GCSE

4341/01

COMPUTER SCIENCE

UNIT 1: Understanding Computer Science

A.M. WEDNESDAY, 8 June 2016

1 hour 30 minutes plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 0 _____

For Examiner's use only	
Total	

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen or your usual method. Do not use pencil or gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces provided on the front cover.

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Quality of written communication (QWC) will be assessed in question **15**.

Answer ALL questions.

1. **TICK (✓) to show which FOUR of the following items are protocols:** **[4]**

    IP ☐   LAN ☐

    ISP ☐   HTTP ☐

    P2P ☐   FTP ☐

    TCP ☐   ROM ☐

2(a) **Name FOUR components of the Central Processing Unit (CPU) and describe the function of EACH named component.** **[8]**

Component 1 _____

Function _____

_____

_____

_____

_____

Component 2 _____

Function _____

_____

_____

_____

2(a)

Component 3 _____

Function _____

_____

_____

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_____

Component 4 _____

Function _____

_____

_____

_____

_____

2(b) **State the purpose of hardware ports and give an example of a hardware port.** **[2]**

Purpose
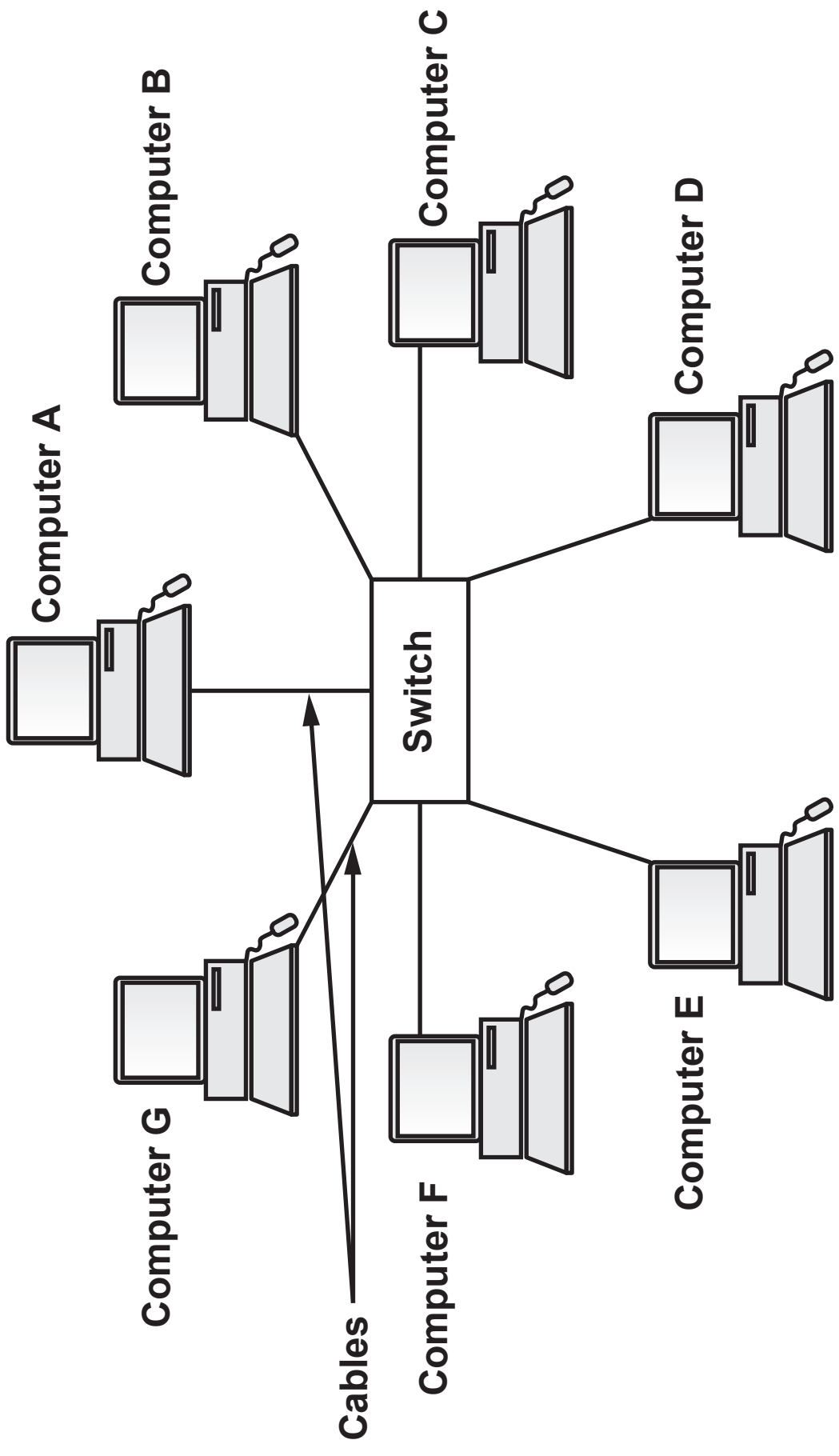
_____

_____

_____

_____

Example of a port

_____

_____

3(a) **A firm of architects store plans for houses using cloud storage. Describe TWO advantages for the architects of using cloud storage compared with other traditional secondary storage methods.   [2]**

