth or depth question.</td>
</tr>
<tr>
<td><strong>Example answer</strong></td>
<td>Schematic of the proposed hardware installation. (1) Hardware specifications (1) to include processing capacity (1) and electrical requirements. (1) Network requirements, (1) including cabling (1) and bandwidth. (1) Schedule of activities. (1) List of responsibilities. (1)</td>
</tr>
<tr>
<td><strong>Area of the specification and AOs this question covers</strong></td>
<td>3.3.10.3, AO1 [4 marks], AO2 [5 marks].</td>
</tr>
</tbody>
</table>
Discuss the factors, in addition to the need for a strong and capable project manager, which contribute to the success of a project. [13 marks]

<table>
<thead>
<tr>
<th>Purpose of the question</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess the candidate’s knowledge and understanding, and the skills involved in developing ICT systems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guidance for examiners on how to mark this question</th>
</tr>
</thead>
<tbody>
<tr>
<td>One mark for each factor mentioned, plus up to two extension marks.</td>
</tr>
</tbody>
</table>

**NOTE:** No marks to be given for “strong and capable project manager” as this is in the question stem.

This is a breadth or depth question.

<table>
<thead>
<tr>
<th>Example answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other factors that may contribute to the success of a project are:</td>
</tr>
</tbody>
</table>

Management and user involvement. (1) This is necessary to ensure that the system being developed meets business needs (1) and that it is understood by the users. (1)

Appropriate allocation of staff. (1). Project tasks are to be allocated to staff with the appropriate skill and experience. (1)

Adequate analysis. (1) It is essential that all required business functions are included in the analysis. (1)

Professional standards. (1) The development needs to be documented at all stages, (1) so that, if a developer falls ill or is unavailable, another can take over. (1)

Good teamwork. (1) All members of the team should aim to meet project deadlines (1) and communicate any problems to the project leader. (1)

<table>
<thead>
<tr>
<th>Area of the specification and AOs this question covers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.7.1, 3.3.7.2, AO1 [5 marks], AO2 [8 marks].</td>
</tr>
<tr>
<td>4</td>
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<td>---</td>
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<tr>
<td><strong>Purpose of the question</strong></td>
</tr>
<tr>
<td><strong>Guidance for examiners on how to mark this question</strong></td>
</tr>
<tr>
<td><strong>Example answer</strong></td>
</tr>
<tr>
<td><strong>Banded marking</strong></td>
</tr>
<tr>
<td><strong>Zero mark [0 marks]</strong></td>
</tr>
<tr>
<td><strong>Low mark range [1-5 marks]</strong></td>
</tr>
<tr>
<td><strong>Medium mark range [6-10 marks]</strong></td>
</tr>
<tr>
<td><strong>High mark range [11-15 marks]</strong></td>
</tr>
<tr>
<td><strong>Area of the specification and AOs this question covers</strong></td>
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</tbody>
</table>
5. **Figure 1** contains three different types of entity relationship diagram. For each one state the name of the relationship type shown.

**Figure 1**

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Type of relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="" alt="Diagram (i)" /></td>
<td>(i) one to many</td>
</tr>
<tr>
<td><img src="" alt="Diagram (ii)" /></td>
<td>(ii)</td>
</tr>
<tr>
<td><img src="" alt="Diagram (iii)" /></td>
<td>(iii)</td>
</tr>
</tbody>
</table>

**Purpose of the question**
To assess the candidate's knowledge and understanding of entity relationship diagrams.

**Guidance for examiners on how to mark this question**
One mark per relationship type correctly identified.

**Example answer**
(i) one to many.
(ii) one to one.
(iii) many to many.

<table>
<thead>
<tr>
<th>Area of the specification and AOs this question covers</th>
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</thead>
<tbody>
<tr>
<td>3.3.9.2, AO1 [0 mark], AO2 [3 marks].</td>
</tr>
</tbody>
</table>
6 (a) For the system changeover methods described in Table 1, identify the changeover method from the list below and write the appropriate letter A, B, C or D in each box.

A - Parallel running  
B - Direct changeover  
C - Pilot running  
D - Phased changeover

A letter must only be used once.

Table 1

<table>
<thead>
<tr>
<th>System changeover method</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) A new system is being planned to replace an old system across 100 stores. Initially the new system is going to be tried out in just one store.</td>
<td></td>
</tr>
<tr>
<td>(ii) An old system is discontinued one day and replaced by a new system the next day.</td>
<td></td>
</tr>
<tr>
<td>(iii) A new system is introduced in stages.</td>
<td></td>
</tr>
</tbody>
</table>

[3 marks]

Purpose of the question
Assesses knowledge and understanding of changeover methods.

Answers
(i) = C  
(ii) = B  
(iii) = D

Method of marking
Auto-mark

Area of the specification and AOs this question covers
3.3.10.3, AO1 [2 marks], AO2 [1 mark].
6 (b) Explain the advantages and disadvantages of using the direct changeover method. [10 marks]

**Purpose of the question**
To assess the candidate’s knowledge and understanding of the direct changeover method.

**Guidance for examiners on how to mark this question**
One mark for identifying each advantage or disadvantage plus one mark for each extension.
If only advantages, the maximum mark is 7.
If only disadvantages, the maximum mark is 7.

