MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPATMENT OF COMPUTER SCIENCE

BCS 227 LOGIC PROGRAMMING CAT 1 [29-FEB-2024]

a. What are the fundamental principles of logic programming, and how does Prolog demonstrate these principles? **[4 marks]**

b. Explain the meaning of terms, atomic formulas, and the concept of well-formed formulas (wff) and how they are constructed in predicate calculus. **[4 marks]**

c. Explain the concept of "**model theoretic**" as a way to describe meanings in logic. **[2 marks]**

d. Express the statement "Some students like math" in first-order logic, then determine the truth value if there are no students who like math. **[3 marks]**

e. Explain how resolution, unification, and instantiation are handled in logic programming. **[4 marks]**

f. Using suitable examples, explain the meaning of: **[4 marks]**

- **i** Horn clauses
- **ii** Atoms
- **iii** Facts
- **iv** Rules

g. Implement a Prolog predicate to compute the sum of all numbers from 1 to N, where N is given as input. Utilize built-in arithmetic predicates to achieve this. **[4 marks]**

h. Explain the use of the tokens "=\=", " :- " and " \+", as used in prolog. **[3 marks]**

i. Explain whether the following statements will be evaluated. Give an appropriate reason to yours answers. **[3 marks]**

- **i** 11+1 is 3+2.
- **ii** X =:= 3+2.
- **iii** X is Y + 1, Y = 3.