Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
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6	
7	
8	
9	
10	
11	
TOTAL	

General Certificate of Education
Advanced Subsidiary Examination
January 2010

Computing COMP2

Unit 2 Computer Components, The Stored Program Concept and The Internet

Thursday 14 January 2010 1.30 pm to 2.30 pm

You will need no other materials.
You must **not** use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- The use of brand names will **not** gain credit.
- Question 6 should be answered in continuous prose. In this question you will be marked on your ability to:
  - use good English
  - organise information clearly
  - use specialist vocabulary where appropriate.

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

1 (a) Put **one** tick on each row of **Table 1** to classify each of (i), (ii) and (iii) as either a URL, a Domain Name, an IP address or a Protocol.

Table 1

		URL	**Domain Name**	**IP Address**	**Protocol**
(i)	http://www.guineas.co.uk				
(ii)	212.58.251.195				
(iii)	guineas.co.uk				

(3 marks)

1 (b) What is the purpose of a Domain Name Server on the Internet?

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.....

(1 mark)

4

2 Simplify the Boolean expression:

$$\overline{A \cdot B} + A$$

Show your working.

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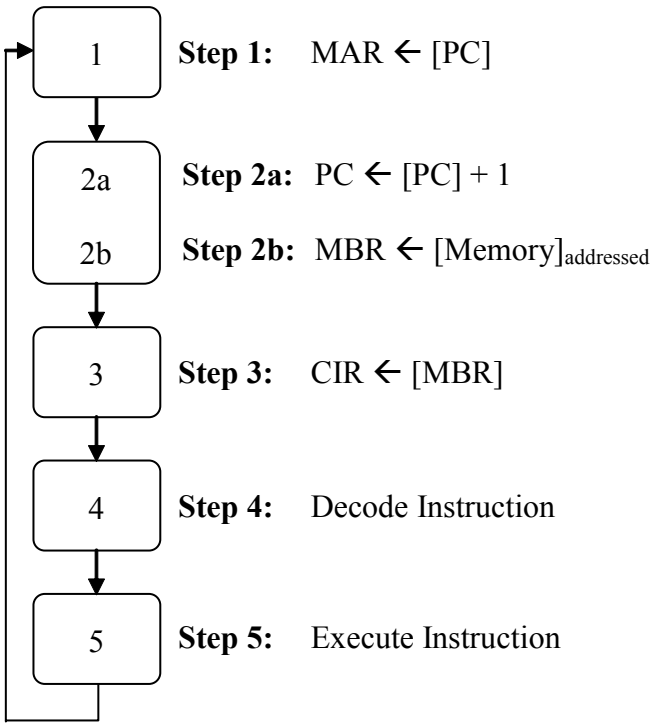
(3 marks)

3

3 **Figure 1** shows the fetch-execute cycle. Steps 2a and 2b occur at the same time.

Figure 1



3 (a) State the full names of **two** of the special purpose registers that are used in the fetch part of the fetch-execute cycle.

Register 1: .....

Register 2: .....

(2 marks)

3 (b) Explain the role of the address bus, data bus and main memory during Steps 1 and 2b.

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(2 marks)

3 (c) Give **one** reason why Steps 2a and 2b are able to occur at the same time.

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(1 mark)

Turn over ▶

5

4 Programs written in a high level language can be compiled or interpreted.

4 (a) Companies that develop computer programs to sell always compile the final version of a program before distributing it to customers.

Explain why a compiler is used to produce the final version of a computer program.

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(2 marks)

4 (b) Scripting programming languages can be used to write programs which are interpreted and executed in a web browser on any Internet user's computer.

Explain why programs written in a scripting language for this purpose are interpreted rather than compiled.

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(2 marks)

4

5 A single accumulator microprocessor supports the assembly language instructions:

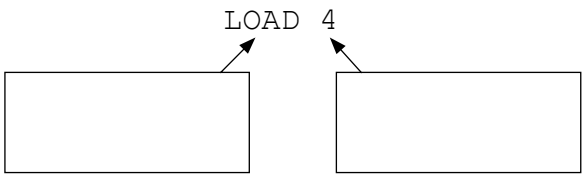
```
LOAD   memory reference
ADD    memory reference
STORE  memory reference
```

An example instruction is:

```
LOAD 4
```

which would copy the contents of the referenced memory location 4 into the accumulator register.

5 (a) (i) Identify which part of the instruction is the *operand* and which part is the *opcode* by writing the words operand and opcode in the two boxes below.



(1 mark)

5 (a) (ii) The accumulator is a general purpose register.

What is a *register*?

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(1 mark)

5 (b) Using the given assembly language instructions, write an assembly language program that adds together the values stored in memory locations 12 and 13, storing the resulting total in memory location 14.

