REFORMED CHURCH UNIVERSITY

FACULTY OF COMMERCE

BACHELOR OF COMMERCE HONOURS DEGREE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

QUANTITATIVE ANALYSIS FOR BUSINESS

HLSM 119

PART 1 SEMESTER 2 EXAMINATION

TOTAL MARKS   [100]

DATE: JULY 2022

TIME: 3 HOURS

INSTRUCTIONS

1. This paper has *six (6)* questions
2. Answer question *one (1)* and *any* other **three (3)**
3. Each question carries *25 marks*
4. Start each question on a new page

1. An oil company has 100 retail outlets for the sale of petrol. Gross profits from petrol sales from the outlets have the frequency distribution show in the table below.

Gross profit (millions $)	Number of outlets
10 - 19	12
20 - 29	23
30 - 39	35
40 - 49	15
50 - 59	9
60 - 99	6

(a) Calculate the
    (i)   Mean   (3)
    (ii)   Mode   (3)
    (iii) Median   (3)
    (iv) Semi interquartile range   (5)
    (v)   Mean absolute deviation   (4)
    (vi) Standard deviation   (4)

(b) Calculate the coefficient of variation for the data.   (4)

2. (a) The rate of return expectations of shares of common stock of Alfa Ltd are shown in the table below.

Possible rate of return (%)	-10	20	25	40
Probability	0.1	0.4	p	0.3

(i) Find the value of p   (2)
(ii) Calculate the expected return of investing in Alfa Ltd.   (4)

(iii)   Calculate the standard deviation of the expected returns.   (5)

(b). A company packaging spices knows that the weights of packets follow a normal distribution with mean weight of 16 grams and standard deviation of 0.2 grams.

(i) find the probability of a packet weighing between 15.8 and 16.4 grams.
      (4)

(ii) How many of these 500 packets can be expected to weigh at least 16.2 grams.   (5)

(iii)What is the minimum weight of the heaviest 20% of the packets
(5)

3.(a) The major components in a basket of goods are believed to be mealie meal and bread. The quantities per week and prices of commodities in 2019 and 2021 are recorded below.

	2019	2019	2021	2021
	Price	Quantity	Price	Quantity
Meali Meal	500	8	5000	10
Bread	76	7	1500	5

(i)   Obtain the simple price indices of these products with 2019 as the base yea.r   (3)

(ii)   Calculate the Paasche price index and comment on your results. (5)

(iii)

(iv)   Calculate the Laspyereprice index.   (6)

(v)

(vi)   Calcualte the unweighted aggregate price index.   (4)

(vii)   Obtain the Fisher price Index and comment on it.   (4)

(viii) Why is the Paasche price index better than the aggregate price index.
(3)

4. The manager of an educational computer facility would like to develop a model to predict the number of service calls per annum for interactive terminals based on the age of the terminal. A sample of 10 terminals was selected and the data is represented in the table below.

Number of Service calls	Age (Years)
4	1
10	5
12	5
5	3
7	3
5	2
3	2
10	4
8	4
3	1

(a) Determine the dependent and the independent. (2)

(b)

(c) Construct a scatter plot for the data and comment. (4)

(d) Is it reasonable to fit a simple linear regression? Explain. (4)

(e) Use the method of least squares to estimate the regression line. (6)

(f) Find the coefficient of determination and comment on it. (6)

(g) Predict the number of service calls for a terminal that is four

years old. (3)

5 (a) A manufacturer claims that the average life span of electric bulbs produced by his company is at least 31 hours. However, a random sample of 81 electric bulbs from this company were found to have a mean life of 28.9 hours with a sample standard deviation of 8.3 hours.

(i) At 5% level of significance, is there enough sample evidence to confirm the manufacturers claim? (6)

(ii) Construct a 99% confidence interval of the true average life span of the bulbs of this company and interpret it. (6)

(b) A study on the voting habits of married couples has shown that the probability the husband votes on communal issues is 0.24, whereas the probability that the wife votes on such issues is 0.32 and the probability that both vote is 0.12.

What is the probability that:

(i) Either the husband or the wife will vote? (3)
(ii) neither of them will vote? (4)
(iii) The wife votes knowing that the husband is going to vote? (3)

(iv) The husband is not voting if the wife has decided to vote? (3)

6. (a) An amount of $50 000 earns 10% per annum interest for 5 years.

Determine the amount realised at the end of the 4 years if interest is:

(i) Compounded annually (3)

(ii) Compounded semi-annually (3)

(i)   Compounded quarterly (3)
(ii)   Compounded monthly (3)

(a) The number of flaws in bolts of cloth in textile manufacturing is assumed to be Poisson distributed with a mean of 0.2 flaw per square meter.

(i)   What is the probability that there are two flaws in one square meter of cloth.   (4)

(ii)   What is the probability that there are no flaws in 20 square meters of cloth.   (4)

(iii)   What is the probability that there are at least two flaws in a 30 square meter cloth.   (5)

End of Paper