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OCR 2025 Predicted Paper 1
GCSE (9–1) Computer Science
J277/01 Computer Systems
Time allowed: 1 hour 30 minutes

Do not use a calculator

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.
- This is just a predicted paper based off previous years

1. (a) The following table has either the binary or hexadecimal value of 4 numbers. Complete the table by converting the 8-bit binary number into hexadecimal and the hexadecimal number into 8-bit binary

8-bit Binary	**Hexadecimal**
11101010	
	40
10010100	
	3D

[4]

(b) A student opens a text file. It contains 40 characters, as shown below. Each character is represented using the ASCII character set.

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(i) Describe what is meant by the term 'character set'.

_____

_____

[2]

(ii) The binary representation for the character 'G' is 01000111. What is the binary representation for the character 'C'?

_____

[1]

(iiI) Calculate the size of the text file in kilobytes (KB).

_____

_____

[3]

(c) Give two reasons why a programmer would prefer to use hexadecimal to represent numbers instead of binary.

1 _____

_____

2 _____

_____

[2]

(d) Binary shifts can be used for multiplication and division.

Draw one line from each shift on the left to its correct outcome on the right.

Binary shift	**Outcome**
Right shift of 2 places on 00101000	00000100, divides by 16
Left shift of 2 places on 00010011	01000100, multiply by 4
Right shift of 4 places on 01000111	01001100, multiply by 4
Left shift of 2 places on 00010001	00001010, divides by 4

[3]

2. A graphic designer is using their computer to perform various tasks related to managing their online portfolio.

(a) Complete the table by identifying the most appropriate protocol for each of the tasks the graphic designer is performing.

Task	Protocol
Uploading a high-resolution image to a cloud server	
Viewing their online portfolio in a web browser	
Sending a large file to a print service	
Receiving an email from a client	

[4]

(b) Define what is meant by a 'network protocol'.

_____

_____

[1]

(c) Some protocols have layers.
Describe one advantage of using layers to construct network protocols.

_____

_____

_____

_____

[2]

(d) The graphic designer also uses Bluetooth to connect a wireless keyboard and mouse to their computer.
Describe one disadvantage of using Bluetooth technology.

_____

_____

_____

_____

[2]

3. Two educational institutions are deciding which network model would suit their campuses.

Institution A	Institution B
1500 students and staff	50 students and staff
Dedicated IT department	No Dedicated IT department

(a) For each institution, tick the appropriate box to indicate whether they should use a Client-Server model or a Peer-to-Peer model.

	Institution A	Institution B
Peer to Peer		
Client Server		

[1]

(b) Justify your choice to part(a).

_____

_____

_____

_____

[2]

(c) Students in both institutions use the can access the Internet and the World Wide Web.

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

_____

_____

_____

_____

[2]

(d) Explain the role of a Network Interface Card (NIC) in a campus network, and discuss why both institutions would need NICs regardless of the network model they choose.

_____

_____

_____

_____

[2]

(e) A student from Institution A says “Star networks are the same as client server networks”.
Explain why the student may not be correct.

_____

_____

_____

_____

[2]

(f) Institution B has a higher network performance than Institution A.

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

WIFI frequency _____

_____

Interference_____

_____

Number of concurrent users_____

_____

[3]

4. Sarah is an architect working on designing a series of new sustainable buildings. She has a team of hundreds of people creating models, conducting environmental impact assessments, and drafting blueprints.

Recent developments in Building Information Modelling (BIM) software mean that a computer program could perform the tasks of dozens of her team members in a much shorter time. Sarah decides to increase her use of BIM software in her projects.

Discuss the issues surrounding this decision. Consider the following in your answer:

- Ethical issues
- Legal issues
- Cultural issues

[8]

5. (a) A computer system faces various security threats. The table contains some common threats and a description of the task each threat performs.

Complete the table by writing the names of the two missing threats and a description of the task performed by the two given threats

Threat	**Task**
	Attempts to guess passwords repeatedly until the correct one is found.
Spyware	
	Injects malicious code into a database query to manipulate or access information
Data interception	

[4]

(b) Define what is meant by the term ‘firewall’.

_____

_____

[1]

(c) While managing the system, the IT team notices that the computer's hard drive is running slower than usual. They suspect that the hard disc drive is fragmented. Explain how defragmentation software could overcome the issue of the slow computer system.

_____

_____

_____

_____

_____

_____

[3]

6. Jake wants to buy a new computer, but he does not understand what the different parts of a computer do.

(a) Jake has heard of a CPU but isn't clear on what it does.

The CPU stands for

..... .

It is the part of the computer that fetches and executes the

.....

that are stored in ..... .

The CPU also contains the Arithmetic Logic Unit (ALU).

[3]

(b) One computer has 64 kilobytes of cache and the other has 512 kilobytes of cache.

Explain how the cache size can affect the performance of the CPU

_____

_____

_____

_____

[2]

(c) Each computer has a BIOS

Tick one box in each row to identify whether each statement in the table is true or false

Statement	True	False
BIOS stands for Boot Input Output Standard		
The BIOS can be used to alter hardware settings, such as which storage device the computer boots from		
BIOS settings are stored in RAM		

[3]

(d) Jake thinks his smartphone is an embedded system

State whether Jake is correct or incorrect, justifying your choice.

Choice_____

Justification_____

_____

_____

_____

_____

[3]

(e) Virtual memory is used by many devices.
Tick one box to identify the statement about virtual memory that is true.

- ☐ A section of primary storage is partitioned to act as virtual memory
- ☐ VM is needed when RAM is full, or nearly full
- ☐ Data from VM is transferred back to secondary storage when needed
- ☐ Data from ROM is transferred into VM

[1]

7. A radio station uses a digital camera to take a photograph of the computer scientist for their website. The photograph is stored as a bitmap image.

(a) Describe how bitmap images are represented in binary.

_____

_____

_____

_____

_____

_____

[3]

(b) Identify three pieces of metadata that would be stored in the image

1_____

2_____

3_____

[3]

(c) The camera allows users to view and edit photos immediately after taking them. Give two examples of data that the camera could store in the RAM.

1_____

2_____

[2]

(d) Describe what type of secondary storage the camera is likely to have, and justify the reason for this choice.

Secondary storage type_____

Justification_____

_____

_____

_____

_____

[3]

(e) The station's web developer, Alex, decides to upload the picture from his computer. Before uploading the image to the website, Alex considers compressing the file. Explain why image compression might be necessary in this situation.

_____

_____

_____

_____

[2]

(f) Identify the most suitable type of compression for the image file. Justify your choice.

Type of compression_____

Justification_____

_____

_____

[3]

END OF PAPER