



22087013



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**COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1**

Thursday 22 May 2008 (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. State **two** features you would expect to find in a *feasibility report*. [2 marks]
2. Outline **two** differences between an *interpreter* and a *compiler*. [2 marks]
3. Outline the meaning of the term *register* in relation to computer architecture. [2 marks]
4. Outline the **four** steps in the *machine instruction cycle*. [4 marks]
5. Describe the role of a *router* in a computer network. [2 marks]
6. (a) Express 1101010_2 as a *hexadecimal* number. [2 marks]
(b) Express 85_{10} as a 7-bit *binary* number. [2 marks]
7. (a) Define the term *analogue data*. [1 mark]
(b) Define the term *digital data*. [1 mark]
(c) Explain **one** situation where analogue data requires conversion to digital data before it can be stored in a computer system. [2 marks]
8. Outline **one** way that a *data entry error* can occur. [1 mark]
9. Outline the main function of *data compression utility software*. [1 mark]

10. Consider the following code segment.

```
int x = 2;  
int a[] = {12, 23, 34, 45, 23, 21, 2};  
output(a[x+3]);
```

(a) State the value of the array index at line `output(a[x+3]);` . [1 mark]

(b) State the value printed by the line `output(a[x+3]);` . [1 mark]

11. Describe **one** technique that can be used to ensure *data integrity* during the transmission of data. [2 marks]

12. Describe the features of a hard disk system that allows *direct access* to data stored in a file on a disk. [4 marks]

SECTION B

Answer *all* the questions.

13. Study the algorithm shown below and answer the questions that follow.

```

public class Prog
{ public static void main(String args [])
  { new Prog();
  }

  public Prog()
  { String s = "xxx";
    getData(s);
    output("end");
  }

  void getData(String p)
  { String a, b;
    a = inputString("Enter String");
    while (!a.equals(p))
    { b = inputString("Enter String");
      output(zing(a,b));
      a = inputString("Enter String");
    }
  }

  String zing(String a, String b)
  { if (a.length() > 6) return "*****";
    else
    { int d = a.length();
      for (int i=0; i<6-d; i++)
        a = a + " ";
      return (a+b);
    }
  }
}

```

(This question continues on the following page)

(Question 13 continued)

The following pairs of data are entered into the program. The first value is stored in variable `a` and the second in variable `b` in method `getData()`.

Value stored in variable <code>a</code>	Value stored in variable <code>b</code>
abc	defg
abcdef	g
abcdefg	h
ab	cedfg

- (a) Copy and complete the following trace table to show what is output at line `output(zing(a,b))`; for each pair of inputs above.

[3 marks]

<code>a=inputString();</code>	<code>b=inputString();</code>	output
abc		
	defg	

- (b) Explain why the trace does not reach the line `output("end");`.
- (c) Suggest a way to fix this problem.
- (d) Outline the information that is provided by the method signature for the method `zing()`.
- (e) Outline what method `zing()` does and suggest a practical use for the method when outputting a table of data values.

[2 marks]

[1 mark]

[2 marks]

[2 marks]

14. A business operates in five major cities within a country.

In each city, a file stores three fields of data for every product: product code, product name and product price.

The price for each product does not vary from city to city. For example, the price for product A is the same in each city.

Every time the price for an individual product increases or decreases, a central program updates the file in each city. The program does this by opening each file over the network and updating the required data.

The product code is simply a number between 1 and 999.

- (a) Describe **two** *data validation* techniques that could be used to validate a product code when it is entered.

[2 marks]

Sequential file access is used to update individual product prices when they change.

- (b) State **one** disadvantage of using *sequential access* in this way.

[1 mark]

- (c) State an alternative file access method and briefly explain one advantage of using this method.

[2 marks]

- (d) Describe the steps that the central program needs to follow to update the price of a product.

[3 marks]

- (e) Suggest a more efficient method of updating the prices that does not involve as much network access.

[2 marks]

15. A doctors' surgery is considering providing patients with the facility to book appointments via the Internet.

The surgery has four doctors, two administrative staff and one nurse.

Each has a computer and the computers are connected via a *local area network* (LAN).

Currently there is no external access via the LAN to the Internet.

A central database, connected to the LAN, holds the records of all patients.

- (a) Define the difference between a *wide area network* (WAN) and a LAN. [2 marks]
 - (b) Briefly describe **two** functions of the hardware component that will allow the current LAN to connect to the Internet. [2 marks]
 - (c) Discuss **two** benefits the patients would expect to gain by booking online. [2 marks]
 - (d) Explain **two** potential risks in connecting the surgery's LAN to the Internet and for each risk suggest a way to minimise it. [4 marks]
16. A DVD recorder, which is controlled by a microprocessor, can be programmed to record TV programs via a simple interface controlled by a handheld remote control.
- (a) State the name of the DVD's computerised component that controls the DVD recording function. [1 mark]
 - (b) Identify **two** key inputs to this component in relation to the recording function. [2 marks]
 - (c) Describe how these inputs would be stored and retrieved. [2 marks]
 - (d) Explain how the component would control the recording. [3 marks]
 - (e) Identify the name of the type of processing performed by this component. [1 mark]
 - (f) Discuss the key characteristics of the type of processing identified in part (e). [1 mark]
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