



Rewarding Learning

ADVANCED
General Certificate of Education
2024

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Digital Technology

Assessment Unit A2 1

assessing

Information Systems

MV18

[ADT11]

FRIDAY 14 JUNE, AFTERNOON

Time

2 hours 30 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write on blank pages.

You are not permitted to use any calculating aid in this paper.

Complete in black ink only.

Answer **all six** questions.

Information for Candidates

The total mark for this paper is 150.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in

Questions **1(d)**, **2(d)** and **4(c)(ii)**.

1 (a) Complete the following table. You should only use each network and communication medium once. [6 marks]

Network user	Network	Communication medium
University campuses spread over a city		
International supermarket chain		
School office		

(b) Explain the purpose of each of the following network resources. [9 marks]

Repeater

Wireless access point

Media converter

(c) Complete the following statements about network resources. [4 marks]

Each device on the Internet is assigned a unique

to distinguish the device from

A _____ is coded

onto a _____

during manufacture.

(d) Evaluate a star network and a bus network with respect to the impact of adding a new node. [6 marks]

Quality of written communication will be assessed in this question.

Blank Page
(Questions continue overleaf)

2 (a) Identify the four layers in the Transport Set of the OSI model. [4 marks]

1. _____
2. _____
3. _____
4. _____

(b) Describe the main features of each of the following communication protocols. [6 marks]

Bluetooth

Wi-Fi

(c) Distinguish between the terms bandwidth and broadband. [4 marks]

Bandwidth

Broadband

(e) When the byte 10011010_2 is transmitted, the most significant bit and the least significant bit both flip.

(i) Show the byte after it has been transmitted.
[1 mark]

(ii) Explain what will happen if echo checking is used.
[2 marks]

(iii) Explain what will happen if a parity bit is used.
[4 marks]

3 (a) Complete the following table which describes the three stages in data normalisation. [5 marks]

Stage	Description
In 1NF	Each record has a _____ key There are no _____ groups of _____
In 2NF	There are no _____ dependencies
In 3NF	There are no _____ dependencies

(b) Explain the meaning of each of the following database terms. [6 marks]

Composite key

Referential integrity

An employer provides training courses for employees. Details about these courses are contained in a table with the following headings.

Employee ID	Employee Name	Employee Email	Course ID	Course Title	Completion Date	Tutor ID	Tutor Name
-------------	---------------	----------------	-----------	--------------	-----------------	----------	------------

A course is taught by a single tutor.

A tutor can teach on a number of courses.

An employee can take a number of courses.

(c) Normalise the table to 3NF showing all your work.

1NF [2 marks]

2NF [3 marks]

3NF [3 marks]

(d) Draw a fully labelled entity-relationship diagram, which does not contain any many-to-many relationships, for this system. [5 marks]



(e) Describe the change which is required to your diagram in part **(d)** if a course can be taught by more than one tutor. Do not redraw the diagram. [2 marks]

- 4 (a) A library uses a relational database. Two entities in the database are shown below.

AUTHOR (AuthorID, Name, ContactNumber)

BOOK (BookID, Title, Format)

- (i) Produce SQL code to add the following author to the database. [4 marks]

AuthorID	A1493
Name	Diggy Tech
ContactNumber	12345

- (ii) Produce SQL code to retrieve the BookID and Title of all books in Hardcopy format. [4 marks]

(iii) Describe how a query to retrieve the BookID and Title of all Hardcopy books would be created using Query By Example (QBE). [4 marks]

(b) Describe the main features of neural network modelling. [6 marks]

- 5 (a)** Explain the difference between a natural language processing system and a voice recognition system. [4 marks]

Natural language processing system

Voice recognition system

- (b)** Explain how each of the following supports mobile phone communication. [6 marks]

A cell

A base station controller

(c) Discuss how the use of data mining could threaten the privacy of supermarket customers. [4 marks]

(d) Explain each of the following terms used in cloud computing. [6 marks]

Clustering

Hosted solution

Blank Page
(Questions continue overleaf)

6 (a) Data Protection legislation sets out how personal data must be collected, processed and stored.

(i) Explain the following terms relating to Data Protection legislation. [4 marks]

Data subject

Data controller

(ii) Data Protection legislation states that personal data should be collected for a specified purpose.

Identify four other principles of Data Protection legislation. [4 marks]

1. _____

2. _____

3. _____

4. _____

(b) Under the Computer Misuse Act, **‘unauthorised access to computer material’** is an offence.

(i) State the two other crimes identified in the Computer Misuse Act. [2 marks]

1. _____

2. _____

(ii) Describe three steps an organisation should take to ensure employees comply with the Computer Misuse Act. [6 marks]

1. _____

2. _____

3. _____

(c) Organisations should consider ethical issues in relation to digital technology.

Describe how an organisation should consider each of the following ethical issues. [6 marks]

1. Automated decision making

2. Monitoring personal behaviour

This is the end of the question paper

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

Examiner Number

Permission to reproduce all copyright material has been applied for.
 In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.