General Certificate of Education
June 2005
Advanced Subsidiary Examination

AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

COMPUTING   **CPT1**

**Unit 1   Computer Systems, Programming
            and Networking Concepts**

Thursday 9 June 2005   Afternoon Session

No additional materials are required.
You may use a calculator.

Time allowed: 1 hour 30 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided. All working must be shown.
- Do all rough work in this book. Cross through any work you do not want marked.

Information
- The maximum mark for this paper is 65.
- Mark allocations are shown in brackets.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.

CPT1

Answer **all** questions in the spaces provided.

1 Software may be classified as *System Software* or *Application Software*.

    (a) Give **three** examples of system software (not product names).

       1 ....

       2 ....

       3 ....

(3 marks)

    (b) Give **three** examples of application software (not product names).

       1 ....

       2 ....

       3 ....

(3 marks)

6

2 (a) The ASCII code for the character '0' (zero) is 00110000. By completing the boxes show how 27 would be represented in a 16 bit word:

(i) as ASCII characters;

(1 mark)

(ii) in Binary Coded Decimal (BCD);

(1 mark)

(iii) in pure binary (unsigned binary).

(1 mark)

(b) Unicode is another coding system for characters. Why is it **not** possible to code 27 into the 16 bit word using Unicode?

....

....

(1 mark)

(c) What is the largest value that can be stored in a 16 bit word when the following coding systems are used?

BCD

Pure binary (unsigned binary)

(2 marks)

6

Turn over ▶

3 Some of the components of a computer system are

Internal components

Clock	1
Data Bus	2
Address Bus	3
Main Memory	4
VDU Controller	5
Keyboard Controller	6
Disk Controller	7

Peripherals

Keyboard	8
Monitor	9
Secondary Storage	10

(a) **Figure 1** is partially filled in. Complete **Figure 1** by writing a number from the list above, in **each** empty circle.
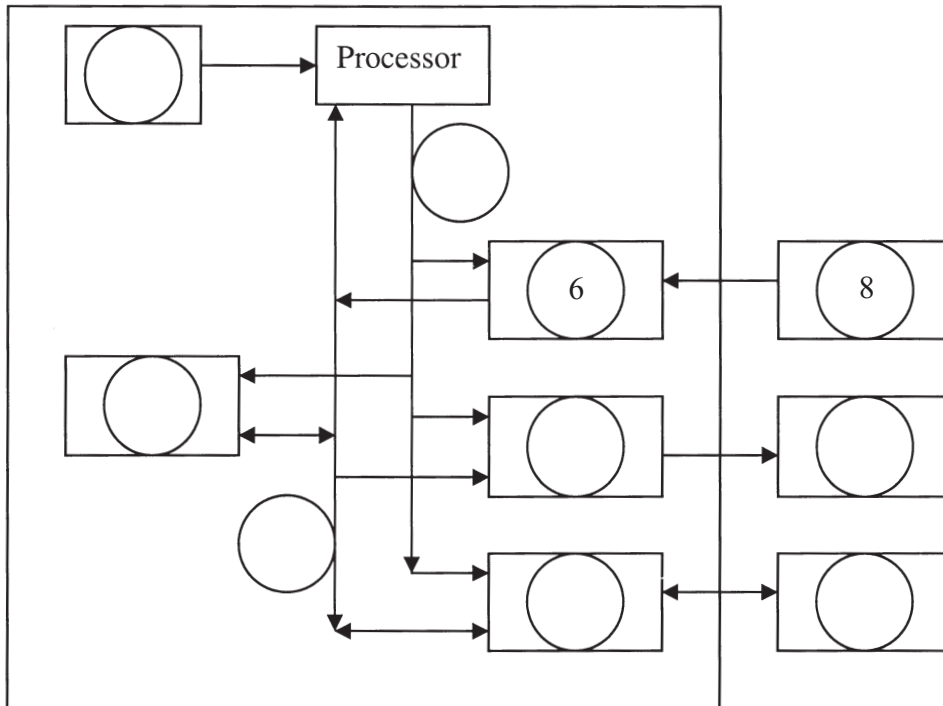
Figure 1

(6 marks)

(b) The above computer system uses the *stored program concept*. Explain this term.

....

....

....

....

(1 mark)

4 A computer system, connected to a microphone, can be used to record sound.

| Microphone | → | Device 1 | → | Computer System |
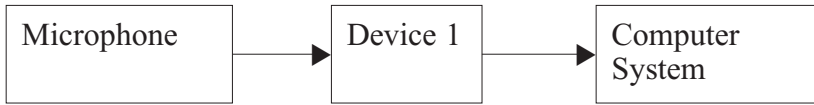
Figure 2

(a) (i) In **Figure 2** name the device labelled Device 1.

Device 1 ....
(1 mark)

(ii) Why is this device necessary?

....

....

