OCR
Oxford Cambridge and RSA

Monday 15 November 2021 – Afternoon

GCSE (9–1) Computer Science

J276/01 Computer systems

Time allowed: 1 hour 30 minutes

Do not use:
- a calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.

INFORMATION
- The total mark for this paper is **80**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- This document has **12** pages.

ADVICE
- Read each question carefully before you start your answer.

1 A computer system has a 2.5 GHz processor and 5 GB of RAM.

(a) Complete the paragraph about memory by writing the missing terms in the spaces, using the words provided.

cache	data	hard drive	instructions	changed	closing
operator	primary	random	read	secondary	start-up
translator	memory stick	virtual	write		

ROM stands for ..... only memory. This stores the ..... instructions for a computer and cannot be ..... .

RAM stands for ..... access memory. This stores the instructions and ..... that are currently being used. If the computer does not have enough RAM to run a process it can make use of ..... memory.

RAM and ROM are both examples of ..... memory. Memory located close to the processor that allows faster access than from RAM is called ..... memory. **[8]**

(b) **(i)** State the purpose of a CPU.

.....

..... **[1]**

(ii) State what is meant by a single core 2.5 GHz processor.

.....

.....

.....

..... **[2]**

(c) Von Neumann architecture includes registers.

Identify **two** registers used in Von Neumann architecture.

1 .....

2 .....

[2]

2 Layla uses her computer to create educational games.

Layla makes use of system software.

(a) One type of system software is the operating system.

Identify and describe **two** functions of an operating system.

Function 1 .....

Description .....

.....

.....

.....

Function 2 .....

Description .....

.....

.....

.....

[6]

(b) Layla also uses utility system software.

(i) State the purpose of utility system software.

.....

..... **[1]**

(ii) Layla uses a backup utility. She performs both full and incremental backups.

Explain the reasons why Layla performs both full and incremental backups.

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.....

.....

..... **[3]**

(c) When Layla has finished her educational game, she is going to release it as open source.

Give **one** benefit and **one** drawback of Layla releasing her game as open source.

Benefit .....

.....

Drawback .....

.....

[2]

3 A technology company brings out new, updated devices twice a year.

(a) Describe the environmental impacts of the company bringing out new devices twice a year.

.....

.....

.....

..... **[2]**

(b) Describe the cultural impacts of the company bringing out new devices twice a year.

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.....

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..... **[2]**

4* A school asks its students to bring in their own electronic devices (e.g. tablets, laptops, mobile phones) to use in lessons instead of purchasing new equipment.

Discuss the issues surrounding students bringing their own devices. Include in your discussion:

- ethical issues
- legal issues
- privacy issues.

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..... **[8]**

5 A program is being created to convert the data capacity of a storage device into a different measure.

The function, `calculate()`, takes the measurement (e.g. gigabytes) and the number (e.g. 2) as two parameters. It then returns the value in bits. The function returns –1 if an invalid measurement was entered.

Complete the function `calculate`

```
function calculate(....., number)
  if measurement == "gigabytes" then
    value = number * 1024 * 1024 * 1024 * 8
  elseif measurement == "....." then
    value = number * 1024 * 1024 * 8
  elseif measurement == "....." then
    value = number * 1024 * 8
  elseif measure == "bytes" then
    value = number * .....
  else
    .....
  endif
  return .....
endfunction
```

[6]

6 Charlie has purchased a new tablet computer. The tablet has an internal secondary storage device.

(a) Describe what the internal secondary storage device will store.

.....

.....

.....

..... **[2]**

(b) The storage device is a solid state device.

(i) Give **three** benefits of the tablet having a solid state device instead of a magnetic device.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) Give **two** drawbacks of the tablet having a solid state device instead of a magnetic device.

1 .....

.....

2 .....

.....

[2]

7 A university has buildings in two sites that are 5 miles apart.

(a) Describe the difference between a LAN and a WAN.

.....

.....

.....

..... **[2]**

(b) Site A has 4 classrooms. Site B has 2 classrooms. The network on each site between the classrooms is a star topology using a switch. The two sites are connected over the Internet.

Complete the network diagram for **site A** of the University.

[2]

(c) Site B has a higher network performance than site A.

(i) Explain how each of the following can contribute to the performance of a network.

Wifi frequency .....

.....

Interference .....

.....

Number of concurrent users .....

.....

Type of network traffic .....

..... **[4]**

(ii) Identify **one** other factor that can contribute to the performance of a network.

.....

..... **[1]**

(iii) The data transmitted between the two sites uses packet switching. Data is transmitted from a computer in site A to a computer in site B.

Describe how packet switching can be used when sending data from one site to the other.

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..... **[4]**

(d) The university want to protect their data against threats when connected to the Internet.

(i) Describe the threat malware can pose to the university's network and give a prevention method that the university can use.

Description .....

.....

.....

.....

Prevention .....

.....

[3]

(ii) Describe the threat a brute force attack can pose to the university's network and give a prevention method that the university can use.

Description .....

.....

.....

.....

Prevention .....

.....

[3]

(e) Data transmitted over the network uses different protocols.

Tick **one** box in each row to identify whether the protocol is related to email, transferring files or accessing websites.

Protocol	Email	Transferring files	Accessing websites
POP			
FTP			
SMTP			
HTTPS			

[4]

(f) The building is considering the implementation of a virtual network.

Describe what is meant by a virtual network.

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.....

..... **[2]**

8 Identify the legislation that relates to the following scenarios:

A programmer wants to protect their work from being copied or distributed.

.....

A person logs into a computer without permission by guessing the password.

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A person makes a request to view financial information held by a public authority.

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A hacker gains access to a company's files over a network without permission.

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A company collects data that it does not need about its customers.

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[5]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).