



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022**

Digital Technology

Assessment Unit AS 2

assessing

Fundamentals of Digital Technology

[SDT21]

MONDAY 16 MAY, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

COVID-19 Context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

- 1 (a) 1 gigabyte = 2^{30} bytes
 1 terabyte = 2^{40} bytes
 1 terabyte = 2^{10} gigabytes
 (3 × [1]) [3]
- (b) Parity bit/Representation of graphic characters/extended ASCII [1]
- (c) **Advantage**
 Larger character set
 Represent most languages in a single character set/special characters
 (2 × [1]) [2]
- Disadvantage**
 Larger file size
 Increased memory/slower transfer speed
 (2 × [1]) [2]
- (d) +19 [1] + [1]
 -1 [1] + [1] [4]
- (e) +40 00101000
 Invert 11010111
 Add1 to LSB 11011000
 (3 × [1]) [3]
- 2 (a) Accuracy
 Up to date
 Complete
 Relevant
 Reliable
 (4 × [1]) [4]
- (b) Double entry
 ... the computer checks that both versions match/compares both versions
 Proof reading
 ... the user checks the data entered matches the source/compares the
 data entered to the source document
 (4 × [1]) [4]
- (c) **Range**
 The value must lie between an upper boundary
 ... and a lower boundary
 [1] + [1] [2]
- Format**
 Ensures data value matches
 a previously determined pattern/picture/input mask
 [1] + [1] [2]
- Lookup**
 The data value is compared
 ... against a stored list of valid/existing values
 [1] + [1] [2]

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 MARKS

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(d)	0	3
Weightings	5	4
Product	0	12
Sum	31	
Division by 11	2 R 9	
11 minus R	2	
Invalid		
(6 × [1])		

Alternative solution

	0 3 2 5 3	0 3 2 5
Weightings	5 4 3 2 1	5 4 3 2
Product	0 12 6 10 3	0 12 6 10
Sum	31	28
Division by 11	2 R 9	2 R 6
11 minus R	2	5
Invalid		Invalid
(6 × [1])		

[6]

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3 (a) Address bus

Stores the location in memory
 ... to be accessed for reading/writing data
 (2 × [1])

[2]

ROM

Contents fixed during manufacture
 Holds boot up sequence/BIOS
 (2 × [1])

[2]

Port

A physical channel/socket/connection
 ... where peripherals/devices can be connected
 ... to enable data transfer between devices and the processor
 (2 × [1])

[2]

(b) Cache memory stores copies of contents of most frequently/recently accessed memory locations/data/applications/programs/data files instructions

The processor first searches cache memory
 ... before searching main memory
 (3 × [1])

[3]

(c) **Program counter**

Holds the address/location of the next instruction
 It is incremented during the fetch phase
 (2 × [1])

[2]

Memory data register

Stores the data/instruction being transferred to/from IAS
 A data item will be copied to the MDR (for use at the next clock pulse)
 (2 × [1])

[2]

(d) Main memory is volatile
 Secondary storage is non-volatile
 (2 × [1])

[2]

(e) Features of flash

Flash memory uses solid state technology
... with no moving parts
It has relatively high-speed access
... requiring relatively little power

Evaluation for use in a smart phone

It is very compact/portable/robust making it suitable
for use in a device carried around
It requires relatively little power and can be powered by a battery
Its contents can be erased/re-written so suitable for storing user data

**AVAILABLE
MARKS**

Band	Marking criteria	Marks
Band 2	The candidate <ul style="list-style-type: none">• Provides a full description of flash storage technology which is correct• Provides a detailed evaluation of its use in a smartphone justifying any conclusions• Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard.	[5] - [6]
Band 1	The candidate <ul style="list-style-type: none">• Provides a detailed description of flash storage which is correct• Provides a brief evaluation of its use in a smartphone with limited justification• Uses some relevant Digital Technology terminology Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3] - [4]
Band 0	The candidate <ul style="list-style-type: none">• Provides a description of flash storage which is correct but which lacks detail• Makes limited use of Digital Technology terminology Presentation, spelling punctuation and grammar are such that the intended meaning is not completely clear.	[1] - [2]

