



Introduction to Computer Science

15 March 2023

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 2 hours

The maximum mark for this paper is 50.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Answer ALL questions

Marks

Question 1

a) State the 8-bit binary code for the following:

- | | | |
|---|----------------|---|
| i) The denary value 222 | 222 = 11011110 | 2 |
| ii) The hexadecimal value B9 | B9 = 10111001 | 2 |
| iii) The denary value -35 (use Two's Complement notation) | 35 = 11011101 | 2 |

b) TWO (2) methods of storing characters in computers are ASCII and the Unicode Standard.

the capability to support a wide variety of encoding systems

- | | |
|--|---|
| i) State ONE (1) advantage of using Unicode instead of ASCII. | 1 |
| Unicode requires more space because it has a large variety of characters | |
| ii) State ONE (1) disadvantage of using Unicode instead of ASCII. | 1 |

c) JPGs and MP3's are file types that use lossy compression.

png = portable network graphics

- | | |
|--|---|
| i) State ONE (1) image file type that uses lossless compression | 1 |
| flac = Free Lossless Audio Codec | |
| ii) State ONE (1) audio file type that uses lossless compression | 1 |

Total 10 Marks

Question 2

-Is a computer's main memory located on a motherboard
-It is used to hold programs while they are being used
-It is used to hold data while it is being processed

a) Briefly explain how a computer makes use of RAM. 3

b) For each sentence in the bulleted list below select the correct word or phrase in bold to make the statement correct. 5

- A bus connects the CPU to other **hardware/software** components
- A bus speed is measured in **seconds/ milliseconds/ MHz/ GHz**
- A bus sends 8, 16 or 32 **bits / bytes/ gigabytes** at a time
- The **front-side / back-side** bus connects CPU to memory
- The BSB is **slower / faster** than the FSB

c) State what is meant by a dual core processor. State ONE (1) benefit to the user. 2

-Dual core is a CPU that has two distinct processors that work simultaneously in the same integrated circuit.
-the cores work simultaneously to achieve a much faster operating speed than a single-core processor

Total 10 Marks

Question continues next page

Question 3

- a) A new musical theatre is getting ready to open.

It uses word processing software to type up the scripts the actors use.

For each task below state the **most suitable** type of application software. Do **not** give brand names of software.

- i) Creating a poster advertising a show poster maker excel 1
- ii) Storing all the actors' personal details so reports can be easily made 1
- iii) Storing and calculating the income and profit from ticket sales Accounting Software 1
- b) Give THREE (3) examples of utility software - Anti-virus utilities
- Back-up utilities
- File managers 3
- c) State what is meant by an embedded system. 2
-An embedded system is a combination of computer hardware and software designed for a specific function.
-printers
Give ONE (1) example of technology that contains an embedded system
- d) Describe what is meant by *assistive technology* and give ONE (1) example of such technology. 2

Assistive technology is technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible.
3D printer

Total 10 Marks

Question 4

- cable media the network topology
-the network connectivity media
- a) State TWO (2) factors that determine the data transfer speed of a network 2
- b) State the function of the following components in a network
- i) Repeater A signal can lose its strength as it's transmitted 1
- ii) Firewall used to prevent unauthorized access to a network 1
- iii) Proxy Server provides a gateway between users and the internet. 1
- c) Give TWO (2) reasons why Ethernet protocols are often chosen by businesses when setting up a wired network. 2
high data transfer speed is the benefit of ethernet.
high-speed data transfer, but they can also save on your electrical bills.

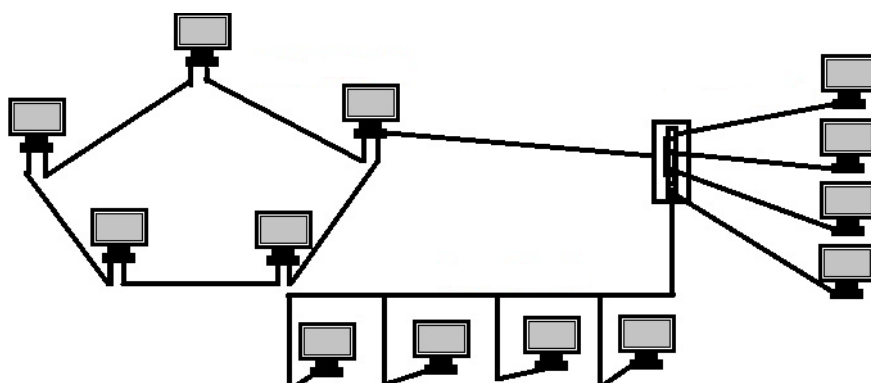
Question continues next page

Marks

- d) A hybrid network topology can consist of many different types of topologies.

3

State TWO (2) types of topologies shown in the hybrid network diagram below and state ONE (1) type of cabling that could be used to wire these PC's together.



-RING topology
-BUS topology
-Ethernet crossover cable

Total 10 Marks

Question 5

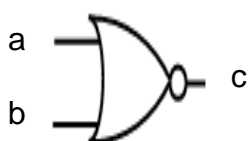
provides a method for mapping out the possible truth values in an expression and to determine their outcomes

- a) Describe the purpose of a truth table

2

- b) Draw a truth table for the following logic gate

4



- c) State THREE (3) offences under the Computer Misuse Act 1990 and ONE (1) penalty for breaking these offences.

4

Offence 1 - Unauthorised access to computer material

Offence 2 - Unauthorised access with intent to commit or facilitate a crime

Offence 3 - Unauthorised modification of computer material

Penalty - up to six months imprisonment or up to a £5,000 fine

Total 10 Marks

End of paper