....
(2 marks)

The sound can subsequently be reproduced.

| Computer System | → | Device 2 | → | Amplifier | → | Device 3 |
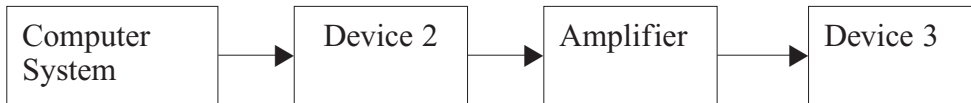
Figure 3

(b) In **Figure 3** name the devices labelled Device 2 and Device 3.

Device 2 ....

Device 3 ....
(2 marks)

(c) Describe how sound is encoded when it is stored in a computer system.

....

....

....

....
(2 marks)

(d) Give **two** features of the coding system that will affect the quality of the sound that is reproduced.

1 ....

2 ....
(2 marks)

Turn over ▶

5


```
  0    1    0    0    1    1    0    1    0    1    1
  C    B                   Data                      A
```
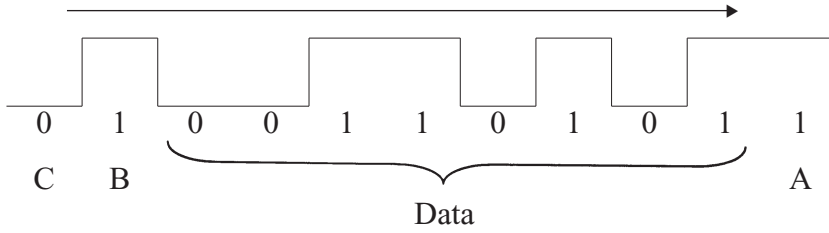
Figure 4

(a) **Figure 4** represents asynchronous data being transmitted using odd parity in the direction of the arrow. Give the name and the purpose of **each** of the following bits.

   (i)   bit A

       Name ....

       Purpose ....

       ....

                                              (2 marks)

   (ii) bit B

       Name ....

       Purpose ....

       ....

                                              (2 marks)

   (iii) bit C

       Name ....

       Purpose ....

       ....

                                              (2 marks)

(b) What is meant by:

(i) baud rate; ....

....

(1 mark)

(ii) bit rate; ....

....

(1 mark)

(iii) bandwidth? ....

....

(1 mark)

(c) The baud rate and the bit rate of a communication channel may be different. Explain how this can occur.

....

....

....

....

(2 marks)

$\frac{}{11}$

TURN OVER FOR THE NEXT QUESTION

Turn over ▶

6 The following code is part of a high level program

       Var Name: String;
       Var Hours: Integer;
       Var RateOfPay: Real;
          •
          •
          •

       Function CalculatePay(InHours: Integer; InRateOfPay: Real): Real;
        Var Total: Real;
          •
          •
          •
          •

(a)   (i)   Name a global variable in the above code.

....

(1 mark)

    (ii)   Name a local variable in the above code.

....

(1 mark)

(b)   Procedures and functions are often *self-contained*. What is meant by the term self-contained in this context?

....

....

(1 mark)

(c)   Give **one** reason why the use of global variables may introduce program bugs.

....

....

(1 mark)

7 (a) In the context of data structures what is meant by the terms:

(i) FIFO; ....

(ii) LIFO? ....

(2 marks)

(b) Queue and stack are examples of data structures. Tick in the following table to indicate whether they are FIFO or LIFO data structures.

	FIFO	LIFO
Queue		
Stack		

(2 marks)

(c) Describe **one** example of the use of a stack.

....

....

....

(2 marks)

(d) Describe **one** example of the use of a Binary Search Tree.

....

....

....

(2 marks)

8

TURN OVER FOR THE NEXT QUESTION

8 (a) What is meant by **each** of the following?

(i) Internet

....

....
(1 mark)

(ii) World Wide Web

....

....
(1 mark)

(iii) Local Area Network

....

....
(1 mark)

(iv) Wide Area Network

....

....
(1 mark)

(v) Intranet

....

....
(1 mark)

(b) Give an example of:

(i) a domain name;

....
(1 mark)

(ii) an IP address.

....
(1 mark)

7

9 The following algorithm uses an array Values that contains the integers 4,7,9.

(a) Dry run this algorithm by using the trace table below.

```
Last ← 3
New ← 6
Ptr ← 1
WHILE(New > Values[Ptr])
    Ptr ← Ptr + 1
ENDWHILE
WHILE (Last >= Ptr)
    Values[Last+1] ← Values[Last]
    Last ← Last – 1
ENDWHILE
Values[Ptr] ← New
```

New	Last	Ptr	Values				
			[1]	[2]	[3]	[4]	[5]
6	3	1	4	7	9		

(6 marks)

(b) What is the purpose of this algorithm?

....

....

(1 mark)

7

END OF QUESTIONS

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE