Uganda Martyrs University

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCES

SEMESTER I EXAMINATIONS

FIRST YEAR EXAMINATION FOR

(i) BAM I, (ii) BSc in Accounting & Finance,
(iii) BA in Entrepreneurship, (iv) BA in Agriculture,
(v) BSc in Economics & Resource Management,
(vi) BA in Microfinance, (vii) BSc in Economics & Statistics,
(viii) BSc in Procurement Supply & Supply Management

BUSINESS STATISTICS / INTRODUCTION TO STATISTICS

DATE: 08th December 2023

TIME: 9:30 – 12:30 pm

DURATION: 3 Hrs

INSTRUCTIONS

1. Carefully read through **ALL** the questions before attempting
2. Attempt any **FIVE** of the seven questions
3. Ensure that your **Reg number** is indicated on all pages of the examination answer booklet
4. Ensure your work is **clear** and **readable**. Untidy work shall be penalized
5. Any type of examination malpractice will lead to automatic disqualification
6. Calculators and mathematical tables may be used

1. (a) Differentiate between
   (i) Descriptive and inferential statistics
   (ii) Sample and population
   (iii) An element and subject
   (iv) Primary and secondary data
   (v) Systematic and stratified random sampling
   (vi) Purposive and convenience sampling
   (vii) Discrete and continuous data
   (viii) Class width and class mark

   (b) Outline any four methods that can be employed in the collection of primary data [4 marks]

2. The table below shows a list of marks obtained by candidates in a Statistics test.

74	77	73	77	69	64	79	60	77	71	70	73	66	51	64	63
45	75	66	62	60	77	82	70	80	78	72	76	81	67	59	73
81	79	73	68	63	52	83	72								

   (a) Make a frequency distribution table of the marks, starting with the class interval 45-49 **[5 marks]**

   Determine

   (b) the median **[3 Marks]**

   (c) the mode **[3 Marks]**

   (d) the geometric mean **[3 marks]**

   (e) the harmonic mean **[3 marks]**

   (f) the quadratic mean **[3 marks]**

3. The table below shows the distribution of marks obtained in a Statistics examination

Marks	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Frequency	10	13	21	32	29	11	3	1

   Calculate

   (a) the mean, using 42 as the assumed mean **[4 marks]**
   (b) the lower quartile **[3 marks]**
   (c) the upper quartile **[3 marks]**
   (d) D_7 **[3 marks]**
   (e) the mean deviation **[3 marks]**
   (f) the standard deviation **[4 marks]**

4. (a) A box contains 36 beads, 28 of which are white and the rest yellow. One bead is picked from the box at random and not replaced. A second bead is then picked at random. Find the probability that

(i) the first bead picked is white [3 marks]

(ii) the second bead picked is yellow [3 marks]

(iii) the two beads are of the same colour [3 marks]

(iv) the two beads are of different colours [3 marks]

(b) A study done on a sample of 1000 people to determine the dominant hand used by individuals produced the following data classified by gender

	Men	Women
Left-handed	63	50
Right-handed	462	425

If a person is selected at random from this group, calculate the probability that the person

(i) is either a man or left-handed [2marks]

(ii) is either a woman or right-handed [2 marks]

(iii) is left-handed, if the person is a woman [2 marks]

(iv) is right-handed, if the person is a man [2 marks]

5. (a) A random variable X has the probability function

$$f(x)=\begin{cases} k2^{x}, x=0,1,2,3,4,5 \\ 0,.....elsewhere \end{cases}$$

Determine

(i) the value of k [3 marks]

(ii) E(X) [3 marks]

(iii) the standard deviation [5 marks]

(b) Let X be a random variable with the following probability distribution

x	-2	3	5
P(X=x)	0.3	0.2	0.5

Given that Y and Z are the random variables defined by $Y = X^2$, $Z = X(X-1)$

(i)Draw a table to show the probability distribution of Y and Z [5 marks]

(ii) determine E(Y) and E(Z) [4 marks]

6. Ten adults have their weight taken and their heights measured. The results obtained are shown in the table below.

Adult	Weight (kg)	Height (ft)
A	60	5.1
B	61	5.3
C	62	5.2
D	63	5.5
E	64	5.6
F	65	5.6
G	66	6.0
H	67	5.7
I	68	6.2
J	69	6.2

Determine

(i) Pearson's correlation coefficient, r [4 marks]
(ii) Spearman's rank correlation [4 marks]
(iii) Kendal's rank correlation [4 marks]
(iv) the regression equation of Y on X [4 marks]
(v) the regression equation of X on Y [4 marks]

7. (a) If 3% of the electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs
(i) 10 bulbs are defective [2 marks]
(ii) at least three bulbs are defective [3 marks]

(b) A housewife buys a dozen eggs of which three turn out to be bad. She chooses five eggs at random to prepare breakfast. Find the probability that she chooses:
(i) three good and two bad eggs [3 marks]
(ii) at least two bad egg [2 marks]

(c) The time taken by a milk man to deliver milk to town is normally distributed with mean of 12 minutes and standard deviation of 2 minutes. He delivers milk every day. Determine the number of days during the year (365 days) when he takes
(i) longer than 10 minutes [3 marks]
(ii) less than 8 minutes [3 marks]
(iii) between 9 and 13 minutes [4 marks]