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**ADVANCED SUBSIDIARY GCE UNIT** **2506**

# COMPUTING

Introductory Computer Systems, Communications and Software

**MONDAY 15 JANUARY 2007** Afternoon

Time: 1 hour 30 minutes

No additional materials are required.

Candidate Name

Centre Number

Candidate Number

**INSTRUCTIONS TO CANDIDATES**

- Write your name, Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- If you run out of space for an answer, continue on the spare pages at the back of the booklet.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

**INFORMATION FOR CANDIDATES**

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 90 (86 + 4 for the quality of written communication).
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.
- No marks will be awarded for using brand names of software packages or hardware.

| For Examiner's Use | | |
|---|---|---|
| Question no. | Max. mark | Mark |
| 1 | 4 | |
| 2 | 8 | |
| 3 | 6 | |
| 4 | 11 | |
| 5 | 8 | |
| 6 | 6 | |
| 7 | 6 | |
| 8 | 8 | |
| 9 | 11 | |
| 10 | 13 | |
| 11 | 5 | |
| WC | 4 | |
| Total | 90 | |

This document consists of **14** printed pages and **2** lined pages.


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Answer **all** questions.

**1** **(a)** State what is meant by

**(i)** systems software .....

..... [1]

**(ii)** applications software .....

..... [1]

**(b)** Give an example of a type of applications software and state what it may be used for.

Type .....

.....

Use .....

..... [2]

**2** **(a)** Describe how each of the following is used to input data to a computer system.

**(i)** MICR .....

.....

.....

..... [2]

**(ii)** OCR .....

.....

.....

..... [2]

**(b)** **(i)** State an application for which the use of OMR would be suitable.

..... [1]

**(ii)** Explain why OMR is suitable for the application which you have chosen.

.....

.....

.....

..... [3]

**3** An automatic teller machine (ATM) deals with customer requests by using both batch and real-time modes of computer system use.

**(a)** Describe what is meant by a batch mode of use and give an example of its use with an ATM.

Batch .....

.....

.....

.....

Use .....

..... [3]

**(b)** Describe what is meant by a real-time mode of use and give an example of its use with an ATM.

Real-time .....

.....

.....

.....

Use .....

..... [3]

**4** The office manager in a doctors' surgery has decided to buy some new computers for the surgery. It is decided to network the computers.

**(a)** State **two** advantages and **one** disadvantage (apart from cost) of networking the computers rather than using stand-alone machines.

Advantage 1 .....

.....

Advantage 2 .....

.....

Disadvantage .....

..... [3]

**(b)** **(i)** State **two** differences between a local area network and a wide area network.

1 .....

.....

2 .....

..... [2]

**(ii)** State **one** extra piece of hardware and **one** extra piece of software necessary if it is decided to connect the network to the Internet.

Hardware .....

.....

Software .....

..... [2]

**(c)** Data is transmitted over a network using either circuit switching or packet switching.

Explain what is meant by these methods, giving an advantage of each.

**(i)** Circuit switching .....

.....

Advantage .....

..... [2]

**(ii)** Packet switching .....

.....

Advantage .....

..... [2]

**5** **(a)** Explain what is meant by a protocol.

.....

.....

.....

..... [2]

**(b)** When data is sent from one device to another, errors can occur in the transmitted data.

Explain how each of the following can be used to detect transmission errors.

**(i)** Parity checks .....

.....

.....

.....

.....

..... [3]

**(ii)** Check sums .....

.....

.....

.....

.....

..... [3]

**6** **(a)** State **three** features that may be seen on a form-based user interface.

1 .....

.....

2 .....

.....

3 .....

..... [3]

**(b)** A telephone operator takes calls from members of the public who want a quote for car insurance. The operator asks them for details which he inputs to a computer terminal.

Explain why the operator uses a form-based interface to input the data to the computer.

.....

.....

.....

.....

.....

..... [3]

**7** **(a)** The following four bytes of data have been received after being transmitted from one piece of hardware to another.

10110110 11010000 10101010 10001111

One of the four bytes has been rejected.

**(i)** State which byte has been rejected.

..... [1]

**(ii)** Explain why this byte has been rejected.

.....

.....

.....

..... [2]

**(b)** Calculate the sum of the following four bytes.
Show your working.

01001000
10000100
00010001
00010010
_____

[3]

**8** This question is about different types of access to data held in storage.

**(a)** A bank holds a file of customer account details. This file is used in the production of monthly statements for customers.

Explain why this file is accessed sequentially.

.....

.....

.....

..... [2]

**(b)** Customers expect to be able to enquire about the details of their accounts over the telephone.

**(i)** Explain why sequential access to data is **not** suitable for this.

.....

.....

.....

..... [2]

**(ii)** State a more suitable type of access to the data, justifying your answer.

Type .....

Justification .....

.....

..... [2]

**(c)** Customer transactions are stored on a temporary file in the order in which they occur.

State a type of file access most suitable for the data in this file, justifying your answer.

Type .....

Justification .....

.....

..... [2]

9 **(a)** When a program is written in a high level language, it must be translated before a computer is able to run it.

State what is meant by

**(i)** source code .....

..... [1]

**(ii)** object code .....

..... [1]

**(b)** Programs often contain programming errors.

State what is meant by the following types of error, giving an example of each.

**(i)** Arithmetic error .....

.....

Example .....

..... [2]

**(ii)** Syntax error .....

.....

Example .....

..... [2]

**(c)** A program module is tested by using black box and white box testing.

State what is meant by

**(i)** black box testing .....

..... [1]

**(ii)** white box testing .....

..... [1]

**(iii)** This module is combined with other modules to create a complete program. All the modules are fully tested and work properly.

Explain why the program might not work.

.....

.....

.....

.....

.....

..... [3]

**10** **(a)** Give an example of each of the following data structures and state a feature of each.

**(i)** LIFO

Example .....

Feature .....

..... [2]

**(ii)** FIFO

Example .....

Feature .....

..... [2]

**(b)** Details about members in a sports club are stored in a linked list, indexed by the members' names in alphabetic order.

**(i)** Draw a diagram to show the following names in the list.

DRAVID ALHAQ MARSHALL KALLIS

[4]

**(ii)** Explain how to search the linked list for a particular member's details when all the members have been added.

.....

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.....

.....

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.....

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..... [5]

**11** **(a)** State what is meant by a

**(i)** procedure .....

..... [1]

**(ii)** function .....

..... [1]

**(b)**

```
TEST (X)
   IF X = 1   THEN
      TEST = 1
   ELSE
      TEST = X + TEST (X – 1)
END TEST
```

**(i)** State the output from this algorithm when the initial value of X is 3.

..... [1]

**(ii)** Identify, from the algorithm, reasons why this is an example of recursion.

.....

.....

.....

..... [2]

If you use these lined pages to complete the answer to any question, the question number **must** be clearly shown.

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