THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

MAY – JULY 2019 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF MATHEMATICS AND ACTUARIAL SCIENCE

REGULAR PROGRAMME

MAT 160: PROBABILTY AND STATISTICS 1

Date: JULY 2019	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1.   a)   Differentiate between the following terms:
   i)   Probability and statistics   **(2marks)**
   ii)   Qualitative and quantitative data   **(2marks)**
   iii)   Discrete and continuous variable   **(2marks)**
   iv)   Census and sample   **(2marks)**

   b)   A coin is tossed three times:
   i)   Draw a tree diagram to show all the possible outcomes
                                                          (2marks)

   ii)   Find the probability of getting
      i) At least one head.   **(2marks)**
      ii) No head   (**2marks**)

   c)   In an agriculture Centre, the lengths of a sample of 50 maize cobs were measured and recorded as shown in the table below.

Length cm	8-10	11-13	14-16	17-19	20-22	23-25
No of cobs	4	7	11	15	8	5

   Calculate
   i)   The mean   **(3marks)**
   ii)   Semi-inter-quartile range   **(3marks)**

iii) The variance **(3marks)**
iv) The standard deviation **(1mark)**

d) Construct an ungrouped frequency table for the data below. **(6marks)**
   16 14 15 13 12 14 16 15 15 14 17 16 13 16 15 14 18 13 15 17

Q2. a) During a tournament the probability of Miruthu girls winning volleyball,

netball, and hockey are $\frac{2}{3}, \frac{\frac{1}{5} \wedge 3}{5}$ respectively. What is the probability that

Miruthu girls
   i) Wins all three games? **(3marks)**
   ii) Wins at least one game? **(3marks)**
   iii) Wins two games **(3marks)**

b) The following table shows the results of the test done in Mathematics and Physics.

Students	A	B	C	D	E	F	G	H
Mathematics	63	72	41	56	44	89	70	45
Physics	48	71	50	46	35	92	42	48

Calculate the product-moment correlation coefficient and comment on the result obtained. **(11marks)**

Q3. a) This frequency distribution shows the number of pounds of each snack food eaten during the Super Bowl. Construct a pie chart for the data.
   (7marks)

snack	Potato chips	Tortilla chips	pretzels	popcorn	Snack nuts
Pounds in millions	11.2	8.2	4.3	3.8	2.5

b) A sample of 250 students was asked to indicate their favorite TV channels and their responses were as follows:

TV station	KBC	NTV	CITIZEN	KTN	FAMILY
Number of viewers	28	52	92	63	15

Draw a bar chart to represent this information. **(5marks)**

c) A bag B_1 has 3 mangoes and 5 oranges and bag B_2 has 9 mangoes and 3oranges. A bag is selected where bag B_1 selected with probability of 3/5 and bag B_2 with probability 2/5. Two fruits are selected without replacement.

Draw a tree diagram and show the probability of the possible events.
(8 marks)

Q4. a) Using the following information 8, 3, 9,15,12,4,8. **(5marks)**
Show that $\overline{X}_H \leq \overline{X}_g \leq \overline{X}$ Where
$$\overline{X}_H : Harmonic mean$$
$$\overline{X}_g : Geometric mean$$
$\overline{X}$: Arithmetic mean

b) The table below relates the variables X and Y

X	3	4	5	6	7	8	9	10	11
Y	9	18	23	29	32	31	35	42	48

Find
    i)   the correlation coefficient   **(7marks)**
    ii)   The value of a and b   **(4marks)**
    iii)   Y if X= 15   **(2marks)**
    iv)   X if Y=62   **(2 marks)**

Q5. a) A company employs skilled and unskilled workers. 30% are skilled workers and the rest unskilled the probability that of skilled worker will finish the job on time is 0.72 and the probability that the unskilled worker will finish on time is 0.48.
Given that a job was completed on time, what is the probability that the job was done by unskilled work?   **(8marks)**

b) Construct a histogram, frequency polygon, and an ogive for the distribution shown of the miles that 20 randomly selected runners ran during a given week. **(12marks)**

class	6-10	11-15	16-20	21-25	26-30	31-35	36-40
frequency	1	2	3	5	4	3	2

END