

CHINIOT ISLAMIA PUBLIC SCHOOL AND COLLEGE

1ST QUARTERLY TEST

Computer Science (2210) - Paper 1 - Grade O-II

Name: _____	Section: _____	Roll No: _____
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Duration: 2 Hours

Total Marks: 50

General Instructions: Answer all questions. Use a black or dark blue pen. Write your name, centre number and candidate number in the boxes at the top of the page.

INSTRUCTIONS • Answer all questions. • Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs. • Write your name, centre number and candidate number in the boxes at the top of the page. • Write your answer to each question in the space provided. • Do not use an erasable pen or correction fluid. • Do not write on any bar codes. • Calculators must not be used in this paper.

INFORMATION • The total mark for this paper is 75. • The number of marks for each question or part question is shown in brackets []. • No marks will be awarded for using brand names of software packages or hardware.

Q1 .

1. Add the **two** binary numbers using binary addition.

Give your answer in binary. You must show all your working.

$$\begin{array}{r} 01100101 \\ + 01110000 \\ \hline \end{array}$$

[3]

An overflow occurs when two other 8-bit binary numbers are added together.

Explain why the overflow error occurs.

.....

.....

.....

..... [2]

The negative denary number –22 is stored in RAM.

Negative denary numbers can be represented as binary using two's complement.

Give the two's complement 8-bit binary integer that would be stored for the denary number –22.

You must show all your working.

Working space

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Two's complement 8-bit binary integer [2]

2. Data can be encrypted using asymmetric encryption.

(a) Complete the paragraph about asymmetric encryption.

Use the terms from the list.

Some of the terms in the list will **not** be used. You may use a term more than once.

algorithm	binary	cipher text	compression	error
hardware	hexadecimal	meaningless	plain text	private
public	readable	transmission	unreadable	

Data is encrypted using an encryption key. This is a type of
that scrambles the and turns it into
..... This makes the data
A key is used to encrypt the data. This key cannot be used
to decrypt the data. A key is used to decrypt the data. Any
device is able to request the key, but only your device
knows the key.

[8]

3. (a) Tick (✓) **one** box to show the smallest data storage unit.
- | | | |
|---|----------------|--------------------------|
| A | byte | ☐ |
| B | gibibyte (GiB) | ☐ |
| C | kibibyte (KiB) | ☐ |
| D | nibble | ☐ |
- [1]

- (b) State how many tebibytes (TiB) are equal to 2 pebibytes (PiB).
- [1]

Working space

.....

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.....

- (c) The size of a file needs to be reduced.
- (i) Give the name of the process that is used to reduce the size of a file.
- [1]
- (ii) One reason the size of a file may need reducing is so that it has a shorter transmission time.

Give **one** other reason why the size of a file may need reducing.

.....

..... [1]

4. An even parity check is used to detect errors in the data after it has been transmitted to the printer.

Describe how an even parity check detects an error.

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..... [4]

5. A band is recording their new song. They need to consider the sample rate and sample resolution of their recording.

(a) Give **one** benefit of using a higher sample rate to record the song.

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

(b) Give **one** drawback of using a higher sample rate to record the song.

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

(c) Describe what is meant by sample resolution.

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

(d) The band wants to compress the sound file, but they do **not** want any data to be permanently removed.

Identify the compression method that should be used.

..... [1]

6. Draw and annotate a diagram to represent the role of a router.

[4]

7. Some error detection methods use a calculated value to check for errors.

Tick (✓) **one** box to show which error detection method does **not** use a calculated value to check for errors.

- | | | |
|----------|--------------|--------------------------|
| A | Check digit | ☐ |
| B | Checksum | ☐ |
| C | Echo check | ☐ |
| D | Parity check | ☐ |

[1]

An automatic repeat request (ARQ) can be used to make sure that data is received free of errors. It can use a positive or negative acknowledgement method to do this.

Explain how an ARQ operates using a positive acknowledgement method.

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..... [5]

8. A checksum is used to check the data for errors after transmission.

(i) Describe the process of the checksum error detection method.

[5]

(ii) Identify **one** other error detection method that could be used to check for errors in the data.

..... [1]

9. Data storage can be measured using different units of measurement.

(a) Identify the name of the smallest unit of measurement of data.