[6]

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- 4 (a) Multitasking**
 A single user can perform more than one application at a time
 ... but only one application is actually running at any time
 The processor switches from one application to the next
 ... and resources/memory/peripherals are shared between the applications
 (3 × [1]) [3]
- Multithreading**
 Different parts of a single program
 ... can be executed at the same time
 Data for each thread is kept separate
 Can be concurrent or single threading
 (3 × [1]) [3]
- (b) Data not currently in use**
 ... or not required for day to day processing is removed
 ... and stored off-line
 ... to free up storage space/compression is used
 Archived data is still available for auditing/legal/historical purposes
 (4 × [1]) [4]
- (c) Advantage**
 Small file size
 Reduced transfer time
 (2 × [1]) [2]
- Disadvantage**
 Compression and decompression
 ... increase processing time
 (2 × [1])
 May be 'lossy'
 ... resulting in loss of image quality
 (2 × [1]) [2]
 [2] for one disadvantage
- (d) Designed for end-users**
 ... to enable them to perform a specific task
 (2 × [1]) [2]
- (e) HW Internal microphone**
SW AD conversion
 Signal sampling
 ... rate/resolution
 Voice recognition
 Comparison to database
 (4 × [1]) [4]
- (f) Features of WIMP**
 GUI Windows/icons/menus/pointers
Features of CLI
 Short commands input at a prompt List of set commands with a syntax
Evaluation 'primary school children'
 WIMP suitable for young children as it is intuitive/easy to learn/visually
 interesting/a common UI
 CLI not suitable as it is text-based/has a large set of commands/which must
 be remembered/typed accurately

Band	Marking criteria	Marks
Band 2	<p>The candidate</p> <ul style="list-style-type: none"> • Provides a correct description of both interfaces • Discusses the suitability of both interfaces justifying any conclusions • Uses the appropriate Digital Technology terminology accurately throughout the response <p>Presentation, spelling, punctuation and grammar are of a high standard.</p>	[5] - [6]
Band 1	<p>The candidate</p> <ul style="list-style-type: none"> • Provides a correct description of both interfaces • Discuss the suitability of one interface • Uses some relevant Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.</p>	[3] - [4]
Band 0	<p>The candidate</p> <ul style="list-style-type: none"> • Provides a correct description of one interface • Makes limited use of Digital Technology terminology <p>Presentation, spelling punctuation and grammar are such that the intended meaning is not completely clear.</p>	[1] - [2]

[6]

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AVAILABLE MARKS

- 5 (a) Web browser**
 Allows users to use/view web pages
 Usually in HTML format
 Provides navigation/search engine/favourites/history/bookmarks
 (2 × [1]) [2]
- WWW**
 An application which runs on the Internet
 Provides users with a multimedia service
 Uses HTML and hyperlinks
 http is commonly used
 (2 × [1]) [2]
- (b) Client-side processing**
 When a user is carrying out a transaction over the Internet
 ... as much processing as possible will be done on the user's computer
 Server-side processing
 When the client-side processing is complete
 ... the Internet server completes the processing required to complete
 the transaction
 (4 × [1]) [4]
- (c) A CSS defines how the formats and appearances of HTML elements in a
 web page are displayed**
 It can be stored as a separate file
 ... which is used to control all pages in the website
 Changes made to this single CSS file will affect all pages in the website
 (4 × [1]) [4]
- (d) User B will have a private key**
 ... and a public key which is in the public domain
 User A will encrypt the message to be sent
 ... using the public key before sending it
 User B will decipher the message
 ... using their private key
 The public and private keys are Mathimatically linked
 ... and both keys are needed to decipher the message
 (6 × [1]) [6]

Total

**AVAILABLE
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