

**ADVANCED SUBSIDIARY GCE  
 COMPUTING**

**2506**

Introductory Computer Systems, Communications and Software

**FRIDAY 16 MAY 2008**

Morning  
 Time: 1 hour 30 minutes

Candidates answer on the question paper

**Additional materials:** No additional materials are required



Candidate Forename

Candidate Surname

Centre Number

Candidate Number

**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.
- Additional answer space is available on the lined pages at the back of this booklet. Answers on these pages **must** be clearly numbered.

**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** of which 4 marks are allocated to the assessment of the quality of written communication.
- No marks will be awarded for using brand names of software packages or hardware.

| FOR EXAMINER'S USE |  |
|--------------------|--|
| 1                  |  |
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| TOTAL              |  |

This document consists of **13** printed pages and **3** lined pages.

Answer **all** questions.

1 (a) State **three** characteristics of a menu based human computer interface (HCI).

Characteristic 1 .....

.....

Characteristic 2 .....

.....

Characteristic 3 .....

.....[3]

(b) (i) State an application of a computer system which would use a menu based HCI, giving **two** reasons why a menu based HCI is appropriate.

Application .....

.....

Reason 1 .....

.....

Reason 2 .....

.....[3]

(ii) State **two** peripheral devices necessary for your application, justifying your choices.

Device 1 .....

.....

Justification .....

.....

Device 2 .....

.....

Justification .....

.....[4]



3 (a) Explain why a translator may be needed before a program is run.

.....  
.....  
.....  
.....[2]

(b) Explain how a translator identifies errors in program statements.

.....  
.....  
.....  
.....  
.....  
.....[3]

(c) When computer programs are written, it is important that good programming techniques are used.

Apart from the use of comments in the code, describe **two** other techniques which will make the program code easy to understand.

Technique 1 .....  
.....  
.....  
.....[2]

Technique 2 .....  
.....  
.....  
.....[2]

4 Primary memory consists of ROM and RAM.

(a) The boot program is stored in ROM in a personal computer.

(i) State what is meant by the boot program.

.....  
.....[1]

(ii) Explain why the boot program is stored in ROM rather than RAM.

.....  
.....  
.....  
.....[2]

(b) State **three** different types of information which would be held in RAM while the computer is working.

Type 1 .....  
.....  
Type 2 .....  
.....  
Type 3 .....  
.....[3]

(c) (i) Explain why ROM would be used to store the application software for a microprocessor-controlled washing machine.

.....  
.....  
.....  
.....  
.....  
.....[3]

(ii) Explain why it is necessary to have a small amount of RAM in the washing machine.

.....  
.....  
.....  
.....[2]

5 (a) (i) Write the decimal number 93 in binary in a single byte.

.....  
.....  
.....  
.....[2]

(ii) Write the decimal number 93 in octal (base 8).

.....  
.....  
.....  
.....[2]

(iii) Describe the relationship between binary and octal representations.

.....  
.....  
.....  
.....[2]

(b) (i) Write the decimal number -93 as a two's complement binary number using a single byte.

.....  
.....  
.....  
.....[2]

(ii) Write the decimal number -77 as a two's complement binary number using a single byte.

.....  
.....  
.....  
.....[2]

**(iii)** Add together the two binary numbers which are the answers to **(b)(i)** and **(b)(ii)** using a single byte. Show your working.

.....  
.....  
.....  
.....[2]

**(iv)** Write down the answer to the binary addition as a decimal number and explain the result.

.....  
.....  
.....  
.....[2]

6 (a) Describe the purpose of the following devices in a computer system.

(i) An input device .....  
.....  
.....  
.....[2]

(ii) An output device .....  
.....  
.....  
.....[2]

(b) (i) Explain what is meant by the character set of a computer system.  
.....  
.....  
.....  
.....[2]

(ii) Describe how characters can be represented in a computer system.  
.....  
.....  
.....  
.....[2]



7 (a) Step-wise refinement is used as a technique for writing software.

Explain what is meant by step-wise refinement.

.....  
.....  
.....  
.....[2]

(b) State what is meant by

(i) Black box testing .....

(ii) White box testing .....

(c) Describe **one** advantage and **one** disadvantage of a piece of software being written in modules when it needs to be tested.

Advantage .....

Disadvantage .....

8 A small business has a single office with three stand-alone computers.

It has been decided to network the computers with a central file storage and shared access to peripherals.

(a) Using diagrams or otherwise, describe star and bus topologies which could be used for this network.

(i) Star .....

.....  
.....  
.....  
.....  
.....

[3]

(ii) Bus .....

.....  
.....  
.....  
.....  
.....

[3]

(b) It has been decided to link the network to the Internet.

State **one** extra piece of hardware which would be necessary, giving a reason for your answer.

Hardware .....

Reason .....

.....[2]

(c) When data is sent across the network it can become corrupted.

Name and describe **one** method of detecting such errors.

Name of Method .....

Description .....

.....

.....

.....

.....

.....[4]

(d) When the business expands, more computers are added to the network.

It is found that access to data held on the network is now sometimes unacceptably slow. It has been decided to introduce a distributed system.

(i) Explain why the system has slowed down.

.....

.....

.....

.....[2]

(ii) Describe how the distributed system can help solve the problem.

.....

.....

.....

.....[2]









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