Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Digital Technology

Assessment Unit AS 2

assessing

Fundamentals of Digital Technology

[SDT21]

FRIDAY 24 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.

AVAILABLE MARKS

1 **(a)** 2 gigabyte = 1024 × 2 = 2048 megabytes [1]
Time for download = 2048/64 = 32 sec.
for 2048 [1]
for / 64 [1]
for 32 [1] [4]

(b) +67 01000011_2 [1]
Inverted 10111100_2 [1]
Add 1 to LSB 10111101_2 [1] [3]

(c) 64 + 32 + 16 + 8 + 4 + 2 + 1 [1]
+127 [1] [2]

(d) 127 or $2^7 - 1$ [1]

(e) 128 or 2^7 [1] [1]

(f) **ASCII** can represent 128 characters **because** it uses 7 bits. This is 27 characters.
Unicode can represent 65536 characters or 216 characters because it uses 16 bits.

Evaluation
ASCII uses fewer bits which results in faster processing and reduced memory/storage requirements.
Unicode eliminates the need to have different character sets for different languages/alphabets/emojis Unicode is a worldwide/web standard.

Level	Marking Criteria	Marks
Band 2	The candidate • Provides an **accurate** description of **both** ASCII and Unicode • Evaluates **both** ASCII and Unicode • 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 • Provides an **accurate** description of **both** ASCII and Unicode • Evaluates **either** ASCII **or** Unicode • 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 • Provides an **accurate** description of **both** ACSII and Unicode **or** Evaluates **either** ASCII or Unicode • 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] 17

AVAILABLE MARKS

2 **(a)** **Data** is raw facts/raw figures [1]
Example: 32661 is a sequence of characters [1] [2]

Information is processed data/data given a meaning/data given a context [1]
Example: 32661 represents Actual Sales/Chocolate bars [1] [2]

Knowledge is the result of applying rules to information [1]
… to assist decision-making [1]
A **decision** relating to the fact that target sales for chocolate bars have been missed, e.g. Fewer bars should be stocked/more advertising is required [1] [3]

(b) **(i)** Double entry [1]
… the computer checks that both versions match/compares both versions [1]
Proof reading [1]
… the user checks the data entered matches the source/compares the data entered to the source document [1] [4]

(ii) Two adjacent characters
… are switched/reversed/swapped
(2 × [1]) [2]

(c) **Range check**
The value must lie between an upper boundary limit
… and a lower boundary limit
([1] + [1])

Type check
The value must be of a particular/specified/defined type
… such as character/integer/real/double/numeric/alphanumeric/string/Boolean/logical/date/time
([1] + [1])

Length check
The number of characters
… must be as specified/must lie within two values
([1] + [1]) [6]

(d)

	9	1	1	6	7	
Weight	6	5	4	3	2	[1]
Product	54	5	4	18	14	[1]
Sum	95					[1]
÷ 11	8 remainder 7					[1]
11 – 7	4 = M					[1]

[5]

24

AVAILABLE MARKS

3 (a) **Program counter**
holds the address of the next instruction
It is incremented
(2 × [1])

CIR
Holds a copy
… of the instruction being executed
(2 × [1]) [4]

(b) **Name** Address bus [1]
Description
Transfers the address in memory/RAM to be accessed [1]

Name Data bus [1]
Transfers an instruction/data between processor components [1]

Name Control bus [1]
Description
Transfers signals within the CPU [1] [6]

(c) **Processor type (any one)**
Dual core/quad core processors
Processors can be shared/tasks can be processed in parallel/more instructions can be fetched/executed at one time
([1] + [1])

RISC processors
… require a number of basic instructions to complete many simple operations slowing down processing speed
([1] + [1])

CISC processors
… can perform complex operations very quickly with a small number of instructions
([1] + [1]) [2]

Cache memory
Increasing cache memory
… will enable more frequently/recently accessed instructions/data to be held thus increasing processing speed
([1] + [1]) [2]

(d) **Internal hard drive**
The primary storage device fixed inside the computer/an integral part of the computer/not portable/magnetic medium/moving parts

