(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)
MAIN CAMPUS

UNIVERSITY REGULAR EXAMINATIONS
2022/2023 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS
FOR THE DEGREES OF:

BACHELOR OF SCIENCE IN COMPUTER SCIENCE
BACHELOR OF TECHNOLOGY EDUCATION (COMPUTER STUDIES)
BACHELOR OF INFORMATION TECHNOLOGY
BACHELOR OF INFORMATION SYSTEMS AND KNOWLEDGE MANAGEMENT

COURSE CODE: **BCS 323/BIK 320**
COURSE TITLE: **HUMAN COMPUTER INTERFACE**

DATE: 14/04/2023   **TIME: 8:00-10:00AM**

INSTRUCTIONS: Please attempt question one and any other two questions
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating
Paper Consists of 3 Printed Pages. Please Turn Over

1) **Question one (30 MARKS)**
   a) Distinguish between the following concepts in HCI (12mks)
      i) Summative evaluation and formative evaluation
      ii) The "gulf of execution" and the "gulf of evaluation"
      iii) User analysis and context analysis
      iv) Internal consistency and external consistency
   b) What is the relationship between internal consistency and mental models [4MKS]
   c) Compare and contrast between Norman's six principles of Interface Design and the Six guidelines of IxD [8MKS]
   d) Using a suitable diagram, describe the Buxton's 3-state behaviour model [6mks]

2) **Question Two (20 MARKS)**
   The amount of mental processing power needed to use your software affects how easily users find content and complete tasks.
   a) Distinguish between extraneous and intrinsic cognitive load [4MKS]
   b) In the context of cognitive load, outline the key features you need to include or avoid in your interface design and briefly explain how you would ensure that you build quality in your interface [8MKS]
   c) Interaction design (IxD) focusses on the functions and behaviour of the system, and the final presentation. State any **FOUR** of the factors to consider in IxD [8MKS]

3) **Question Three (20 MARKS)**
   Schneiderman described FIVE principles of Direct Manipulation:
   a) Briefly discuss each [10MKS]
   b) Heuristics are rules, which are used to define how an interface design can be inspected. State any five of the rules proposed by Nielsen (1994) [5MKS]
   c) However much we develop good user interfaces, many challenges still exist in addressing the needs of people with physical and cognitive impairments who require specialist interfaces for them to use computers. Give some specific examples instances where specialist interfaces are required [5MKS]

4) **Question Four (20 MARKS)**
   Context analysis is performed in order to understand the technical, environmental and social settings where the information systems will be used. It examines whether and how the physical and social environment interaction with the physiological and psychological characteristics of the user would affect HCI.
   a) Briefly, describe any TWO aspects of context analysis [4MKS]
   b) The different age groups of potential users has an effect on the usability of a system. Identify the challenges of aged users and briefly explain how you could cater for them in your design. Give suitable examples to qualify your explanation [6MKS]
   c) Cognitive analysis of for HCI is the analysis of cognition-intensive interactions with computers, such as learning, problem solving, or reading; and the analysis of

cognitive content, structures, and processes involved in any interaction with a computer. Discuss [10MKS]

5) **Question Five (20 MARKS)**
   a) Write brief notes on the following HCI concepts [8mks]
      i) Constraints
      ii) Affordance
      iii) Cognitive psychology
      iv) Universal interfaces
   b) Constantine and Lockwood describe a collection of principles for improving the quality of your user interface design. Describe any TWO [4mks]
   c) Explain the various approaches to task analysis   [8 MKS]