



Rewarding Learning

**ADVANCED**  
General Certificate of Education  
2019

Centre Number

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Candidate Number

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## Digital Technology

Assessment Unit A2 1

*assessing*

Information Systems

**MV18**

**[ADT11]**

**MONDAY 10 JUNE, MORNING**

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### **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)**, **3(d)** and **6(b)**.

- 1 (a) Explain how each of the following resources is used in a network. [6 marks]

Network card

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Wireless access point

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MAC address

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**(b)** Distinguish between a local area network (LAN) and a metropolitan area network (MAN). [4 marks]

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**(c)** Describe the main features of a peer-to-peer network. [4 marks]

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**(e)** The OSI network model consists of seven layers, one of which is the Application layer.

Name four other layers in the OSI model. [4 marks]

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**(f)** Compare wireless transmission and fibre optic cable from the point of view of bandwidth. [4 marks]

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2 Details about student examination results are stored in a relational database.

The data held about some students is shown below.

Student ID	Student Name	Exam ID	Exam Name	Result
167	O'Hare C	C12 P14	Chemistry Physics	Grade A Grade C
114	Black P	B12 P14	Biology Physics	Grade B Grade A
321	Morrison R	B12 P14 C12	Biology Physics Chemistry	Grade A Grade B Grade C

(a) In the box below draw a fully labelled entity-relationship diagram, which does not contain any many-to-many relationships, for this system. [5 marks]

**(b)** Normalise the data in the table to 3NF, showing all your working. [6 marks]

1NF

2NF

3NF



(d) Explain what is meant by each of the following database terms. [4 marks]

Composite key

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Foreign key

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(e) In the context of a relational database, explain what is meant by each of the following. [4 marks]

Entity

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Referential integrity

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Details of actors and films are stored in a relational database. Two entities in the database are shown below.

**ACTOR (ActorID, Name, ContactNumber)**

**FILM (FilmID, Title, Genre)**

(f) Produce SQL code which will add details of the following actor to the database. [3 marks]

<b>ActorID</b>	<b>TC2001</b>
<b>Name</b>	<b>Tim Cruise</b>
<b>ContactNumber</b>	<b>4455667788</b>

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(c) Explain what is meant by each of the following terms used in expert systems. [6 marks]

Heuristics

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Knowledge engineer

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Robots are used by car manufacturers to spray paint cars.

(e) Describe two benefits of using robots in this case.  
[4 marks]

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**4** Data mining is widely used by banks.

**(a)** Explain the term data mining. [4 marks]

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**(b)** Describe two threats to the privacy of bank customers from the use of data mining. [4 marks]

1. \_\_\_\_\_

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2. \_\_\_\_\_

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Banks store personal details of their customers.

(c) Identify four principles of the Data Protection Act.  
[4 marks]

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

4. \_\_\_\_\_

\_\_\_\_\_



Organisations are making increasing use of cloud computing.

(e) Describe two advantages of using cloud computing for email services. [4 marks]

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**5** A data transmission error occurs if a bit flips when data is sent over a network.

**(a)** Describe how each of the following can detect data transmission errors. [12 marks]

Parity bits

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Checksums

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## Echo checking

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**(b)** Describe how each of the following methods ensures that transmitted data is kept secure. [12 marks]

https

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Encryption

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## Digital certificate

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

<b>Total Marks</b>	
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Examiner Number

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