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(3 marks)

5

6 There are three different types of application software. General purpose is one type.

Name the other **two** types, and describe all **three** types. Use examples to illustrate your descriptions.

In your answer you will also be assessed on your ability to use good English, and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

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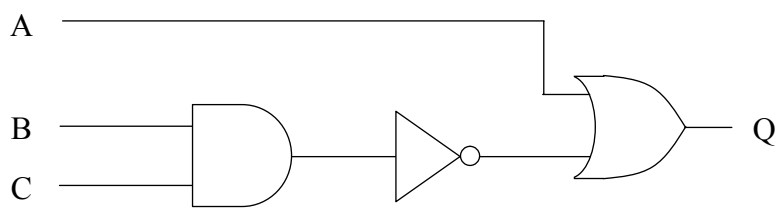
(6 marks)

6

7 **Figure 2** shows a logic circuit.

Figure 2



7 (a) Complete the truth table below for the logic circuit shown in **Figure 2**. Write the correct value of the output Q for each of the listed sets of inputs.

Input A	Input B	Input C	Output Q
1	0	1	
0	1	0	
0	1	1	

(3 marks)

7 (b) Two of the gates in the circuit shown in **Figure 2** could be replaced by a single gate.

7 (b) (i) Which **two** gates could be replaced?

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(1 mark)

7 (b) (ii) What single gate would be used instead?

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(1 mark)

7 (c) Why is it an advantage to use as few gates as possible in a logic circuit?

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(1 mark)

6

8 Computers connected to the Internet use the TCP/IP suite of protocols for data transmission.

8 (a) What is a protocol?

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(1 mark)

8 (b) The TCP/IP stack is divided into four layers. One of these is the application layer protocol.

Table 2 shows four different scenarios that all use the TCP/IP protocol.

Complete **Table 2** by writing the name of the particular application layer protocol that would be used to transfer data during each operation. You must give a different answer in each case.

Table 2

	Operation	**Application Layer Protocol**
(i)	Managing a server remotely	
(ii)	Retrieving e-mail from an e-mail server	
(iii)	Viewing a sports news web page using a web browser	
(iv)	Accessing your online bank account using a web browser	

(4 marks)

5

9 A supermarket uses a computerised stock control system. Each product is identified by a unique product code which is printed on the product as a bar code. The bar codes are input into the stock control system at the till using a bar code reader. One of the digits in the bar code is a check digit.

9 (a) Describe the principles of operation of a bar code reader, **excluding** the use of the check digit.

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(4 marks)

9 (b) Explain the purpose of the check digit.

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(1 mark)

9 (c) Some unpackaged items such as loose fruit and vegetables do not have a product code printed on them.

Name an input device that the till operator could use to enter details of these items.

.....

(1 mark)

6

Turn over ▶

10 **Figure 3** shows the HTML for a web page.

Figure 3

```
<html>
  <head>
    <title>Introduction to Storage Devices</title>
  </head>

  <body>
    <h1>Types of Magnetic Storage Device</h1>
    <p>Some common magnetic storage devices are:</p>
    <ul>
      <li>Floppy Disk Drive</li>
      <li>Hard Disk Drive</li>
      <li>Magnetic Tape</li>
    </ul>
    <p>Data can also be stored
       <a href="optical.htm">optically</a>.
    </p>
  </body>
</html>
```

10 (a) Draw a diagram in the space below to show the appearance of the web page when viewed in a web browser. Use labels to clarify the layout, where necessary.

(6 marks)

10 (b) A Cascading Style Sheet (CSS) is added to the web page. This contains three style rules.

Describe what effect, if any, each of the three rules listed below would have on the appearance of the page. If the rule would **not** change the appearance of the page, state this.

10 (b) (i) `body {background-color: yellow}`

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(1 mark)

10 (b) (ii) `p.dark {font-weight: bold}`

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(1 mark)

10 (b) (iii) `h1 {text-align: center}`

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(1 mark)

9

Turn over for the next question

11 A company that develops computer software has just taken on a new employee.

11 (a) The actions of the employee and company are covered by several laws.

Name the law that would be most relevant in each of the following cases.

11 (a) (i) The employee brings into work a copy of a computer game that he has purchased and already installed on his home computer. He installs it on his work computer.

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(1 mark)

11 (a) (ii) The employee gains access to company confidential data by correctly guessing a manager's username and password.

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(1 mark)

11 (a) (iii) The company issues the employee with a voucher once a year for a free eye test.

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(1 mark)

11 (b) The company makes the employee sign a Code of Conduct before he is allowed to start work.

11 (b) (i) What is a Code of Conduct?

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(2 marks)

11 (b) (ii) Why does the company have a Code of Conduct rather than just expecting employees to obey the law?

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(2 mark)

END OF QUESTIONS

7