**Example answer**
Speed is the main advantage of the direct changeover method (1) as, provided it works, the new system will be implemented the next day. (1) It is also inexpensive (1), as there is no need to run two systems concurrently. (1)

There is significant risk (1) because, if the new system fails, the old system may no longer be available. (1) Also, there are training issues, as staff will have to be fully trained beforehand (1) and will not have the opportunity to learn new functions on a gradual basis. (1)

Finally, it places considerable pressure on the system developers (1), as they have only limited time to transfer files and data from the old system to the new system. (1)

**Area of the specification and AOs this question covers**
3.3.10.3, AO1 [5 marks], AO2 [5 marks].
An organisation has purchased a package system for a part of its business and is considering what type of support will be required once the system is implemented.

Discuss the factors an organisation should consider before deciding on a suitable type of support.

| 7 | An organisation has purchased a package system for a part of its business and is considering what type of support will be required once the system is implemented. Discuss the factors an organisation should consider before deciding on a suitable type of support. | [10 marks] |

**Purpose of the question**

To assess the candidate’s knowledge and understanding of support options.

**Guidance for examiners on how to mark this question**

This is a depth and breadth question about factors governing the choice of a support system.

1 mark per factor, 1 mark for each relevant expansion/example
For maximum marks, the candidate must include at least two factors.

**Example answer**

The organisation should first consider the importance of the system to its business (1) and then consider available support options appropriate to that importance. (1) It should also consider the practicality and cost of any support option chosen. (1)

If the organisation is wholly dependent upon the system, it may consider on-site support. (1) This would be appropriate for an online booking system (1), as the organisation would lose business when the system was not working. (1)

The expertise available within the organisation could also be taken into account. (1) If the organisation has its own experienced ICT staff, it might be able to train them (1) to perform the required support. (1)

Support available via online forums or user groups (1) could be considered.

**Area of the specification and AOs this question covers**

3.3.11.3, AO1 [6 marks], AO2 [4 marks].
Using examples, discuss what should be considered when designing an interface between an e-commerce site and the customers it serves. [12 marks]

**Purpose of the question**
To assess the candidate’s knowledge and understanding of the interface between an organisation and its users.

**Guidance for examiners on how to mark this question**
Banded marking – see below.

**Example answer**

**Banded marking**

**Zero mark [0 marks]**
Candidate has written nothing that is worthy of credit.

**Low mark range [1-4 marks]**
Candidate has listed and described a limited number of factors without demonstrating any deep knowledge or understanding. Any examples, if included, are irrelevant or too generalised.

**Medium mark range [5-8 marks]**
Candidate has explained the importance of a number of factors, making some reference to customers and the need to design the interface accordingly. Some examples included.

**High mark range [9-12 marks]**
Candidate has discussed the expected design considerations and linked these to customers. A range of relevant examples is used.

**Area of the specification and AOs this question covers**
3.3.11.4, AO1 [6 marks], AO2 [6 marks].
Since the introduction of the microchip it has been estimated that processing capability has doubled, and that costs have halved, every two to three years.

Using examples of new and emerging technology, discuss the impact that such continued growth may have on organisations, individuals and society as a whole.

In this question you will be marked on your ability to use good English, to organise information clearly and to use specialist vocabulary where appropriate.

<table>
<thead>
<tr>
<th>9</th>
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</tr>
</thead>
</table>

**Purpose of the question**

To assess the candidate’s understanding of the implications of the continued growth of computing capability.

**Guidance for examiners on how to mark this question**

No ticks or other annotation to be used on the script, just the final total. Start at the bottom band and work up.

**Example answer**

**Zero mark [0 marks]**

Candidate has written nothing that is worthy of credit.

**Low mark range [1-5 marks]**

Some impacts are included but these are described, rather than discussed. Typically, the impacts mentioned are confined to continued usage of existing and established systems, rather than new or emerging technologies. Only one or two of the three groups (organisations, individuals and society) are mentioned, if at all.

The candidate typically uses a form and style of writing which is barely appropriate for its purpose. Candidate has expressed simple ideas clearly but may be imprecise and awkward in dealing with complex or subtle concepts implied by the question. Information or arguments may be of doubtful relevance or be obscurely presented. Errors in spelling, punctuation and grammar may be noticeable and intrusive to understanding, suggesting weaknesses in these areas. Text is barely legible.

**Medium mark range [6-10 marks]**

Likely impacts are explained, rather than discussed. One or two examples of new or emerging technologies are mentioned but possible changes to existing and established systems form the main part of the answer. Two or three of the groups (organisations, individuals and society) are mentioned but not discussed in any depth.

The candidate uses a form and style of writing which is sometimes appropriate
for its purpose but with many deficiencies. Candidate has expressed straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Information or arguments may sometimes stray from the point or may be weakly presented. There may be some errors of spelling, punctuation and grammar but not such as to cause problems in the reader’s understanding and not such as to suggest a weakness in these areas. Text is legible.

**Good mark range [11-15 marks]**

Relevant examples of new and emerging technologies are discussed but the impact on the three groups (organisations, individuals and society) is limited. Meanings and arguments are clear.

The candidate has, in the main, used a form and style of writing appropriate for its purpose, with only occasional lapses. Candidate has expressed moderately complex ideas clearly and reasonably fluently. Candidate has used well-linked sentences and paragraphs. Information or arguments are generally relevant and well structured. There may be occasional errors of spelling, punctuation and grammar. Text is legible.

**High mark range [16-20 marks]**

New and emerging technologies are discussed with authority and the impact on each of the three groups (organisations, individuals and society) is analysed and justified. Meanings and arguments are clear.

The candidate has selected and used a form and style of writing appropriate to purpose and has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another clearly and coherently. Specialist vocabulary has been used appropriately. There are few, if any, errors of spelling, punctuation and grammar. Text is legible.

**Area of the specification and AOs this question covers**

3.3.1.3, AO1 [10 marks], AO2 [10 marks].