WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF MANAGEMENT AND ENTREPRENEURIAL SCIENCES

BSc HONOURS DEGREE IN INFORMATION SYSTEMS

MAIN PAPER

IS212: COMPUTER QUANTITATIVE METHODS

INTAKE 25: SECOND YEAR FIRST SEMESTER

TIME: 2 HOURS AFTERNOON

INSTRUCTIONS TO CANDIDATES

Answer any **four** questions.

Question 1

a) Define the following terms

i) Matrix; [2]

ii) Square matrix; [2]

iii) Proposition; [2]

iv) Relation; and [2]

v) Domain [2]

b) Let $C = \begin{bmatrix} 2 & 1 & 4 \\ 3 & 5 & -7 \\ 1 & 6 & 2 \end{bmatrix}$

i. Find the adjoint of the matrix C [5]

ii. Hence or otherwise find inverse of matrix C [5]

c) Let p be "it is raining " and q be "it is overcast". Find the conjugation p ∧ q of the original statement and construct the truth table. [5]

Question 2

a) Let p be the statement ' She studied Information System at the Women University In Africa" and q be " She lives in Harare", Find the disjunction of the composite statement and construct the truth table. [10]

b) Verify by truth tables that the negation of p ∧ q is logically equivalent to ¬ p ᵛ ¬ q..
[Apply the De Morgan's law] [10]

c) What do you understand by the term "transpose of a matrix' [5]

Question 3

a) Solve the following simultaneous equation using Cramer's Rule

a +2b +4c = 14

3a +6b +10 c = 34

2a +6b + 6c = 28 [15]

b) State and explain the four types of relations [10]

Question 4

a) State and explain the three types of functions [10]

b) Find the inverses of the following functions

i) **y=**3x +1

ii) Y=In(8x +7)

iii) Y =√(2-5x) [5]

c) Solve the following linear equations using the Gauss Jordan Elimination

$2x_1 + 3x_2 - x_3 = 4$

$x_1 - 2x_2 + x_3 = 6$

$x_1 - 12x_2 + 5x_3 = -10$ [10]

Question 5

a) Given that $f(x)=x^2 - 1$ $g(x)=e^{2x}$ and h(x)= In(x+2). Find

i. fg(x)

ii. gf(x)

iii. fhg(x)

iv. gh(x)

v. hf(x) [15]

b) Use Sarrus rule to find the determinant of the following matrix [10]

$$\begin{bmatrix} 2 & 0 & -3 \\ 0 & 4 & 1 \\ -5 & -1 & 2 \end{bmatrix}$$

Question 6

Prove the following by Principle of Mathematical Induction

a) $\sum_{r=1}^{n} r = \frac{n(n+1)}{2}$ for all n ε N [10]

b) $\sum_{r=1}^{n} r^2 = \frac{n}{6}(n+1)(2n+1)$ for all n ε N [15]

END