MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

FIRST YEAR SEMESTER EXAMINATION FOR

CERTIFICATE IN INFORMATION COMMUNICATION TECHNOLOGY

COMPUTATIONAL MATHEMATICS

DATE: 16/4/2019   **TIME: 8.30-11.30 AM**

INSTRUCTIONS: Answer QUESTION ONE and any other TWO QUESTIONS

QUESTION ONE (30 MARKS)

a.)   Solve the equation $5x - 2y = 4$ **(3 marks)**

                                               $2x + 3y = 13$

b.)   Find the x-and y-intercepts of $4x - y = -3$ **(3 marks)**

c.)   If $P = \begin{pmatrix} 2 & 5 & 4 \\ 0 & 7 & 3 \end{pmatrix}$ and $Q = \begin{pmatrix} 1 & 3 & 8 \\ 6 & 2 & 5 \end{pmatrix}$. Find $P + Q$ and $P - Q$ **(6 marks)**

d.)   Calculate Arithmetic mean, Median and mode from the data below   **(6 marks)**

Daily wages (Shs.)	No. of workers
30-35	5
35-40	8
40-45	10
45-50	6
50-55	3
55-60	2

e.)   Explain at least five importance of statistics   **(10 marks)**

f.)   Express $A \cap B$ in a venn diagram   **(2 marks)**

QUESTION TWO (20 MARKS)

a.) Explain use of statistics in an organization (10 marks)

b.) The probability that a contractor will get a plumbing contract is $\frac{2}{3}$ and the probability that he will not get an electric contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$, what is the probability that he will get both? (5 marks)

c.) Find Q.D and Coefficient of Q.D from the following data (5 marks)

Class: 30-39, 40-49, 50-59, 60-69, 70-79, 80-89, 90-99

Frequency: 8   87   190   304   211   85   20

QUESTION THREE (20 MARKS)

a.) Define the following terms

    i.) Equal sets (2 marks)

    ii.) Disjoint sets (2 marks)

    iii.) Complement of a set (2 marks)

b.) Given $P = \begin{pmatrix} 1 & 2 \\ 0 & 4 \end{pmatrix}$, $Q = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}$ and $R = \begin{pmatrix} 3 & 0 \\ 2 & 2 \end{pmatrix}$. Find

    i.) $3P - 2(Q + R)$ (4 marks)

    ii.) $2Q - 3P + R$ (4 marks)

c.) Explain three features of a good questionnaire (6 marks)

QUESTION FOUR (20 MARKS)

a.) Solve the equations using completing the square method

    i.) $x^2 + 5x + 1 = 0$ (4 marks)

    ii.) $x^2 + 4x - 12 = 0$ (4 marks)

b.) What is the probability of obtaining a total of 9 points in a single throw with two dice?

(5 marks)

c.) List and explain advantages and disadvantages of interviews as a method of collecting primary data (7 marks)

QUESTION FIVE (20 MARKS)

a.) Solve the following equations

    i. $\frac{1}{2}(2x-3) - \frac{1}{3}(x-2) = \frac{7}{6}$ (3 marks)

    ii. $tx - t^2 = Tx - T^2$ expressing x in terms of t and T (3 marks)

b.) Solve the simultaneous equation, giving the answer in terms of r (5 marks)

$$x^2 + y^2 = 25r^2$$

$$2y + x = 10r$$

c.) Solve the equation $\begin{bmatrix} x-3 & 1 & -1 \\ -7 & x+5 & -1 \\ -6 & 6 & x-2 \end{bmatrix} = 0$ (5 marks)

d.) Identify and explain kinds of errors.   (4 marks)