..... [1]

(b) State how many nibbles there are in 2 bytes.

..... [1]

(c) A 10 second sound effect is recorded for a movie.

It is recorded with a sample rate of 22,016 Hz and a sample resolution of 8 bits.

Calculate the file size of the sound effect in kibibytes (KiB). Show all your working.

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.....
.....
.....
.....
.....

Answer KiB

[3]

Q2 .

1. Cassie stores data for her business every day. She stores the data using optical data storage.

(a) Identify **three** examples of optical data storage.

Example 1

Example 2

Example 3

[3]

(b) **Six** statements are given about the operation of three different types of storage.

Tick (✓) to show which statements apply to each type of storage. Some statements may apply to more than **one** type of storage.

Statement	Type of storage		
	Magnetic (✓)	Optical (✓)	Solid state (✓)
this storage has no moving parts			
this storage uses a laser to read and write data			
this storage uses a read/write head			
this storage burns pits onto a reflective surface			
this storage uses NAND and NOR technology			
this storage stores data in tracks and sectors			

[6]

2. 6 The table contains names and descriptions of components in a central processing unit (CPU).
Complete the table by giving the missing component names and descriptions.

Component name	Description
.....	sends signals to manage the flow of data through the CPU
program counter	
.....	stores the address of the data that is about to be fetched from random access memory (RAM) into the CPU
.....	transmits data between the RAM and the CPU
accumulator	
.....	stores an instruction when it is being decoded

[6]

5. The smartwatch has built-in input and output devices.

Identify **two** input devices that can be built into the smartwatch.

1

2 [2]

Identify **one** output device that can be built into the smartwatch.

..... [1]

The smartwatch has read only memory (ROM).

Explain why the smartwatch needs ROM.

.....

.....

.....

..... [2]

The smartwatch uses a text message application that receives data from cloud storage.

(i) Describe what is meant by cloud storage.

.....

.....

.....

..... [2]

4. A student's computer has primary storage. One example of primary storage is random access memory (RAM).

(a) Identify **one** other example of primary storage.

..... [1]

(b) Explain why RAM is an example of primary storage and **not** secondary storage.

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

(c) The student is editing a large video file for a project and during this process the RAM becomes full. This makes the computer crash.

Describe how virtual memory could be used in this process to stop the computer crashing.

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

2. Julia inputs personal data into her computer.

She stores three copies of the data using a hard disk drive (HDD), a solid state drive (SSD) and a USB flash memory drive.

(a) Identify **three** devices Julia can use to input personal data into her computer.

Device 1

Device 2

Device 3

[3]

(b) Six statements are shown about HDDs, SSDs and USB flash memory drives.

Tick (✓) to show which statements apply to each type of storage. Some statements can apply to more than one type of storage.

Statement	HDD (✓)	SSD (✓)	USB flash memory drive (✓)
it has no moving parts			
it is non-volatile			
it can use NAND gates to store data			
it uses magnetic properties to store data			
it has the smallest physical size			
it has the slowest read/write speeds			

[6]

6. Data is processed by the central processing unit (CPU) in a computer that has a Von Neumann architecture.

(a) Complete the table with the missing terms and definitions about processing data.

Term	Definition
current instruction register (CIR)	
.....	This is a processing unit within the CPU that can fetch, decode and execute instructions.
.....	This is a list of all the commands that can be processed by the CPU.
cache	
accumulator	

[5]

- (a) The computer has a central processing unit (CPU).

Complete the table of components in the CPU and their descriptions.

Component	Description
.....	It sends signals to all the components in the CPU to manage the flow of data through the CPU.
.....	It carries out all the arithmetic and logic operations in the CPU.
cache	
program counter (PC)	
.....	It controls the number of fetch–decode–execute (FDE) cycles that are performed per second.
.....	It stores data immediately before it is transmitted to RAM and immediately after it is received from RAM.

[6]

Q2. A barcode scanning system uses a check digit to check for errors in data on input.

(a) Explain how the barcode scanning system operates to check for errors.

.....

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..... [4]

(b) After a barcode is scanned, data is sent to a stock control system to update the stock value stored for that product.

The data is sent to the stock control system using serial simplex data transmission.

(i) Explain how the data is sent using serial simplex data transmission.

