

- a) Briefly explain the rationale behind decomposing a time series. (5 marks)
- b) Briefly explain any two qualitative forecasting methods highlighting situations where they can be superior to quantitative forecasting. (5 marks)
- c) Construct a time series plot and identify the pattern that exists in the data? (3 marks)
- d) Deseasonalize the time series. (12 marks)

Year	Quarter	Sales
2020	1	47
	2	45
	3	68
2021	4	79
	1	62
	2	56
2022	3	72
	4	74
	1	64
2023	2	60
	3	79
	4	82
	1	67
	2	63
	3	84
	4	88

The table shows quarterly sales of fish by fishmongers in Nhukwe Dam from 2020 to 2023;

Question 1

1. Answer all questions
2. NO CELLPHONES ALLOWED IN THE EXAMINATION ROOM.

INSTRUCTIONS:

APR 2005

DURATION: 3 HOURS

EC 203: QUANTITATIVE METHODS

PROGRAMMES: BSc HONOURS DEGREE IN ECONOMICS

DEPARTMENT OF ECONOMICS

FACULTY OF COMMERCE

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Question 2

The number of domestic violence cases reported is likely to be dependent on the socio-cultural characteristics of the location the families reside. Data collected by a women advocacy group for 3 geographic locations over the year 2022 is shown in the table below;

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Urban	25	70	60	85	95	90	80	42	81	66	71	62
Farm	60	20	30	75	40	35	65	56	96	88	78	98
Rural	50	70	60	80	90	70	75	45	72	82	75	67

a) One advocacy group argues that the average number of cases for the rural families is 79. Using the sign test at 5% level of significance, test whether the group's claim is true.

(5 marks)

b) Using the Wilcoxon signed rank test at the 5% significance level is there any difference in domestic violence amongst the urban and rural locations?

(7 marks)

c) Another advocacy group that deals largely with farm population argued that the domestic violence in the three locations is not the same, but rather high for farm populations and hence there is need to design location specific policies. Using the Kruskal Wallis test at the 5% significance level is there any difference in domestic violence amongst the three locations?

(9 marks)

d) Under what situations will it be preferable to use non parametric tests?

(4 marks)

Question 3

- a) The table below shows prices and quantities of the most common building materials required to build a standard 1000 hen capacity fowl run.

Item	Quantity (2014)	Price (2014)	Quantity (2021)	Price (2021)
Cement	85	9.10	62	11.76
Roofing sheet	18	22.45	21	18.67
Bricks	8050	1.11	8050	1.19
Doorframes	3	16.43	3	22.34
W. frames	6	41.31	6	51.09
Mesh wire	23	16.66	28	19.99
Poles	54	8.00	66	11.00

- i. Generate price relatives for all the items in the basket. (4 marks)
- ii. Generate an unweighted price index for the basket. (4 marks)
- iii. Calculate the Laspeyres and the Paasche price index for the basket. (6 marks)
- b) Briefly explain why most economists use the Laspeyres price index uncommon in applied statistics. (5 marks)
- c) Explain the rationale behind use of index numbers in applied statistics. (6 marks)

Question 4

- a) A survey show that 9 of the 22 sampled communal farmers in Chihota communal areas use inorganic fertilizer while 3 of the 9 sampled communal farmers in Chiveshe uses inorganic fertilizers.

- i) Build a 95% confidence interval for the difference between the two population proportions.
- ii) At 5% level of significance, does the data indicate a difference between the two population proportions?

- b) Annual motor vehicle repair costs depend on the age of the vehicle. A researcher is interested in finding out whether the variance of the annual repair costs also increases with the age of the vehicle. A sample of 81 vehicles that have been in use for above 5 years showed a sample standard deviation for annual repair costs of \$770 and a sample of 64 vehicles with less than 3 years in use showed a sample standard deviation of \$300. At 1% level of significance, test whether the data shows evidence of increasing variance of annual repair costs.

(11 marks)

END OF PAPER