Advantage 1 _____

_____

_____

_____

Advantage 2 _____

_____

_____

_____

3(b) **Some of the architects still prefer to store their designs on a traditional secondary storage medium. Give a reason why they might not want to use cloud storage.   [1]**

_____

_____

_____

_____

_____

Computer B

Computer C

Computer A

Computer D

Computer G

Switch

Computer F

Computer E

Cables

4. Opposite is a labelled diagram of a star topology network.

(a) Other than the items labelled on the diagram, state the hardware required by every computer to connect to a network. **[1]**

_____

_____

_____

_____

(b) Describe how a packet is transmitted from computer **A** to computer **D**, including the role of the switch. **[5]**

_____

_____

_____

_____

_____

_____

5. There are many different types of errors that can occur when developing computer programs.

(a) State the name of the TWO different types of programming error described below.

(i) Unexpectedly halts the program. [1]

_____

(ii) The program produces the wrong output.
[1]

_____

(b) Another error can result from incorrectly using the rules or grammar of the programming language.

(i) Name this error. [1]

_____

(ii) State when this error is detected. [1]

_____

_____

_____

_____

6(a) **A software house encourages its programmers to use libraries when developing software.**

Explain why it is good programming practice to use such libraries when developing computer programs.   [4]

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6(b) **If a program calls a library routine that has not been loaded correctly an error occurs. Name this type of error.   [1]**

_____

_____
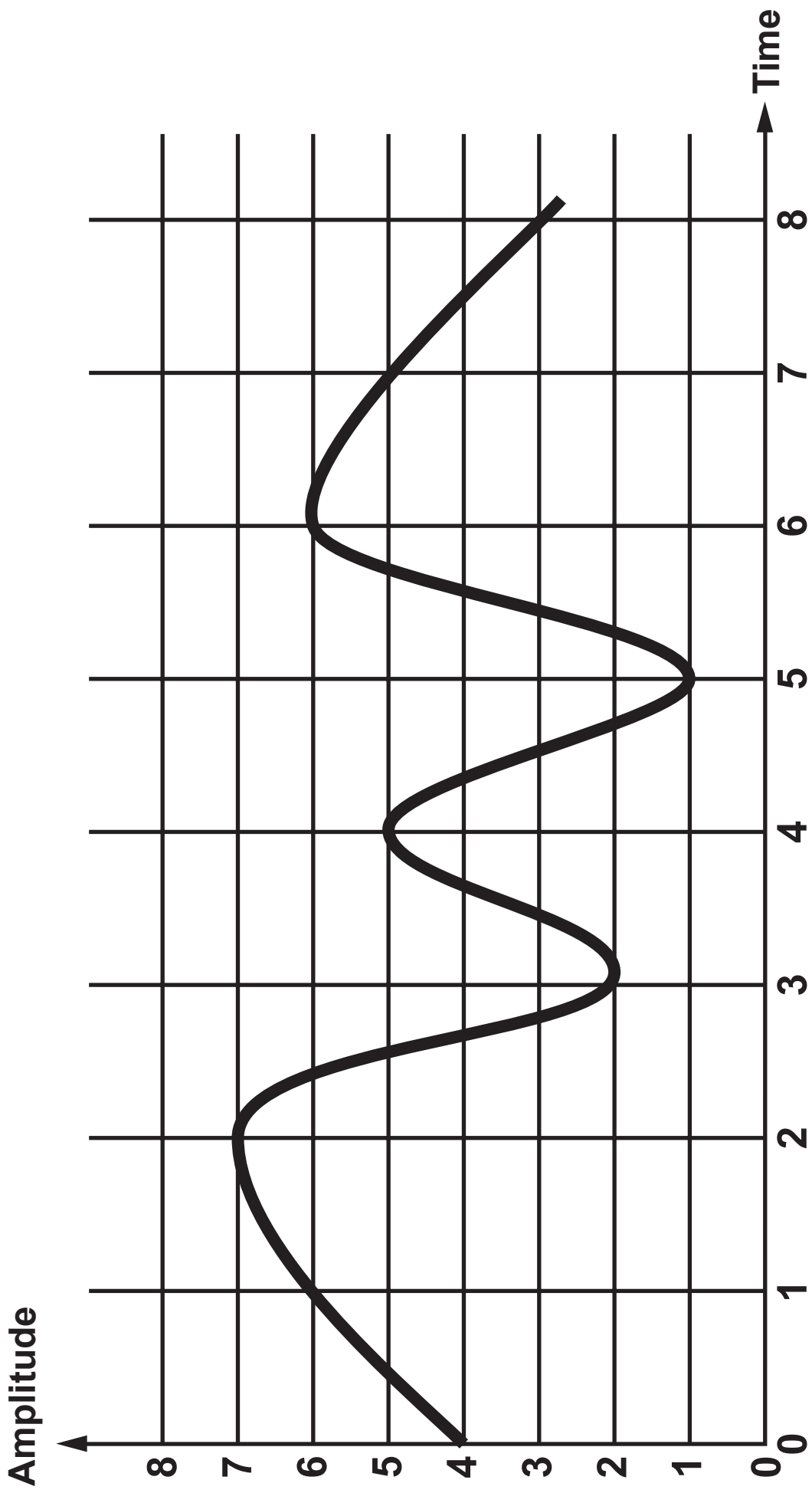
7.   Opposite is a representation of a simple sound wave. The wave is sampled every second and the amplitude is stored as a 4-bit binary number.

