UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

COURSE CODE: STA 114

COURSE TITLE: **STATISTICS AND PROBABILITY I**

DATE: 25/04/2023 **TIME: 9 AM -11 AM**

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

QUESTION ONE (30 MARKS)

a) Briefly explain the difference between the following;

i) Sample and population as used in statistics (4 marks)

ii) Independent and dependent variables (4 marks)

b) What is a measure of central tendency? (2 marks)

Describe four characteristics of a good measure of central tendency (4 marks)

c) Given the following set of numbers: 25, 20, 15, 10, and 5; calculate

i) Geometric mean (3 marks)

ii) Harmonic mean (3 marks)

d) Explain the term dispersion as used in statistics (2 marks)

e) Find the range, variance, and standard deviation of

15, 21, 14, 18, 21, 17, 22, 27, 19, 18, 12, 21, 17, 20 (8 marks)

QUESTION TWO (20 MARKS)

a) What is an index number? (2 mark)

b) The table below shows the fees in hundreds charged by a university on four-course categories and their corresponding number of students in a class for the academic years 2020 and 2021

Course Category	2020		2021	
	Fees (Ksh. 00)	No. of Students	Fees (Ksh. 00)	No. of Students
Business	300	35	360	40
Hospitality	250	30	300	35
Computer	600	25	750	30
Engineering	900	22	1000	25

Taking 2020 as base years, Calculate

i) Laspeyre price index (3 marks)

ii) Paasche price index (3 marks)

iii) Value index (2 marks)

iv) Marshalls Edgeworth (3 marks)

c) State the importance and limitations of using index numbers in data analysis (7 marks)

QUESTION THREE (20 MARKS)

a) What is the difference between descriptive statistics and inferential statistics (4 marks)

b) The class performance in a given semester was recorded, and marks were tabulated as below:

68	73	61	66	79	84	79	65	78	62
75	88	75	82	67	82	73	87	75	97
68	60	74	94	78	90	93	62	77	85
62	71	95	69	76	88	59	78	74	65
76	85	63	68	53	93	75	72	60	74

i) Use the data to construct a frequency distribution table. Use class size 5, i.e., 50-54, 55- 59, etc. (2 marks)

ii) Compute the arithmetic mean, mode, and median (7 marks)

iii) Calculate the variance and standard deviation (7 marks)

QUESTION FOUR (20 MARKS)

a) Discuss the role of statistics as used in different fields. (10 marks)

b) The marks of 500 candidates in an examination are normally distributed with a mean of 45 marks and a standard deviation of 20 marks.

i) Given that the pass mark is 43, estimate the number of candidates who passed the examination (3 marks)

ii) If 5% of the candidates obtained a distinction by scoring x marks or more, estimate the value of x (3 marks)

iii) Estimate the interquartile range of the distribution (4 marks)

QUESTION FIVE (20 MARKS)

a) Define regression analysis and state its assumptions (3 marks)

b) The height x cm of each man in a random sample of 200 men living in Nyahururu was measured. The following results were obtained: $\sum x = 35{,}050$, $\sum x^2 = 6163109$

i) Calculate unbiased estimates of the mean and variance of the heights of men living in Mombasa (10 marks)

ii) Determine an appropriate 90% confidence interval for the mean height of men living in Nyahururu and name the theorem that you have assumed (7 marks)