REFORMED CHURCH UNIVERSITY

FACULTY OF COMMERCE

QUANTITATIVE ANALYSIS FOR BUSINESS

HLSM 119\HBUM 112\HMKT 102\HACC 120\HPMG 120\HBAF 107

TOTAL MARKS [100]

DATE: DECEMBER 2024

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 each question on a new page

2 ***NB Mathematical Tables must be provided***.

1. A psychologist recorded the time that she spent on counselling sessions with victims of Gender Based Violence from a local College and produced the following table

Time (minutes)	Number of Students
5-10	16
11-16	19
17-22	15
23-28	22
29-34	20

a) Calculate the

i) Mean and comment [3]

ii) Median and comment [3]

iii) Mode and comment [3]

iv) Variance and comment [3]

v) Standard deviation and comment [2]

vi) Semi- interquartile range and comment [3]

b) Find the coefficient of the variation of the distribution. Comment on the distribution[4]

c) Find the degree of skewedness of the distribution. Comment on the findings.[4]

2. The profits to be realized from a certain business venture, to the nearest $500, are believed to follow the probability distribution shown below.

X	-1000	-500	0	500	1000	1500
P(X=x)	0.1	0.2	0.1	***P***	0.2	0.2

a) Determine the value of ***p.*** **[2]**

b) Find the probability that the business venture

i) Makes loss [3]

ii) Realizes profit of at least $1000 [3]

c) Find

i) the expected earnings of the business [4]

ii) standard deviation of profits for the business [5]

d) Is the venture likely to be successful? Explain. [2]

f. The demand for the second hand Japanese cars in Zimbabwe is normally distributed with a mean of 2000 cars sold per month and standard deviation of 50 cars. What is the probability that:

i) At most 2000 cars will be sold in one month? [2]

ii) Between 1600 and 1800 cars will be sold in one month? [2]

iii) Comment on each of these probabilities in relation to what decision the business should take (2)

3. The prices ($000) and ages (in years) of ten imported used cars of a specific model are as follows:

Age (years)	Prices ($000)
6	15
9	9
7	12
6	13
8	10
10	6
9	9
11	5
5	20
7	12

a) State the dependent and independent variables [2]

b) Plot a scatter diagram and comment [3]

c) Using the method of least squares, estimate the regression equation and comment [4]

d) Interpret the meaning of the slope in part ***b*** above**.** **[1]**

e) Predict the prices of the car for an age is 5 [3]

f) Calculate the correlation coefficient, r and integrate its meaning [4]

g) Calculate the coefficient of the determination, r^2 and interpret its meaning. [4]

h) Calculate the Spearman's rank of correlation coefficient, r and its meaning [4]

4. a) An investor wants to invest $15000 in two types of bonds. He earns 12% in the first type and15% in the second type. Find his investment if each of his total earnings is $1950. [5]

ii. The total production costs of a packaging machine machinery manufacturer are found to be an average of $60 000 per day. The cost accountant finds that the fixed cost are $32 000 per day and direct costs average $7 000 per machine. Using a graph, calculate the average number of machines produced per day. [11]

b. Solve the following simultaneous linear equations;

i. $3x+ 10y = 180$

$6x + 15y = 300$ [3]

ii. $3x + 3y +4z = 100$

$2x +4y + 6z = 140$

$5x + 8y + 3z = 145$ [4]

iii) Find two consecutive numbers such that 5 times the smaller number is equal to 5 more than the greater number.

[2]

5. A company buys five products with the following characteristics

Item	Number of units bought		Price paid per unit	
	Year 0	Year 1	Year 0	Year 1
A	130	151	8	10
B	139	153	22	25
C	183	181	28	24
D	184	104	30	35

a) Find the simple quantity index for product A and interpret its meaning [3]

b) Construct a simple quantity index for A and interpret its meaning [3]

c) Calculate the simple value index for item D and interpret its meaning [4]

d) Calculate the unweighted aggregate quantity aggregate quantity index and interpret it. [4]

e) Calculate Paasche quantity index and interpret its meaning. [5]

f) Calculate Laspyere index of products using 0 as the base year and comment [6]

6. a) A survey of first year university students sought to establish any association between choice of degree programme and sex. Assuming only two degree programmes were on offer, the following results were obtained.

	Degree programme	
Sex	Mathematics	Marketing
Male	117	63
Female	24	56

Use a 5%level of significance to test whether there is an association between sex and the choice of degree programme. [15]

b) The number of AIDS deaths recorded per day in government hospitals over a period of 365 days are:

Number of deaths	0	1	2	3
Observed frequency	9	80	120	156

Test at 5%significance level, the hypothesis that the number of deaths per day follows a Poison distribution with mean 2.

[10]

END OF PAPER