(a)   Complete the table below to show how the wave would be represented in binary.   [5]

Time	1	2	3	4	5	6	7	8
Amplitude	6	7	2					3
Binary	0110	0111						0011

USE THE SPACE BELOW FOR YOUR WORKINGS.

7(b) **(i)** State the number of bits required to store the binary data from the completed table.

[1]

_____

_____

(ii) Convert your answer from (b) (i) to bytes.

[1]

_____

_____

(c) Taking a sample every second produces a very poor quality sound. Explain how the sample rate could be altered to improve the sound quality.   **[1]**

_____

_____

_____

_____

7(d) **(i)** If ten samples were taken every second, state the effect on the size of the file. **[1]**

(ii) Calculate the number of bytes required to store the data for the wave when ten samples per second are taken. **[2]**

You MUST show your workings.

_____

_____

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8(a) **Convert the denary number 162 to hexadecimal. Show your workings.   [2]**

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8(b) Convert the hexadecimal number 1E to denary. Show your workings.   [2]

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9. Complete the following TRUTH TABLE. [4]

A	B	A OR B	NOT (A OR B)
1	1		
1	0		
0	1		
0	0		

10. **Describe FOUR features of the operating system when providing a graphical user interface on a personal computer. Give a suitable example of EACH feature.   [8]**

Feature 1 _____

_____

_____

_____

_____

Example _____

_____

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_____

Feature 2 _____

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_____

_____

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Example _____

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Feature 3 _____

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_____

Example _____

_____

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_____

Feature 4 _____

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_____

_____

Example _____

_____

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_____

_____

```
Algorithm June2016

M is integer
P is integer
i is integer

startmainprog

  input M

  for i = 1 to 4
    set P = i * M
    output P
  endfor

endmainprog
```

11. **Opposite is an algorithm.**

Write down all the outputs produced by the algorithm when the value of M input is 3. **[4]**

_____

_____

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```
Total is ?           {stores the total of the numbers
                      input}
Mean is ?            {stores the mean of the numbers
                      input}
Count is ?           {stores the loop control value}

startmainprog

    set Total = 0 {initialise variables}
    set Count = 0

    repeat

        set Count = Count + 1
        set Total = Total + Count

    until Count = 20

    output "The total is ", Total

    set Mean = Total / 20
    output "Mean is ", Mean

endmainprog
```

12. **Opposite is an algorithm.**

The algorithm has three variables.

(a) **State, giving a reason for each, the most suitable data type for the variables below.   [4]**

Variable: MEAN

Data Type _____

_____

Reason _____

_____

_____

Variable: COUNT

Data Type _____

_____

Reason _____

_____

_____

_____

(b) **Some computer languages have local static variables that can only be declared inside a function. Describe the difference between a local variable and a local static variable.   [2]**

_____

_____

_____

_____

_____

_____

13. **Command Line Interfaces (CLI) are often used in the computer industry.**

Describe who might use a CLI and give THREE reasons why they might choose to use a CLI. **[4]**

Who might use a CLI?

_____

_____

_____

Reason 1 _____

_____

_____

_____

_____

Reason 2 _____

_____

_____

_____

_____

Reason 3 _____

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_____

_____

_____

14. Image files can be stored on a computer using lossy or lossless compression.

(a) Compare lossy and lossless compression, in terms of their effect on quality and file size. [2]

_____

_____

_____

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_____

14(b) Give THREE reasons why image files are compressed.   [3]

Reason 1 _____

_____

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_____

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Reason 2 _____

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Reason 3 _____

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(c) **Give TWO examples of metadata that might be stored with an image. [2]**

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15. A small business stores data about customers on its computer system.

   Describe how the business ensures that only employees can access the network. Describe other security measures the business will have in place to limit how data is accessed by employees.

   The business encrypts their data so it cannot be used by hackers even if they gain access to the network. Describe how the data could be encrypted and decrypted by the business.

   Describe the procedures the business should have in place to recover data from a natural disaster. Explain how data would be recovered after a fire destroyed the hard discs holding all the customer data.

   ## Quality of written communication will be assessed in this question. [10 QWC]

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_____

_____

_____

END OF PAPER

40

41

Question number	Additional page, if required. Write the question numbers in the left-hand margin.

43