**GCSE – LEGACY**

**4341/01**

S18-4341-01

**COMPUTER SCIENCE**
**UNIT 1: Understanding Computer Science**

MONDAY, 14 MAY 2018 – MORNING

1 hour 30 minutes

wjec cbac

| For Examiner's use only | |
|---|---|
| **Total** | |

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010001

**INSTRUCTIONS TO CANDIDATES**

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

Write your name, centre number and candidate number
in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation page 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 **14**. The total marks available for this unit is **90**.

*Answer **all** questions.*

1.  Starting with the smallest, complete the table, numbering the units from 1 to 5 in order of data storage capacity. The smallest unit has been completed for you.                                    [4]

| Units | Order (1-5) |
|---|---|
| Gigabyte | |
| Yottabyte | |
| Byte | 1 |
| Exabyte | |
| Kilobyte | |

2.  *(a)*  State what is meant by the term ROM.                                                                      [1]

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    *(b)*  State a feature of ROM and give an example of its use.                                           [2]

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**3.** *(a)* The diagram below shows four components of a Central Processing Unit (CPU). State a purpose of each component. [4]

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        ┌─────────────────────────┐
        │          ALU            │
        ├───────────┬─────────────┤
        │ Registers │             │
        ├───────────┤  Controller │
        │ Internal  │             │
        │ Memory    │             │
        └───────────┴─────────────┘
```
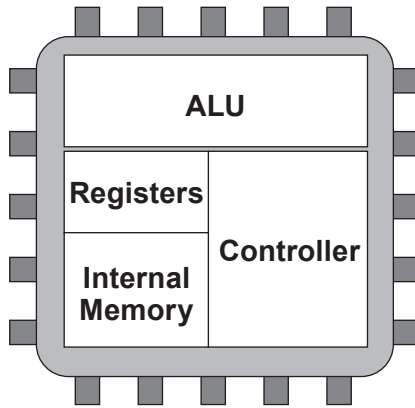
ALU ...........................................................................................................................................

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Registers ...............................................................................................................................

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Internal Memory .....................................................................................................................

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Controller ...............................................................................................................................

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*(b)* Buses allow data to be transferred to different parts of the computer. Name the **two** main buses that are used by the CPU. [2]

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*(c)* Describe **one** possible benefit of a dual core CPU. [2]

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**4.** *(a)* Data is split into packets before transmission over a network. Name the **two** protocols that
allow packets to be sent and received. [2]

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*(b)* Describe the contents of a packet. [5]

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*(c)* Describe packet switching. [3]

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**5.** Many different data types can be stored on a computer system. Five common data types are string, Boolean, real, character and integer. Give suitable examples of data that could be held in each data type using the table below: [5]

| Data type | Example |
|---|---|
| **String** | |
| **Real** | |
| **Boolean** | |
| **Character** | |
| **Integer** | |

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**6.** *(a)* The American Standard Code for Information Interchange (ASCII) is a character set. State how many bits are used in this character set. [1]

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*(b)* Explain the limitations of this character set. [2]

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**7.** Calculate the size of files A, B and C using the following compression ratios. [3]

| File | Size before Compression | Compression Ratio |
|---|---|---|
| File A | 9000 KB | 10:1 |
| File B | 5000 KB | 16:2 |
| File C | 3000 KB | 15:2 |

**File A**

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**File B**

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**File C**

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**8.** There are many different types of network topology. State the most suitable topology for the following and **explain** how the topology will meet the requirement. [9]

(a) **Offers good security**

**Topology**

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**Explanation**

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(b) **Network needed for a short time (temporary)**

**Topology**

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**Explanation**

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(c) **Avoids collisions**

**Topology**

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**Explanation**

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**9.** Below is an algorithm that calculates rewards for sales staff.

```
Sales is real
Customers is integer

startmainprog

 input Sales
 input Customers

 if ((Sales > 500) OR ((Sales > 300) AND (Customers>9))) then
        output "Bonus Awarded"
 else
        output "No Bonus"
 end if
end subroutine
```

Complete the table below stating what the output will be: [4]

| Inputs | Output |
|---|---|
| Sales = 600<br>Customers = 9 | |
| Sales = 300<br>Customers = 10 | |
| Sales = 420<br>Customers = 9 | |
| Sales = 350<br>Customers = 12 | |

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**10.** *(a)* Explain why hexadecimal numbers are used in computer science. [2]

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*(b)* Convert the $11111100_2$ binary number to hexadecimal.
Show your workings. [2]

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*(c)* Convert the denary number $138_{10}$ to hexadecimal.
Show your workings. [2]

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*(d)* Convert the hexadecimal number $5D_{16}$ to denary.
Show your workings. [2]

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**11.** *(a)* Name the legislation (law) that was introduced to try to prevent malicious damage to a computer system. [1]

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*(b)* A virus checker aims to prevent malicious damage. Identify **three** typical functions carried out by this software. [3]

**Function 1** ....................................................................................................................

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**Function 2** ....................................................................................................................

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**Function 3** ....................................................................................................................

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*(c)* State the role of a firewall. [1]

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*(d)* Identify **three** typical functions of a firewall. [3]

**Function 1** ....................................................................................................................

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**Function 2** ....................................................................................................................

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**Function 3** ....................................................................................................................

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**12.** The operating system manages resources and provides the human computer interface.

   *(a)*    Give **three** reasons why a train ticket system would use a touch sensitive interface.   [3]

**Reason 1** ....................................................................................................................................

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**Reason 2** ....................................................................................................................................

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**Reason 3** ....................................................................................................................................

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   *(b)*    Explain how the operating system manages printing.   [2]

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   *(c)*    Explain how the operating system manages the processor.   [2]

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   *(d)*    Explain how the operating system manages RAM.   [2]

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**13.** The following program is intended to calculate a total mark achieved by one student who has taken four tests. The program contains **two** errors. [4]

```
Total is integer
Count is integer
Mark is integer

Total = 0

for Count = 1 to 4

   ipnut Mark

   Total = Total – Mark

next Count
```

Name the errors and write down the corrected code.

**Error type 1**

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**Corrected code 1**

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**Error type 2**

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**Corrected code 2**

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**14.** Software Development Environments (IDE) provide programmers with various tools that are needed to develop computer programs. Identify **five** tools and explain how these tools are used during the development of a computer program. [12 QWC]

*Quality of written communication will be assessed in this question.*

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**END OF PAPER**

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| Question number | Additional page, if required. Write the question number(s) in the left-hand margin. | Examiner only |
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