.....

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..... [3]

Q3.

The programmer uses a high-level language to write the program.

One reason for writing the program using a high-level language is that it is easier to read and write.

Give **two** other reasons why the programmer chose to use a high-level language.

1

.....

2

.....

[2]

The programmer uses an integrated development environment (IDE) to write the program.

One function of the IDE is to provide a translator.

(i) Complete the statements about translators.

Use the terms from the list. Some of the terms will **not** be used. You should only use a term once.

all together	all	assembler	binary	error
executable file	executing	interrupt	line by line	
partial code	some	translating	whole code	

A compiler translates the at once before

..... it. A compiler produces an error report that displays

..... errors.

An interpreter translates and executes the code

An interpreter stops execution when an is found

and continues once it is corrected.

[5]

(a) State what is meant by a URL.

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

(b) Identify **two** different parts of a URL.

1
2 [2]

(c) The student enters the URL into a piece of software that then displays the web page.

Identify the name of this software.

..... [1]

(d) Draw and annotate a diagram to show how the web page is located and retrieved to be displayed on the student's tablet computer.

[5]

3. The figure below is a diagram that illustrates how a tablet computer connects to the internet.

The finance company is concerned that a hacker may perform a brute-force attack to gain access to an employee's account.

(i) Describe how the hacker would perform the brute-force attack.

.....

.....

.....

..... [2]

(ii) Give **three** cyber security solutions that could be used to help prevent a brute-force attack from being successful.

1

2

3 [3]

The company uses a digital currency to purchase a new car.

(i) State what is meant by a digital currency.

.....

..... [1]

(ii) The digital currency uses a process that involves a digital ledger. The ledger has time stamped transactions that cannot be altered.

Give the name of this process.

..... [1]

4. Give **two** other functions commonly found in an IDE

Give two other functions commonly found in an IDE.

State the role of each function.

Function 1

Role

.....

Function 2

Role

.....

[4]

5. The programmer uses an integrated development environment (IDE) to write the program.

One function of the IDE is to provide a translator.

- (i) Complete the statements about translators.

Use the terms from the list. Some of the terms will **not** be used. You should only use a term once.

all together	all	assembler	binary	error
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A compiler translates the at once before
..... it. A compiler produces an error report that displays
..... errors.

An interpreter translates and executes the code

An interpreter stops execution when an is found
and continues once it is corrected.

[5]

6. A patient is making a payment through a secure connection

Explain how a secure connection is created using the SSL protocol.

[6]

[6]

7. Complete the statements about cookies.

Complete the statements about cookies.

Use only terms from the list.

Not all terms need to be used. Some terms may be used more than once.

binary	close	denary	expire
hexadecimal	image	malware	operating system
permanent	persistent	session	sound
temporary	web browser		

Cookies are small text files that are stored by a

..... cookies are text files
that are deleted when the is closed.

..... cookies are text files
that are stored on a user's secondary storage device until they are manually deleted or they
.....

[7]

Joelle uses a firewall to keep her data safe when she uses the Internet.

Tick (✓) to show which statement about firewalls is true.

	Tick (✓)
Firewalls can only be hardware-based	☐
Firewalls can only be software-based	☐
Firewalls can be hardware-based or software-based	☐

[1]

Joelle's parent also uses the firewall to limit the websites that Joelle can access.

Explain how the firewall is used to limit the websites that Joelle can access.

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..... [4]

9. Complete the table to give the missing term or description for the internet terms.

Internet term	Description
.....	the collection of web pages accessed using the internet
.....	the address given to a device when it connects to the internet
web browser	
.....	the hardware that stores a database of matching website and IP addresses
.....	a type of hardware that can be used to prevent a distributed denial of service (DDoS) attack
hacking	

[6]

10. The data for the web page is transmitted using the secure socket layer (SSL) protocol.

Complete the paragraph about the SSL protocol.

Use only terms from the list.

Not all terms need to be used. Some terms may be used more than once.

encrypted file server hypertext markup language (HTML)
hypertext transfer protocol (HTTP) operating system search engine
unencrypted URL web browser web server

The asks the
to identify itself. The sends back its digital
certificate. The authenticates the digital certificate.
If it is authentic, data transmission begins.
[5]