cea
Rewarding Learning

ADVANCED
General Certificate of Education
2019

Centre Number

Candidate Number

Digital Technology

Assessment Unit A2 1
assessing
Information Systems

[ADT11]
MONDAY 10 JUNE, MORNING

ADT11

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

11992

32ADT1101

1 **(a)** Explain how each of the following resources is used in a network.

Network card

_____

_____

_____

_____

Wireless access point

_____

_____

_____

_____

MAC address

_____

_____

_____

_____ **[6]**

11992

32ADT1102

(b) Distinguish between a local area network (LAN) and a metropolitan area network (MAN).

_____

_____

_____

_____

_____

_____

_____ [4]

(c) Describe the main features of a peer-to-peer network.

_____

_____

_____

_____

_____

_____

_____ [4]

[Turn over

32ADT1103

(d) Evaluate the star topology and the bus topology with respect to data security.

Quality of written communication will be assessed in this question.

_____

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_____

_____ [6]

11992

32ADT1104

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

Name four other layers in the OSI model.

1. _____

2. _____

3. _____

4. _____ [4]

(f) Compare wireless transmission and fibre optic cable from the point of view of bandwidth.

_____

_____

_____

_____

_____

_____

_____

_____ [4]

[Turn over

32ADT1105

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]

11992

32ADT1106

(b) Normalise the data in the table to 3NF, showing all your working.

1NF

2NF

3NF

[6]

11992

(c) Describe the contents of a typical data dictionary.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

11992

32ADT1108

(d) Explain what is meant by each of the following database terms.

Composite key

_____

_____

_____

_____

Foreign key

_____

_____

_____

_____ [4]

[Turn over

11992

32ADT1109

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

Entity

_____

_____

_____

_____

Referential integrity

_____

_____

_____

_____ [4]

11992

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(Questions continue overleaf)

11992

32ADT1111

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.

ActorID	**TC2001**
Name	**Tim Cruise**
ContactNumber	**4455667788**

_____

_____

_____

_____

_____

_____ [3]

11992

32ADT1112

(g) Produce SQL code which will retrieve the **FilmID** and **Title** of all **Horror** films, and display the results by descending **FilmID**.

_____

_____

_____

_____

_____

_____

_____

_____

_____ [5]

[Turn over

11992

32ADT1113

3 **(a)** Explain the term artificial intelligence.

_____

_____

_____

_____ [2]

(b) Explain how the Turing test determines whether a computer can exhibit intelligence equivalent to a human.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [5]

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

Heuristics

_____

_____

_____

_____

_____

_____

Knowledge engineer

_____

_____

_____

_____

_____

_____ [6]

[Turn over

11992

32ADT1115

An expert system can be used to diagnose faults in car engines.

(d) Evaluate this use of an expert system.

Quality of written communication will be assessed in this question.

_____

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_____ [6]

11992

Robots are used by car manufacturers to spray paint cars.

(e) Describe two benefits of using robots in this case.

1. _____

_____

_____

_____

2. _____

_____

_____

_____ [4]

[Turn over

11992

32ADT1117

4 Data mining is widely used by banks.

(a) Explain the term data mining.

_____

_____

_____

_____

_____

_____

_____ [4]

(b) Describe two threats to the privacy of bank customers from the use of data mining.

1. _____

_____

_____

_____

2. _____

_____

_____

_____ [4]

11992

32ADT1118

Banks store personal details of their customers.

(c) Identify four principles of the Data Protection Act.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____ [4]

[Turn over

11992

32ADT1119

(d) Discuss the impact of the Data Protection Act on a bank as an organisation.

_____

_____

_____

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_____ [8]

11992

32ADT1120

Organisations are making increasing use of cloud computing.

(e) Describe two advantages of using cloud computing for email services.

1. _____

_____

_____

_____

2. _____

_____

_____

_____ [4]

[Turn over

32ADT1121

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.

   Parity bits

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   Checksums

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

11992

Echo checking

_____

_____

_____

_____

_____

_____

_____ [12]

[Turn over

32ADT1123

(b) Describe how each of the following methods ensures that transmitted data is kept secure.

https

_____

_____

_____

_____

_____

_____

Encryption

_____

_____

_____

_____

_____

_____

_____

11992

Digital certificate

_____

_____

_____

_____

_____

_____

_____

_____ [12]

11992

32ADT1125

6 Digital Technology has created a range of new ethical problems.

   (a) Explain the main ethical considerations relating to each of the following.

    Online censorship

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

11992

32ADT1126

Automated decision making

_____

_____

_____

_____

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_____

_____ [6]

32ADT1127

(b) 'Copying software is not really stealing'.

Evaluate this statement with respect to relevant legislation.

Quality of written communication will be assessed in this question.

_____

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_____

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_____

_____ [6]

11992

THIS IS THE END OF THE QUESTION PAPER

11992

32ADT1129

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32ADT1130

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32ADT1132