

New  
Specification

Rewarding Learning

**ADVANCED**  
General Certificate of Education  
2018

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

# Digital Technology

Assessment Unit A2 1

*assessing*

Information Systems



**[ADT11]**

\*ADT11\*

**MONDAY 11 JUNE, MORNING**

## TIME

2 hours 30 minutes.

## 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 outside the boxed area on each page or on blank pages.**

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

Complete in black ink only. **Do not write with a gel pen.**

Answer **all six** questions.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 150.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Questions **1(d)**, **2(c)**, **3(f)**, **4(b)(iii)**, **5(e)** and **6(e)**.

11601



\*32ADT1101\*

1 (a) Describe each of the following types of network.

Metropolitan Area Network

---

---

---

---

Wide Area Network

---

---

---

---

[4]



(b) Describe how each of the following is used in a network.

Server

---

---

---

---

Switched hub

---

---

---

---

Repeater

---

---

---

---

[6]

[Turn over







2 (a) The Open Systems Interconnection (OSI) model plays a key role in defining communication protocols.

(i) Explain why communication protocols are necessary.

---

---

---

---

[2]

(ii) Describe each of the following layers of the OSI network model.

The Application layer

---

---

---

---

---

---

The Data Link layer

---

---

---

---

---

---

[6]



(b) Explain how each of the following can be used to transfer data from a computer to a mobile device.

Bluetooth

---

---

---

---

---

---

---

---

Wi-Fi

---

---

---

---

---

---

---

---

[6]

[Turn over







**BLANK PAGE**  
**DO NOT WRITE ON THIS PAGE**  
**(Questions continue overleaf)**

11601

**[Turn over**



\*32ADT1109\*

3 (a) Explain each of the following in terms of a relational database.

A logical data model

---

---

---

---

---

---

A physical data model

---

---

---

---

---

---

[6]



(b) State **two** conditions necessary for a database table to be in each of the following.

2NF

---

---

---

---

3NF

---

---

---

---

[4]



The following table shows some of the students who have completed courses at a college.

CourseID	CourseTitle	TutorID	TutorName	StudentID	StudentName	DOB	StudentStatus	Result
C1	Dig Tech	T1	Babbage	S3	Green	01/01/01	Full-time	Pass
C1	Dig Tech	T1	Babbage	S5	White	04/02/01	Part-time	Merit
C4	Maths	T2	Turing	S7	Black	12/02/01	Full-time	Pass
C4	Maths	T2	Turing	S3	Green	01/01/01	Full-time	Merit
C7	Prog	T1	Babbage	S8	Gray	12/03/01	Part-time	Pass
C9	ICT	T3	Pascal	S3	Green	01/02/01	Full-time	Pass

(c) By referring to the table, explain what is meant by each of the following.

Data duplication

---

---

---

---

Data inconsistency

---

---

---

---

[4]



The data needs to be normalised and an ER model produced.

(d) Assuming that any errors in the table are corrected, normalise the data in the table to 3NF.

1NF

---

---

---

---

2NF

---

---

---

---

3NF

---

---

---

---

[6]

[Turn over



(e) In the box below, draw an ER model, which does not contain a many-to-many relationship, for the table.



[5]





4 (a) The following is an extract from the data dictionary for a stock control system.

Entity	Attribute	Key	Type	Required	Default Value
Product	ProductID	Primary	Integer	Yes	
Product	ProductName		Text	Yes	
Product	DepartmentID	Foreign	Lookup	Yes	
Product	ReorderLevel		Integer	Yes	50
Product	Description		Text	No	

(i) Explain each of the following database terms.

Entity

---

---

Attribute

---

---

[2]



(ii) By referring to the data dictionary, describe each of the following terms.

Foreign key

---

---

---

---

Lookup

---

---

---

---

[4]

(iii) By referring to the ReorderLevel attribute, explain how the default value will be used.

---

---

---

---

[2]

[Turn over



(b) A company's payroll database system includes an Employee table. The following is an extract from the table.

EmployeeID	EmployeeName	JobTitle	Address	Telephone
E102	Green	Manager	Belfast	123321
E109	White	Supervisor	Lisburn	214563

(i) Produce a SQL command which will add the following details to the table.

EmployeeID: E123  
 EmployeeName: Black  
 JobTitle: Supervisor  
 Address: Omagh  
 Telephone: 324531

---



---



---



---



---



---



---

[3]

(ii) Produce a SQL command to delete employees who do not live in Belfast.

---



---



---



---



---



---



---

[3]





5 (a) Explain what is meant by each of the following:

Artificial intelligence

---

---

---

---

---

---

The Turing test

---

---

---

---

---

---

[6]

(b) Describe the main features of a neural network.

---

---

---

---

---

---

[3]



An insurance company uses an expert system to calculate the cost of life insurance policies.

(c) Explain what is meant by fuzzy logic.

---

---

---

---

---

---

---

---

---

---

[4]

[Turn over



(d) Describe the role of each of the following in the development of the company's expert system.

An expert systems shell

---

---

---

---

---

---

The knowledge engineer

---

---

---

---

---

---

The company's life insurance consultants

---

---

---

---

---

---

[9]





6 (a) Describe the three offences defined in the Computer Misuse Act and state the penalty for each.

Offence

---

---

---

---

Penalty

---

---

Offence

---

---

---

---

Penalty

---

---



Offence

---

---

---

---

Penalty

---

---

[9]

[Turn over

11601



\*32ADT1125\*

**(b)** Explain the following terms used in the Data Protection Act.

Information Commissioner

---

---

---

---

Data controller

---

---

---

---

Data subject

---

---

---

---

[6]



(c) Explain the main ethical considerations about each of the following.

Automated decision making

---

---

---

---

Online censorship

---

---

---

---

[4]

(d) Describe the main features of data mining.

---

---

---

---

---

---

---

---

[4]

[Turn over







---

**THIS IS THE END OF THE QUESTION PAPER**

---

11601



\*32ADT1129\*



**BLANK PAGE**  
**DO NOT WRITE ON THIS PAGE**

11601



\*32ADT1130\*



**BLANK PAGE**  
**DO NOT WRITE ON THIS PAGE**

11601



\*32ADT1131\*

**DO NOT WRITE ON THIS PAGE**

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

<b>Total Marks</b>	
--------------------	--

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.

238538

