OCR
Oxford Cambridge and RSA

Practice Paper
GCSE (9–1) Computer Science

J277/01 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. You can use an HB pencil, but only for graphs and diagrams.
• 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 extended response will be assessed in questions marked with an asterisk (*).
• This document has **12** pages.

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

Answer **all** the questions.

1 The ASCII code for the character J is the denary number 74.

(a) (i) State what is meant by a character set.

....

.... **[1]**

(ii) ASCII has 8 bits per character.

Identify the maximum number of different characters that ASCII can represent.

.... **[1]**

(iii) A text file uses the ASCII character set. The text file has 2000 characters in it.

Calculate an estimate of the file size of the text file in Kilobytes. Show your working.

....

....

....

.... Kilobytes

[2]

(iv) Identify **one** other character set.

.... **[1]**

(b) Write the 8-bit binary number for the ASCII character J in the following boxes:

[1]

(c) Give the hexadecimal number for the ASCII character K.
Show your working.

....

....

....

.... **[2]**

(d) A binary shift can be performed on a binary integer.

Identify which shift will multiply a number by 8.

.... **[2]**

2* The use of digital technology in medicine is constantly evolving.

Discuss the impact of digital technology on medicine including:
- diagnosing patients
- treating patients
- storage of records.

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.... **[8]**

Turn over

3 **(a) (i)** The table has **five** components of a computer, and **four** statements.

Tick (✓) **one or more** boxes in each row to identify which component(s) each statement describes.

Statement	MAR	MDR	Cache	Program Counter	RAM
It stores a single address					
It stores frequently used instructions					
It is a register					
It stores all currently running data **and** instructions					

[4]

(ii) Identify the name of **one** register **not** given in **part (a)(i)** and describe its purpose.

Register ....

Purpose ....

....

[2]

(b) Computer A has a single core, 3.2 GHz processor.
Computer B has a single core, 1.2 GHz processor.

Explain why Computer A will usually run faster than Computer B.

....

....

....

.... **[2]**

4 The following paragraph describes embedded systems.

Complete the paragraph by selecting terms from the list and writing them in the correct places. Not all terms are used.

actuator   applications   change   functions   laptop   larger

lights   microprocessor   processor   range   smaller   washing machine

Embedded systems have limited …………………………………………………… . They are often

built into a …………………………………………………… machine. Two examples of embedded

systems are a ………………………………………………… and automated

………………………………………………… in a car.

[4]

5 Layla is an artist. She draws images by hand. The image is then scanned and stored on a computer.

(a) The table has **four** statements about the storage of images on a computer.

Tick (✓) **one** box in each row to identify if the statement is true or false.

	True	False
Each colour has a unique binary code		
Metadata stores the colour of each pixel in the image		
A bitmap is made of pixels		
The higher the colour depth, the smaller the number of different colours that can be displayed		

[2]

(b) Layla stores her images on a secondary storage device.

(i) Each image has a fixed size of 1 MB. The storage device has a capacity of 3 GB.

Calculate how many images can be saved on the storage device. Show your working.

....

....

.... images

[2]

(ii) Layla uses the images to make videos. These videos are stored on her computer's internal storage device.

Identify the most appropriate type of storage device for Layla to use in her computer. Justify your choice.

Type of storage device ....

Justification

....

....

....

....

[3]

(iii) The videos include sound. The table has **four** statements about the storage of sound in a computer.

Tick (✓) **one** box in each row to identify if the statement is true or false

	True	False
The sample rate is the number of times the amplitude is recorded per second		
The smaller the bit depth the smaller the range of sounds recorded		
The larger the sample rate the larger the bit depth		
The frequency and pitch of the sound wave are measured		
Sound is stored using pixels		

[3]

(c) Layla uploads her images and videos to a website.

 (i) Explain why Layla compresses the images and videos before uploading them.

 ....

 ....

 ....

 .... **[2]**

 (ii) Layla wants to reduce the file size of the images and videos by the largest amount possible.

 Identify the method of compression that would be most appropriate. Justify your choice.

 Compression method ……………………………………………………

 Justification

 ....

 ....

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 .... **[3]**

(d) Layla wants to protect her images so they cannot be copied by other people.

 Identify which legislation can help protect Layla's images.

 .... **[1]**

Turn over

6 Amir has a home network that includes two laptop computers, four mobile phones, and two televisions.

(a) Identify the type of network Amir has at home.

.... **[1]**

(b) The network uses a star topology with a central switch. The switch has an integrated wireless access point (WAP).

(i) Describe the similarities and differences between a switch and a router.

Similarities ....

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Differences ....

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[6]

(ii) Draw the star topology for Amir's home network. Clearly label each device.

[3]

(c) Amir wants to protect the computers on his network from threats such as unauthorised access.

The following incomplete table contains a form of attack, description and method of preventing each attack.

Complete the table by writing the missing Forms of attack, Descriptions and Methods of prevention.

Form of attack	Description of attack	Method of prevention
	A program attempting all possible password combinations	
Data interception		
		Anti-virus

[6]

Turn over

7 Eve's computer has system software including an Operating System and Utility Software.

(a) Eve runs the defragmentation program on her computer.

Explain why Eve's computer is more efficient after the program has been run.

....

....

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....

....

.... **[3]**

(b) Tick (✓) **one** box in each row to identify which function of the Operating System deals with each action.

Action	Memory management	Peripheral management	File management	User management
Creating a new folder to store documents in				
Moving data from Virtual Memory to RAM				
Renaming a file				
Reading data from a scanner				
Changing the password required to log on to the computer				

[5]

(c) Eve uses a computer to write a computer game. She wants people to be able to download her program online.

Eve is choosing between an open source and proprietary licence.

(i) Give **two** benefits to the customers of Eve choosing an open source licence.

1 ....

....

2 ....

....

[2]

(ii) Give **two** benefits to Eve of choosing a proprietary licence.

1 ....

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2 ....

....
[2]

(d) Eve stores her computer program on the cloud whilst working on it.

(i) Describe the benefits to Eve of storing the program on the cloud.

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.... **[3]**

(ii) Describe the drawbacks to Eve of storing the program on the cloud.

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.... **[3]**

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE