

Please write clearly in block capitals.

Centre number

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Candidate number

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Candidate signature

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# AS COMPUTING

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

Tuesday 14 June 2016

Afternoon

Time allowed: 1 hour

## Materials

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

## 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 5(c) 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) (i) State the name of the logic gate that is represented by the truth table below.

Inputs		Output
A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

[1 mark]

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1 (a) (ii) State the name of the logic gate that is represented by the truth table below.

Inputs		Output
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0

[1 mark]

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**Question 1 continues on the next page**

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0 3

1 (b) A fish tank has a controller that can monitor sensors and control external devices.

- Sensor A returns a 1 (true) when the water level is too low and a 0 (false) otherwise
- Sensor B returns a 1 (true) when the water level is too high and a 0 (false) otherwise
- Sensor C returns a 1 (true) when the water temperature is above 28°C and a 0 (false) otherwise
- Sensor D returns a 1 (true) when the water temperature is below 23°C and a 0 (false) otherwise.

The controller also has outputs to the following devices:

- The heater is turned on when output H is 1 (true) and turned off when output H is 0 (false)
- The top-up water pump is on when output J is 1 (true) and turned off when output J is 0 (false)

The controller can also read the current state of both H and J to see whether the devices are turned on or off.

1 (b) (i) The top-up water pump is turned on and off according to the Boolean equation:

$$J = A \cdot \bar{B}$$

Draw the logic circuit corresponding to this equation in the box below.

[2 marks]



1 (b) (ii) A fault alarm should sound when either of the following two conditions are met:

- if the water temperature is above 28°C and the heater is on
- if the water level is too low and the top-up water pump is **not** on.

Write a Boolean equation to represent the logic required to turn the fault alarm on when either or both of these conditions are met.

[3 marks]

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1 (c) **Without** using a truth table, simplify the following Boolean expression:

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

[3 marks]

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**2 (a)** A common misconception is that the Internet is the World Wide Web.

Explain the differences between the Internet and the World Wide Web.

**[4 marks]**

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**2 (b)** **Figure 1** shows a segment of HTML and CSS code taken from a school website.

**Figure 1**

```
<html>
  <head>
    <title>High View Academy</title>
    <link rel="stylesheet" type="text/css" href="theme.css">
  </head>
  <body>
    <p style="text-size: 18pt; color: red;">Important Notice</p>
```

Complete the following table by explaining what the extracts of the code do.

**[2 marks]**

Code	Explanation
<title>High View Academy</title>	
<p style="text-size: 18pt; color: red;">Important Notice</p>	



2 (c) The code in **Figure 1** includes a link to an external stylesheet.

Describe one benefit of using an external stylesheet rather than embedding styles.

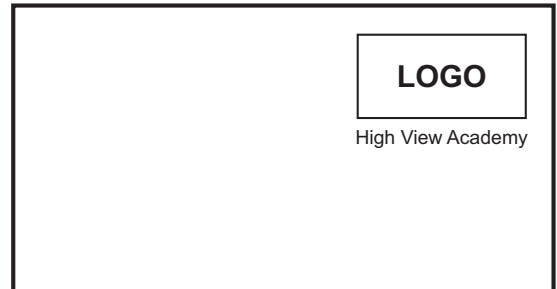
[1 mark]

Four horizontal lines for writing the answer to question 2(c).

2 (d) The sketch shown in **Figure 2** was provided by a web designer along with the code to implement it.

**Figure 2**

```
<div style="text: right;">
<img scr="pictures/schoollogo">
High View Academy
</div>
```



Describe **three** errors in the code provided by the web designer.

[3 marks]

Error 1 \_\_\_\_\_  
\_\_\_\_\_

Error 2 \_\_\_\_\_  
\_\_\_\_\_

Error 3 \_\_\_\_\_  
\_\_\_\_\_

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**3 (a)** Below is a list of different software **classifications**:

1. General purpose application software
2. Utilities
3. Operating systems
4. Translators

Complete each row of the following table with the number from the list above that represents the most appropriate software classification.

**[2 marks]**

<b>Software</b>	<b>Classification (number)</b>
Virus scanner	
Interpreter	
Spreadsheet	

**3 (b)** Another software classification is library programs.

Explain the purpose of library programs.

**[1 mark]**

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**3 (c) (i)** Explain what is meant by an imperative high level programming language. **[2 marks]**

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**3 (c) (ii)** Explain why translators are needed for high level programming languages. **[1 mark]**

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**3 (d)** A company has software made for it.  
Name the classification of this type of software and suggest **one** advantage and **one** disadvantage of obtaining software in this way. **[3 marks]**

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**4** The system bus connects together the processor, main memory and input/output components.

The system bus itself is split into three separate buses: data, address and control.

