



**MACHAKOS UNIVERSITY**  
**END OF SEMESTER EXAMS FIRST SEMESTER 2022**  
**EXAMINATIONS**  
**BCU 901: BUSINESS STATISTICS**

**DATE:** \_\_\_\_\_

**TIME:** \_\_\_\_\_

**INSTRUCTIONS: Answer Question ONE and any other THREE Questions**

**QUESTION ONE (COMPULSORY 24 MARKS)**

a) Differentiate the following terms as used in statistics

i) Descriptive and inferential statistics

(2 marks)

ii) Quantitative and qualitative research

(2 marks)

iii) Parametric and non-parametric tests

(2 marks)

b) A research firm conducted a household survey and recorded the monthly incomes and consumption in thousands of Kenya Shillings for ten households

Household	A	B	C	D	E	F	G	H	I	J
Income	34	44	53	28	37	56	25	48	50	20
Consumption	22	25	33	24	23	34	20	30	29	18

Estimate and interpret the sales function of the firms and coefficient of determination

(4 marks)

c) A gynecologist observed that the weights of many of the babies delivered in a certain hospital followed a normal distribution with a mean weight of 3.6 Kgs and a standard deviation of 0.6 Kgs. He noted that a sample of 36 babies who got delivered in one month had a mean weight of 3.2 Kgs. Perform the necessary hypothesis test at 5% level of significance to find out if this sample of babies actually had a lower mean weight.

(6 marks)

- d) A lecturer wanted to investigate the performance of students in a Statistics course. He sampled 40 students out of the ones who sat for the statistics exam and recorded their marks as follows.

60	25	15	95	93	82	50	22	80	40
29	44	76	10	70	90	29	30	50	26
69	90	46	78	17	38	30	44	84	16
80	52	55	90	70	35	45	65	87	90

Construct a 95 % confidence interval estimate for the mean of the sampled population.  
(4 marks)

- e) Explain briefly four reasons why researchers prefer to use samples rather than population while carrying an inquiry  
(4 marks)

**QUESTION TWO (12 marks)**

- a) A real estate firm sells studio and one-bedroom apartments. During a certain month it was found out that one in five customers bought a studio apartment. If 6 customers were randomly selected in a given month, what is the probability that 4 will have bought a studio apartment?

(4 marks)

- b) The management of Kenya commercial bank sought to know whether the profits posted by various regions in the country were statistically equal. The research department of the bank sampled five branches in four regions and recorded their annual profits in millions of Kenya Shillings as follows.

Eastern	Western	Coast	Central
118	150	92	122
146	128	106	136
140	136	118	118
126	156	112	112
150	150	122	102

Perform an ANOVA test at 1% level to determine whether the mean annual profits for regions were equal.

(8 marks)

**QUESTION THREE (12 marks)**

- a) A research firm conducted a households' survey in a certain town. The annual incomes of 10,000 households were found to be normally distributed with mean of 22,750 dollars and a standard deviation of 1,000 dollars. The households that had annual incomes of less than 20,000 dollars were in the outskirts of the town. Determine the number of households who hailed from the outskirts.

(4 marks)

- b) A university registrar wanted to determine whether gender had an influence on performance of students. She sampled a number of students who were set to graduate and recorded their performance as follows.

Performance

Performance/Gender	Pass (D)	Lower division (C)	Upper division (B)
Female	480	960	580
Male	720	640	620

Test whether the course selection of performance was independent of the gender at 5%.  
(8 marks)

**QUESTION FOUR (12 marks)**

- a) The monthly sales in millions of Kenyan shillings of three supermarkets in a certain town were recorded as follows.

	March	April	May
84		68	124
108		100	112
116		80	88
92		60	120
100		92	96
128		132	140

Perform the Kruskal Wallis test at the 5% level to determine if the mean sales of the 3 supermarkets are equal

(5 marks)

- b) A mobile phone company intends to offer a new product. Marketing experts advised the company that for the product to be economically feasible it must attract at least 36% subscription of the registered members. A market survey on the prospects of the new product was conducted among 1000 registered members out of whom 400 indicated their intention to subscribe. Carry out a hypothesis test at 5% level of significance and advise whether the product should be offered.

(7 marks)

**QUESTION FIVE (12 marks)**

- a) Briefly explain four properties of good estimators.

(4 marks)

- b) A parent seeking to transfer his son to a top performing school in the country is torn between two good schools. To make a well-informed decision he sought to establish whether the difference in 2020 KCSE performance of the two secondary schools was statistically significant. He felt that if it was not significant then he would consider other characteristics of the schools that contribute to holistic development of a child. He sampled 14 candidates in each school and recorded their KCSE performance as follows.

School	Sample size	Mean score	Standard Deviation
Mako School	14	9.62	1.82
Bema School	14	8.96	2.36

Show whether there was a statistically significant difference in performance between the two schools at 5% level of significance and advise the parent accordingly.

(8 marks)