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ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2018

Digital Technology

Assessment Unit AS 2

assessing

Fundamentals of Digital Technology

[SDT21]

FRIDAY 8 JUNE, AFTERNOON

MARK SCHEME

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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.

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AVAILABLE MARKS

1 **(a)** The most significant bit (MSB) is used as a sign bit
The MSB is 0 for a positive number
The MSB is 1 for a negative number
For a positive number, place values are used
A negative number is stored as the two's complement (of its positive equivalent)
To get the two's complement, invert the bits and add 1 to the LSB
(4 × [1]) [4]

(b) +15 [2]
–31 [2] [4]

(c) The range of symbols/characters
... that can be represented
Each character has a unique binary code
These include displayable characters/letters/digits/punctuation marks
And control codes/non-printing characters
(4 × [1]) [4]

(d) 2^7 or 128 [1]

(e) It can be used for error checking
... as a parity bit
It can be used to represent additional characters/extend the number of characters which can be represented
... so that graphics characters/accented letters can be represented
(2 × [1]) [2]

(f) Terabyte [1]
1024 or 2^{10} [1] [2]

(g) More characters can be represented
Unicode uses 16 bits
Unicode can represent 2^{16} characters/65536 characters
2^9 (512) times as many characters can be represented
Allows characters from most of the world's languages to be represented
/emoticons can be represented
(3 × [1]) [3]

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2 **(a)** **Data** Raw facts/figures
Information Data given a context/or meaning/processed
Knowledge Application of rules to information to make a decision
(3 × [1]) [3]

(b) How up to date it is
Completeness
Relevance
Effective presentation
Reliability
max (3 × [1]) [3]

(c) The data is keyed in twice
The computer/system
... checks that both versions match/are the same
(3 × [1]) [3]

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AVAILABLE MARKS

(d) Its position/place within the data value [1]

(e) Each digit is multiplied [1]
... by its weight [1] [2]

(f) If remainder is 1 or 0, the result will be 10 or 11
If remainder is 1 (or the result is 10) the check digit becomes X
If remainder is 0 (or the result is 11) the check digit becomes 0
(3 × [1]) [3]

(g) A check digit can detect most transposition errors.
If the positions of two digits change, their weightings and the products will change. This will usually cause the check digit to be incorrect and the error will be detected. Some transposition errors may not be detected.
A check digit can detect when a single incorrect digit is entered.
If a single incorrect digit is entered, the product will change. This will cause the check digit to be incorrect and the error will be detected.
Multiple incorrect digits may not be detected.

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • States that a check digit will detect the entry of an incorrect digit **or** a transposition error • Explains that this is because the weighting product will change • States that check digits are effective in that most such errors will be detected • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling punctuation and grammar are of a high standard.	[4]–[5]
Band 1 **Good**	The candidate • States that a check digit will detect the entry of an incorrect digit **or** a transposition error • Explains that this is because the weighting product will change • Uses some relevant Digital Technology terminology Presentation, spelling punctuation and grammar are sufficiently competent to make the response clear.	[2]–[3]
Band 0 **Basic**	The candidate • States that a check digit will detect the entry of an incorrect digit **or** a transposition error • Makes limited use of Digital Technology terminology Presentation, spelling punctuation and grammar are such that the intended meaning is not completely clear.	[1]

[5]

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AVAILABLE MARKS

3 (a) **Main memory**
Part of internal memory
Immediate access memory
Made up from random access memory/volatile memory
(2 × [1])

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

Port
A physical channel/socket/connection
... where peripherals/devices can be connected
... to enable data transfer between devices and the processor
(2 × [1]) [6]

(b) 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) Main memory is volatile
This is needed for permanent storage is needed
Secondary storage is non-volatile
Secondary memory has more capacity than main memory
This is needed hold all software/data needed by a computer
Enables data to be transferred to another computer system
(3 × [1]) [3]

(d) The surface of the disk is coated in aluminium/is reflective
A red laser is used
... to create pits
... and lands
... which represent 0s and 1s/binary
(3 × [1]) [3]

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AVAILABLE MARKS

(e) Feature: A memory stick is non-volatile
Consequence: It can be used to store backup data permanently
Feature: A memory stick is portable
Consequence: It can be removed and the backup stored safely away from the live system
Feature: A memory stick is rewritable
Consequence: It can be used for backups