**4 (a)** State what each of the following components does:

**[3 marks]**

Processor \_\_\_\_\_

\_\_\_\_\_

Main memory \_\_\_\_\_

\_\_\_\_\_

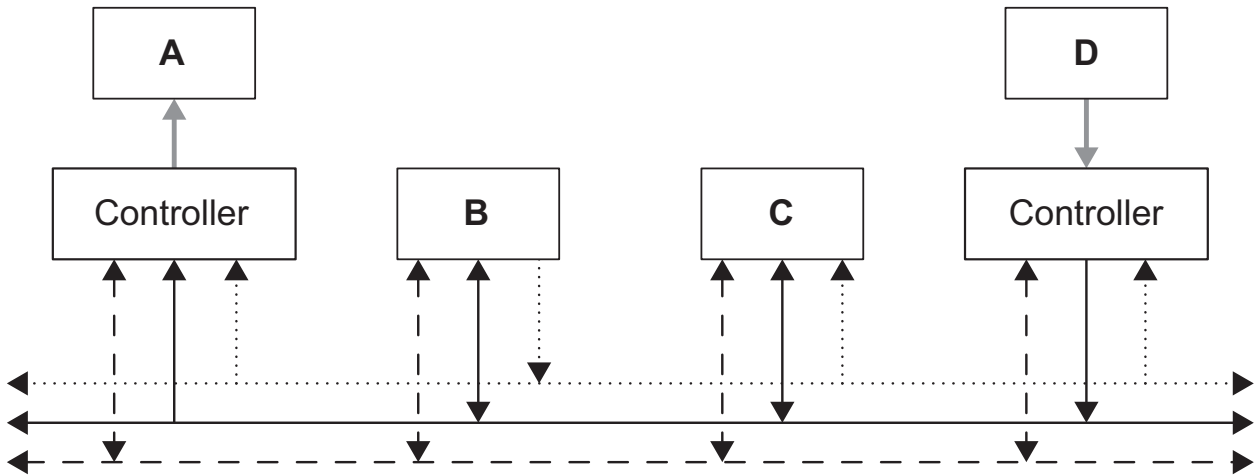
Control bus \_\_\_\_\_

\_\_\_\_\_



4 (b) Figure 3 shows how components of a computer system can be connected.

Figure 3



Write, in the corresponding space below, the correct name for each of the components **A**, **B**, **C** and **D** from **Figure 3** using only the following:

Processor, Address Bus, Control Bus, Data Bus, Hard Disk Drive,  
Main Memory, Visual Display Unit, Keyboard

[4 marks]

- A \_\_\_\_\_
- B \_\_\_\_\_
- C \_\_\_\_\_
- D \_\_\_\_\_

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**5** The configuration file for a school’s firewall contains the following three rules:

Rule 1	ACCEPT	80.1.12.100:22	[SSH]
Rule 2	ACCEPT	* . * . * . * :80	[HTTP]
Rule 3	DENY	* . * . * . * :23	[TELNET]

\* represents all numbers from 0 – 255

**5 (a)** Explain what is meant by an IP address.

**[1 mark]**

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**5 (b) (i)** SSH, HTTP and Telnet are all protocols.

State what is meant by the term protocol.

**[1 mark]**

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**5 (b) (ii)** Explain why the school has set up the firewall so that HTTP requests are accepted from any IP address but Telnet requests are denied.

**[2 marks]**

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**5 (c)** David is a company’s network manager who is away travelling for his summer holiday. Whilst he is on holiday, a security update is released for a critical piece of software running on one of his company’s servers. The update can be downloaded from the FTP server at URL ftp.aqaservertools.com for which David has a username and password.

David has a laptop which has a Telnet client and an FTP client installed on it.

On the company server, David has access to a Telnet server, an FTP server and an FTP client.

**Figure 4** shows this situation.

**Figure 4**

<b>Laptop</b>	<b>Security update server</b>	<b>Company server</b>
IP: 12.23.56.78	ftp.aqaservertools.com	IP: 80.56.34.12
Telnet client FTP client	FTP server	Telnet server FTP client FTP server

David uses his laptop to connect to a local wireless access point.

Explain what is meant by the client server-model and describe the steps David would go through to apply the security update to the company’s server.

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

**[6 marks]**

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**6 (a)** The following is a list of secondary storage devices:

- 1 – Internal hard disk
- 2 – Magnetic tape
- 3 – CD-ROM
- 4 – DVD-ROM
- 5 – USB flash drive

Complete each row in the following table with the number from the list above that represents the most appropriate secondary storage device to use. Your answer should not make use of a secondary storage device more than once.

Situation	Device (number)
Storing a small file (50KB) which is to be transferred from one computer to another	
Distributing the contents of a sound library (3GB) to 2000 owners of a piece of music software	
Storing a backup of the data from a server (2TB)	

**[3 marks]**

**6 (b)** A file is read from a CD-RW, edited and then written back to the CD-RW with a different name.

Explain the principles of operation when:

- reading from a CD-RW
- writing to a CD-RW.

**[3 marks]**

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**7** Company A provides Management Information Systems (MIS) to a group of schools. The MIS allows the school to organise the timetable, classes, students and staff members at the school.

Rather than set up a server inside each school, Company A rents a bank of servers from Company B in a remote data centre.

Each member of staff at a school should only have access to the parts of the system which they need to carry out their job.

**7 (a)** Explain **two** advantages for **Company A** in having servers in the remote data centre instead of having a server at each school that they provide their software on.

**[2 marks]**

Advantage 1 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Advantage 2 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**7 (b) (i)** It is found that a school staff member can see pupil data from another school that the staff member has no connection with.

State which principle of the Data Protection Act has been broken.

**[1 mark]**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**7 (b) (ii)** Company A has become concerned over the location of the servers they rent from Company B.

Explain why the location of the servers they rent from Company B might be a concern in relation to the Data Protection Act.

**[1 mark]**

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