MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: +254(0) 799 529 958, +254(0) 799 529 959, +254 (0)712 524 293
Website: www.must.ac.ke Email: info@mucst.ac.ke

UNIVERSITY EXAMINATIONS 2023/2024

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY, BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY, BACHELOR OF SCIENCE IN MATHEMATICS, BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER SECURITY AND FORENSICS, BACHELOR OF SCIENCE IN DATA SCIENCE AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

CIT 3150: COMPUTER SYSTEMS AND ARCHITECTURE

DATE: APRIL 2024 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) Explain the role of the following components in a computer motherboard
   i. Chipset (2 Marks)
   ii. BIOS (2 Marks)
   iii. Extension slots (2 Marks)

b) Define the term CPU registers and discuss two of its importance in computer architecture (3 Marks)

c) Highlight the three main importance of operating systems as the interface between hardware and software in computer systems (3 Marks)

d) Define the central processing unit (CPU) and discuss its role as the main component of a computer system (4 Marks)

e) Explain the functions of input and output devices within computer systems, illustrating their significance with examples and detailing their unique characteristics (4 Marks)

f) Briefly discuss two types of storage devices, highlighting their storage capacity, speed, and reliability (4 Marks)

g) Discuss three fundamental characteristics of computers explaining how these attributes contribute to the broad functionality and adaptability of computers across diverse applications and industries (6 Marks)

QUESTION TWO (20 MARKS)

a) Compare and contrast between the following in terms of their functions and roles in translating programming code into machine-understandable form

   i. Assemblers (3 Marks)

   ii. Compiler (3 Marks)

   iii. Interpreters (3 Marks)

b) With aid of a diagram, explain the different components of a Central Processing Unit (CPU) establishing how these components work together in execution of instructions (5 Marks)

c) List three computer buses and briefly explain the significance of these buses in facilitating communication within computer systems (6 Marks)

QUESTION THREE (20 MARKS)

a) Compare and contrast the following concepts

   i. Standalone vs Networked operating system (2 Marks)

   ii. Graphical user interface vs Command Line Interface (2 Marks)

   iii. Optical Disk Storage vs Magnetic Disk storage (2 Marks)

   iv. Sequential-access storage vs Random-access storage (2 Marks)

b) Discuss how operating systems facilitate the execution of application software and manage hardware resources effectively (3 Marks)

c) Printers can be classified by how they transfer characters from the printer to the paper. State and briefly explain the two major classes of printers (4 Marks)

d) As a computer expert advising a friend on installing a Linux-based operating system on their laptop, outline five essential factors they should consider before proceeding with the installation. (5 Marks)

QUESTION FOUR (20 MARKS)

a) Differentiate between the following character representations

i. ASCII and ANSI (2 Marks)

ii. EBCDIC and Unicode (2 Marks)

b) Explain the concept of tailor-made software and its significance in addressing specific user requirements (3 Marks)

c) Describe the sequence of actions that occur when an interrupt occurs (4 Marks)

d) With help of a diagram, discuss how the fetch-execute cycle enables the CPU to retrieve, interpret, and execute instructions stored in memory and facilitating the operation of computer systems (4 Marks)

e) Trace the evolution of programming languages across different generations, highlighting the key characteristics, limitations, advancements, and innovations introduced in each subsequent generation (5 Marks)

QUESTION FIVE (20 MARKS)

a) Convert the following to the specified base.

i. $BCDA_{16}$ to Binary (2 Marks)

ii. 4321_{10} to Octal (2 Marks)

iii. 11100110_2 to Hexadecimal (2 Marks)

b) Briefly explain how the use of transistors and integrated circuits led to the emergence of smaller, cheaper and more powerful computers (3 Marks)

c) Discuss the significance of the binary numbering system in computing exploring its role in representing data, instructions, and electrical states within a computer system (5 Marks)

d) Discuss how advancement in programming languages have shaped the landscape of software development, influenced programming paradigms, and impacted the efficiency and versatility of computer programs (6 Marks)