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • Identifies two relevant features of a USB memory stick and the consequence of both for backing up data • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling punctuation and grammar are of a high standard.	[4]–[5]
Band 1 **Good**	The candidate • Identifies one relevant feature of a USB memory stick and its consequence for backing up data • Uses some relevant Digital Technology terminology Presentation, spelling punctuation and grammar are sufficiently competent to make the response clear.	[2]–[3]
Band 0 **Basic**	The candidate • Identifies one relevant feature of a USB memory stick • Makes limited use of Digital Technology terminology Presentation, spelling punctuation and grammar are such that the intended meaning is not completely clear.	[1]

[5]

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4 **(a)** The OS manages memory management/internal & external storage
... manages peripheral devices/IO devices
... manages files/directories/performs file management
... controls the user interface/performs user management
(3 × [1]) [3]

(b) **Multiprocessing**
Requires two or more processors
Different parts of the same program/application
... can be executed simultaneously
Each processor may be responsible for specific programs/applications
... or they may work together on the same task
(3 × [1])

Multitasking
A single user perform more than 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]) [6]

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AVAILABLE MARKS

(c) Data not currently in use/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
(2 × [1]) [2]

(d) **Generic software**
Designed to solve common problems/general tasks
Example: word processors/spreadsheets/photo editing software
(2 × [1])

Special purpose software
Designed to solve a specific task/a particular task
Example: student examination system
(2 × [1]) [4]

(e) Proprietary software is developed by a company/organisation who control all its aspects
They retain copyright/release the software under licence
Open source software's source code is made available for users to edit and redistribute collaboratively
Possible issues
The organisation will not have the expense of purchasing software licences
Proprietary software will probably have a higher degree of customer support because of the resources available to the developer
With open source software there may be compatibility issues with their existing systems and applications software and their data

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • Provides an accurate description of **both** types of software • Describes an advantage **or** a disadvantage of the organisation's decision • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling punctuation and grammar are of a high standard.	[4]–[5]
Band 1 **Good**	The candidate • Provides an accurate description of **both** types of software • Uses some relevant Digital Technology terminology Presentation, spelling punctuation and grammar are sufficiently competent to make the response clear.	[2]–[3]
Band 0 **Basic**	The candidate • Provides a description of **one** of the two types of software which is correct but lacking detail • Makes limited use of Digital Technology terminology Presentation, spelling punctuation and grammar are such that the intended meaning is not completely clear.	[1]

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AVAILABLE MARKS

5 **(a)** **URL**
Identifies the address
... of a resource on the Internet
(2 × [1])

http
A protocol/set of rules which defines/specifies
... how data is transferred over the Internet
(2 × [1])

Web server
Provides/delivers web pages/web resources
... in response to requests from web users
(2 × [1]) [6]

(b) A United Nations agency
... responsible for web telecommunication standards
Allocates radio spectrum/satellite orbits
Aims to improve global interconnectivity
(3 × [1]) [3]

(c) **(i)** The text 'Home page' underlined/highlighted
... as a hyperlink
... to the page 'index.html'
(3 × [1]) [3]

(ii) The image 'logo.gif' will be displayed
The words 'Company logo' will be displayed if the image does not load/will be provided for a screen reader/is the rollover text
The image size will be 50 by 50 pixels
(3 × [1]) [3]

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	AVAILABLE MARKS

(d) What is a CSS and how are they used

A CSS defines how the formats and appearances of HTML elements in a web page/document are displayed

It may be included as part of the web page or it can be stored as a separate file

Benefits

All the pages can be linked to the same master CSS so that a consistent style can be applied across the web site

A change to the CSS will be implemented across the web site. Other CSS can override the master CSS.

A web page can be linked to a number of CSS so the page can be displayed differently on different devices/platforms such as laptops, tablets and smart phones

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • Provides an accurate description of CSS • Describes how a CSS defines the appearance of a website • Explains the benefit of using a CSS in the design of a website • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling punctuation and grammar are of a high standard.	[4]–[5]
Band 1 **Good**	The candidate • Provides an accurate description of CSS • Describes how a CSS defines the appearance of a website • Uses some relevant Digital Technology terminology Presentation, spelling punctuation and grammar are sufficiently competent to make the response clear.	[2]–[3]
Band 0 **Basic**	The candidate • Provides a description of CSS 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]

[5] 20

Total **100**