Storage
The operating system/application software/data files
Higher capacity measured in terabytes

Flash memory pen
Portable device/plug and play device/no moving parts/solid state

Storage
File transfer/Backup/Archive
Lower capacity measured in gigabytes

Level	Marking Criteria	Marks
Band 2	The candidate • Provides an **accurate** description of **both** devices • Provides an accurate comparison of how they are used for storage • 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 • Provides an **accurate** description of **both** devices or an accurate comparison of how they are used for storage • 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 • Demonstrates a limited knowledge of **both** devices **or** makes a simple comparison of how they are used for storage • 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] 20

AVAILABLE MARKS

AVAILABLE MARKS

4 **(a)** **(i)** Bar code reader/scanner
Chip and pin reader/scanner/contactless card reader
Keypad/keyboard
Touch screen
Scales
Magnetic stripe reader
(4 × [1]) [4]

(ii) Sound/auditory/audio/beep
... to alert the operator that the transaction has been successful and that the next one can commence
(2 × [1]) [2]

Visual/graphics/text
… to alert the operator/customer that further action is required in order to complete the transaction
(2 × [1]) [2]

(b) Payroll is carried out at regular intervals/weekly/monthly
… and can be performed at off-peak periods/overnight/is not time critical
All payslips are processed in the same way/human intervention is not required
Timesheets can be batched together
(2 × [1]) [2]

Stock control movements must be processed in real time
… so that stock movements are recorded as soon as they happen
It is critical that stock levels are always up to date
… to avoid stock shortages/prevent over stocking/enable automatic stock re-ordering
(2 × [1]) [2]

(c) **Bitmap**
Each pixel of an image is stored as a pattern which defines its colour/depth using 8/16/32 bits without compression
JPEG
Identifies patterns/similarities which are repeated in an image and are stored only once/compression/lossy compression is used

Webpage image
Bitmap
Good for continuous tone images Produces large files which take longer to transfer/result in no loss of detail
JPEG
Results in smaller files which transfer more quickly but which can lead to reduction in detail

Level	Marking Criteria	Marks
Band 2	The candidate • Provides an **accurate** description of **both** file formats • Provides an **accurate** evaluation of **both** methods • 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 • Provides an **accurate** description of **both** file formats • Provides a **brief** evaluation of **both** methods • 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 • Demonstrates a limited knowledge of **both** file formats **or** provides a **brief** evaluation of **both** methods • 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]

AVAILABLE MARKS

18

				AVAILABLE MARKS
5	(a)	**URL** Identifies the address … of a resource on the Internet … usually a file ([1] + [1])	[2]	
		IP address Identifies the location … of a device/computer on the Internet/on a network It can be static/dynamic ([1] + [1])	[2]	
	(b)	**W3C** Develops/regulates open standards … for the languages … used in the design of web pages … such as HTML/XML/CSS/CGI/scripting (3 × [1])	[3]	
		ITU Coordinates/regulates worldwide telecommunications Allocates the radio spectrum … and satellite orbits Develops network technology standards … such as submarine fibre cables/fixed broadband subscriptions/cyber threat warnings/digital certificates/cloud computing/the internet of things (3 × [1])	[3]	
	(c)	**<body>** Defines the content of/what is displayed on … a web page/HTML document … such as hyperlinks/images/tables/text Each web page/HTML document must have one/only one <body> tag (2 × [1])	[2]	
		<h1> A heading tag h1 is the most important heading/the main heading/(usually) the heading with the largest text (2 × [1])	[2]	
		<p> The paragraph tag … which splits text up into paragraphs Paragraphs are separated by blank lines/start with an indentation (2 × [1])	[2]	
	(d)	It sets the background colour of the page to light blue It sets heading h1 as red text in arial font, size 40, aligned centre … which is used for the heading Cascading Style Sheet It sets the font to green verdana, size 30, aligned centre … which is used for the text CSS is a language …be displayed (5 × [1])	[5]	21
			Total	**100**