



**University of Kelaniya – Sri Lanka  
Centre for Distance and Continuing Education**

**Bachelor of Science (External) First Year First Semester - 2023  
2024 – December  
Faculty of Science**

**Computer Science/Computer Studies  
COSC 16512/COST 16512 – Introduction to Computing**

**No. of Questions: Four(04)**

**No. of Pages: Three (03)**

**Time Allowed: Two (02) hrs**

**Answer ALL Questions**

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**Question 1**

- (a) Convert the following numbers to those in the given base.
- (i)  $123.5_8$  to decimal.
  - (ii)  $A1.2_{16}$  to decimal.
  - (iii)  $10101101101_2$  to hexadecimal.
  - (iv)  $45.6_{10}$  to binary
  - (v)  $243.1_{10}$  to octal. (20 Marks)
- (b) Convert the decimal number  $-15.25$  into an 8-bit floating-point representation showing all necessary steps. (10 Marks)
- (c) Convert the decimal number  $-563.58$  into a 32-bit IEEE 754 single-precision floating-point representation showing all necessary steps. (10 Marks)
- (d) Evaluate the following expressions using 8-bit two's complement representation. Show all steps, including conversion to binary, addition or subtraction, and conversion back to decimal.
- (i)  $25 - 12$
  - (ii)  $-42 - 22$
  - (iii)  $-17 - 50$
  - (iv)  $-60 - 45$  (20 Marks)

- (e) Explain the Bitmap Graphics Method used for representing black-and-white images in computer systems.
- (i) Using a 5x5 black-and-white image of your choice, illustrate:
- A. A matrix representation.
  - B. A linear representation. (20 Marks)
- (f) Suppose you are using an even parity. What should the binary word "0001010" look like after you add a parity bit? (20 Marks)

## Question 2

- (a) Input devices allow users to send data to a computer, while output devices display the results of processing.
- (i) What are the advantages of using a touchscreen compared to a traditional keyboard?
- (ii) List two factors that can affect the quality of output from a monitor. (20 Marks)
- (b) Briefly explain the two main functions of a computer's Central Processing Unit (CPU). (10 Marks)
- (c) Briefly explain the main two types of data processing in a computer. (10 Marks)
- (d) List down the main factors affecting the processing speed of a computer and briefly explain two from that list. (15 Marks)
- (e) Define the below terms:
- (i) Swapping.
  - (ii) Volatility.
  - (iii) Cache Memory. (15 Marks)
- (f) List Differences between Complex Instruction Set Computing (CISC) and Reduced Instruction Set Computing (RICS). (10 Marks)
- (g) List four (04) factors affecting the speed of a computer and briefly explain one of them. (20 Marks)

### Question 3

- (a) Define a Computer Program. (10 Marks)
- (b) Compare and contrast a high-level programming language with a low-level programming language. (20 Marks)
- (c) Explain the purpose of algorithms and flowcharts in problem-solving. (10 Marks)
- (d) Draw simple flow charts for the following scenarios.
- (i) To calculate the sum of the first 10 natural numbers. (20 Marks)
  - (ii) To calculate the product of the first 5 integers. (20 Marks)
- (e) Briefly explain the two major functions of operating systems. (10 Marks)
- (f) Compare the Graphical User Interface (GUI) and Command Line Interface (CLI). (10 Marks)

### Question 4

- (a) Differentiate Local Area Network (LAN), and Wide Area Network (WAN). (20 Marks)
- (b) Briefly explain the advantages and disadvantages of the bus and star topologies. (20 Marks)
- (c) Define the below terms:
- (i) Router
  - (ii) Switch
  - (iii) Access Point
  - (iv) Modem (20 Marks)
- (d) Explain the following internet protocols:
- (i) Hypertext Transfer Protocol (HTTP)
  - (ii) File Transfer Protocol (FTP). (20 Marks)
- (e) Explain the difference between the Internet and the World Wide Web. (10 Marks)
- (f) Define a URL and break down its components. (10 Marks)

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