Cambridge Assessment International Education

# Cambridge International AS & A Level

**INFORMATION TECHNOLOGY** **9626/03**

Paper 3 Advanced Theory **For examination from 2022**

MARK SCHEME

Maximum Mark: 70

**Specimen**

This document has **8** pages. Blank pages are indicated.

**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

| Question | Answer | Marks |
|---|---|---|
| 1(a) | **Four** from:<br><br>Clients may not know what their exact requirements are before they see/test working software so design needs to be changed at intervals<br>Clients change their requirements resulting in redesign/redevelopment/ retesting leading to increased costs<br>Developer may not be aware of possible future difficulties/technological developments when designing a new software product/feature<br>Developer might continue with a design that does not account for new developments/constraints/requirements leading to increased costs/time delays | **4** |
| 1(b) | **Two** from:<br><br>Easy to manage due to the rigidity of the model<br>Each phase has specific deliverables and a review process<br>Phases are processed and completed one at a time/phases do not overlap<br>Waterfall model works well for smaller projects where requirements are clearly defined | **2** |

| Question | Answer | Marks |
|---|---|---|
| 2 | **Six** from:<br><br>Max **two** from:<br>Public Wi-Fi is accessible by any/anonymous users without logins being required<br>Many hotels/cafes provide Wi-Fi free/at no cost to customers<br><br>Max **five** from:<br>Many Wi-Fi 'hot spots'/access points available so can access internet from most places/anywhere<br>Requirement to use secure connections e.g. https/VPNs to prevent data theft leading to increased processing overheads<br>Different hotel/café login/access procedures required which can be time-consuming/slow down working pace when conducting business<br>Internet connection may have low bandwidth/reduced capacity as is free so work may take a long time<br>Internet connection may be time-limited so may disconnect after set time period/may need frequent reconnection which will interrupt working<br>Internet connect may not be secure so business/personal details may be at risk of unauthorised access/theft<br>Danger of 'spoof' Wi-Fi 'hot spots' being used to capture data leading to theft of (business) data<br>Residual data may be found in temporary files on local servers/hard disks in café/hotel<br>Physical security threats from others being able to view details/data on screen | **6** |

| Question | Answer | Marks |
|---|---|---|
| 3(a) | **One** from:<br><br>Insert a banner from an 'ad' server<br>Insert text links to product websites | **1** |

| Question | Answer | Marks |
|---|---|---|
| 3(b) | **Four** from:<br><br>Small quantities of/amount of/links to digital content/text/images/video content can be added to a website by individuals<br>Content can be added by many users<br>Content can be viewed by many users<br>Control over who can view/amend/add to content<br>Can be accessed from different types of devices<br>Can be accessed when away from home/mobile | **4** |

| Question | Answer | Marks |
|---|---|---|
| 4 | **Eight** from:<br><br>**Advantages**<br>Cheap to install/repair<br>Requires little maintenance so costs are minimal<br>Copper has higher conductivity than e.g. aluminium so smaller conductor sizes can be used<br>Can be easily joined (by compression) to plugs/sockets as does not form an oxidised layer at surface<br>Is (relatively) unaffected by changes in environmental conditions/temperature<br><br>**Disadvantages**<br>Limited bandwidth/c.10 Gbps due to distance restrictions/speed of electrons/ impurities in the copper<br>High signal loss when used for lengths over 300–500 m/becomes significant over (only) 100 m so distances are restricted<br>Speed of electricity/electrons in copper is <1% speed of light so data transmission speed is low<br>Susceptible to 'tapping' so security can be (easily) compromised<br>Life expectancy before failure can be as low as 5 years<br>Failures can be partial so can cause reduction in conductivity/electrical issues/shorting which may lead to fires/device failures.<br><br>Max 6 marks for all advantages or all disadvantages<br>1 mark available for a reasoned conclusion | **8** |

| Question | Answer | Marks |
|---|---|---|
| 5 | **Three** from:<br><br>System flowchart includes decisions/DFD does not include decisions<br>DFD shows only the path/flow of the data from input to output<br>... via processing and storage<br>System flowcharts has separate symbols for output and storage/DFD store symbol represents output<br>DFD shows human interactions with system | **3** |

