



**COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1**

Tuesday 16 November 2010 (afternoon)

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Section A: answer all the questions.
- Section B: answer all the questions.

SECTION A

Answer **all** the questions.

1. (a) Outline the purpose of the *systems life cycle* model. [2 marks]
 (b) Identify the stage of the systems life cycle in which a feasibility report is prepared. [1 mark]

2. Customer orders are collected on paper, keyed in, and stored in the *customer orders file*. A stock *master file* is searched to determine whether sufficient stock is available and an appropriate report is produced.
 Construct a *systems flowchart* representing the process described above. [5 marks]

3. Draw a labelled diagram representing the basic structure of the *central processing unit* (CPU). [4 marks]

4. Outline **one** example of *online processing*. [2 marks]

5. (a) Convert, showing your working, the decimal number 205 into binary. [2 marks]
 (b) Convert the binary number 1010 1001 into hexadecimal. [1 mark]

6. Describe the *phased introduction* method of implementing a new system. [2 marks]

7. Data is collected by groups of students on a field trip, and later transferred to a central computer.
 (a) Identify **one** method of *data capture*. [1 mark]
 (b) Identify **one** method of transferring data from the field to the central computer. [1 mark]
 (c) There have been concerns about the accuracy of the data. Outline how *verification* and *validation* can be used to ensure it is as accurate as possible. [4 marks]

8. State the nature of the Boolean data type. [1 mark]

9. Define the terms *local area network* (LAN) and *wide area network* (WAN). [2 marks]

10. State **two** types of *utility software*. [2 marks]

SECTION B

Answer *all* the questions.

11. Consider the following method.

```
static void calc(int d, int q)
{
    int r = 0, p = 0;
    while (q >= d * p)
    {
        p = p + 1;
    }
    p = p - 1;
    r = q - (d * p);
    output("p = " + p);
    output("r = " + r);
}
```

(a) Construct the trace table, started below, for the method call `calc(8, 37)`. [5 marks]

d	q	p	r	q >= d * p	output

(b) In the method, identify

(i) the *parameters*; [2 marks]

(ii) the *local variables*. [2 marks]

(c) Assuming that the arguments are both positive, state the operation performed by this method. [1 mark]

- 12.** A digital music player stores a song as a file of numbers (each of which is called a sample) that are converted to a signal for the audio speaker or headphones.
- (a) Define the term *analog data*. [1 mark]
 - (b) Define the term *digital data*. [1 mark]
 - (c) Identify **one** example of analog data and **one** example of digital data in a digital music player. [2 marks]
 - (d) A CD-quality recording requires 44100 samples for every second of time and each sample is a 16-bit integer (2 bytes).
 - (i) Outline how the number of kilobytes required for a CD-quality recording of a 3-minute song would be calculated. [2 marks]
 - (ii) State the type of software that could be used to reduce the size of the recording. [1 mark]
 - (e) Discuss **one** ethical issue created by the availability of digital music recordings on a computer network. [3 marks]
- 13.** A school has a *local area network* (LAN) used by students, teachers and administrators. The LAN is not connected to the Internet.
- (a) Student marks are stored on a server that is connected to the network. Identify ways in which the data could be protected so that only teachers can change the marks. [2 marks]
- It is suggested that all students be given internal e-mail accounts on the system.
- (b) Identify **two** possible technical issues that might result from providing e-mail access to the students. [2 marks]
 - (c) Discuss **two** possible social/ethical issues that might result from providing e-mail access to the students. [6 marks]
- 14.** A particular computer is designed to work with non-volatile memory in place of a disk drive.
- (a) Draw a block diagram of the computer showing the CPU, cache, primary memory and non-volatile memory. [4 marks]
 - (b) Outline the function of cache memory. [2 marks]
 - (c) Explain reasons for having both volatile and non-volatile memory in a computer. [4 marks]