| Question | Answer | Marks |
|---|---|---|
| 6(a) | **Three** from:<br><br>Compare two (or more) data values<br>Allow decisions to be made about data/values<br>Can be used on any data type in JavaScript<br>Returns one of (only) a TRUE or FALSE value | **3** |
| 6(b)(i) | Keywords are reserved words which cannot be used as labels for variables/ function names. | **1** |
| 6(b)(ii) | **Two** from:<br><br>Arrays are variables<br>Use a single name<br>Can hold more than one value at a time<br>Values are referenced by index number | **2** |
| 6(b)(iii) | **Two** from:<br><br>Can execute the same block of code a number of times<br>Number of times looped can be controlled by user in code/variable input<br>Can be used to provide different values to the code each time it is executed | **2** |

| Question | Answer | Marks |
|---|---|---|
| 7 | **Eight** from:<br><br>**Advantages**<br>Medical information about new procedures can be shared quickly<br>Medical information about alerts/problems/issues can be shared quickly<br>Medical information about new procedures/issues/alerts can be shared across vast distances/globally/to all staff/health care professionals<br>Health care professionals (from all around the world) can (easily) collaborate on ideas/projects<br>Cost effective method of distributing information to health care professionals/ staff<br>Can be used to communicate with patients who are unable to travel<br>Patients are (often) already using social media so are familiar with it<br><br>**Disadvantages**<br>Security/privacy issues may arise/private/confidential data may be leaked/ shared/intercepted without permission<br>Training is required to fully use the collaborative tools<br>Health care advice to/information from patients can be inaccurate/incomplete leading to misdiagnosis<br>Patients are reluctant to discuss symptoms/problems online/using social media<br><br>Max 6 marks for all advantages or all disadvantages<br>1 mark available for a reasoned conclusion | **8** |

| Question | Answer | Marks |
|---|---|---|
| 8 | **Eight** from:<br><br>**Advantages**<br>No cables are needed which reduces installation/maintenance costs<br>No cables means vandalism is not an issue<br>More difficult to intercept without being noticed/observed<br>Multiple channels available for communication resulting in greater bandwidth available.<br><br>**Disadvantages**<br>Line-of-sight required so can be disrupted if any obstacle, such as new buildings, are in the way/trees grow if unattended<br>Signal absorption by the atmosphere can result in poor connections resulting in lower bandwidths connections<br>Microwaves suffer from attenuation due to atmospheric conditions resulting in loss of connection<br>Towers are expensive to build<br>Towers may be environmentally intrusive<br>Towers/dishes can reveal installations that should/may want to be kept secret.<br><br>Max 6 marks for all advantages or all disadvantages | **8** |

| Question | Answer | Marks |
|---|---|---|
| 9 | **Five** from:<br><br>Clients and servers communicate over a network<br>(Email) server is the host running the email server programs which shares resources with clients<br>Client/smartphone does not share any of its resources with server<br>Client/smartphone initiates communication sessions with (email) servers<br>Smartphone asks email server if it has any email for downloading<br>(Email) server waits for incoming requests (from smartphone)<br>Smartphone/client requests content/service function from the (email) server | **5** |

| Question | Answer | Marks |
|---|---|---|
| 10 | **Five** from:<br><br>Results/outputs from new system can be compared to those from old system<br>Results/outputs can be used to check for errors/accuracy and new system adjusted/amended/modified accordingly<br>Old system can still be used while new system is modified<br>Some staff can be trained on new system while old system is still available for rest of staff to use until trained on new<br>Staff training can take place at intervals and not all at once allowing for proper/in depth training<br>Old system can be used as backup if new system fails/loses data | **5** |

| Question | Answer | Marks |
|---|---|---|
| 11 | **Eight** from:<br><br>*Layout:*<br>Use of house style<br>(sensible/appropriate) use of white space/spacing<br>Spaces in fields must be appropriate for the data being collected<br><br>*Structure of the form:*<br>Order of the fields to be completed must be logical to user<br>Any connections between fields must be logical/clear/made in the layout<br><br>*Types of input fields:*<br>User data is collected by use of text fields, checkboxes, radio buttons<br>Field labels must be sensible and clear to users<br><br>*Action buttons:*<br>Buttons that carry out actions must work and their action must be clear to users<br><br>*Feedback to users:*<br>User must/should be informed of result of their actions<br>Appropriate message must be clear and simple to understand<br>Error messages should give information on how to correct error/proceed<br><br>*Validation of data being entered:*<br>Data should be checked as it is entered to try to ensure it is accurate and reasonable | **8** |

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