REFORMED CHURCH UNIVERSITY

FACULTY OF COMMERCE

MASTER OF COMMERCE DEGREE IN BUSINESS ADMINSTRATION

BUSINESS STATISTICS

MBA 103

PART 1 SEMESTER 1 EXAMINATION

TOTAL MARKS   [100]

DATE: OCTOBER 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. TelOne has implemented a system of charging out telephone calls based on the length of a call. To find out how this new charging out system would affect its telephone bill, a market research company which carries out extensive telephone interviews monitored the duration of 00 calls over a period of 3 days.

The following frequency distribution was compiled.

Duration (minutes)	Numbers of calls
2 – 4.9	50
5 – 7.9	130
8 – 10.9	190
11 – 13.9	150
14 – 16.9	98
17 – 19.9	42

a) Find the following:

i. Mean and interpret its meaning to TelOne. [3]
ii. Mode and interpret its meaning to TelOne. [3]
iii. Median and interpret its meaning to TelOne. [3]
iv. Standard deviation and interprete its meaning to TelOne. [5]
v. Inter quartile range and quartile range deviation and interpret its meaning to TelOne. [4]
vi. Establish the values of both Pearson and Bowley's sleekness measures and comment in relation to TelOne. [4]
vii. Which set of descriptive measures above (i, ii, iii, iv, & v) would you recommend to the management as the representative measures of call lengths? Justify your answer. [3]

2. A train has 500 passengers on board whose ages are normally distributed around a mean of 50 years with a standard deviation of 10 years.

a) How many of the passengers are

i. Between 40 and 70 years old? [3]
ii. Older than 60 years? [3]
iii. Younger than 35 years [3]
iv. What is the minimum age of the oldest 30% of the passengers? [3]

b) The number of car accidents in Harare is 3 per month. What is the probability that a month passes when there are:

a) No car accidents? [3]

i.	More than 2 accidents?	[3]
ii.	4 or fewer car accidents?	[3]
iii.	At most 2 accidents?	[2]
iv.	At least 2 accidents?	[2]

3. The controller of a large supermarket would like to predict the account balance (in millions) at the end of a billing period based upon the number of transactions made during the building period. A random sample of 12 accounts was selected with the results given in Table below.

Account	Number of transactions	Account balance
1	2	32
2	3	67
3	10	170
4	4	74
5	1	23
6	15	190
7	3	50
8	10	110
9	6	94
10	12	140

a) Determine the independent and dependent variable [2]
b) Plot a scatter diagram and comment [3]
c) Use the least squares method to find the regression equation and comment [4]
d) Interpret the meaning of the slop b [2]
e) Predict the account balance for an account which has 5 transactions in the last billing. [3]
f) Calculate the correlation coefficient, r and comment on it. [3]
g) Calculate the coefficient of determination, r^2 and interpret its meaning. [3]
h) Calculate Spearman's rank correlation coefficient, r and comment on it. [4]
i) Comment on the results obtained in parts (f) and (h) [1]

4. The following data is on the wages paid to four groups of workers and the number of workers in each group.

Groups	Year 0		Year 1	
	Wages (millions)	No. of Workers	Wages (Millions)	No. of Workers
Managerial	370	40	380	80

Skilled	240	80	280	80
Semi- skilled	220	60	250	80
Labourer	170	100	260	90

a. Construct a simple wage index for semi-skilled workers using year 0 as the base year. [5]

b. Calculate the simple aggregate index of wages using year 0 as the base year. [5]

c. Calculate Laspyere index of wages using year 0 as the base year and comment. [5]

d. Calculate the Paasche index of wages using year 0 as the base line and comment. [5]

e. Calculate a simple wage index for skilled labour and comment. [5]

5. a) The manufacturer who produces machines finds that he could sell an average of four machines per day at a price of $20 000 per machine. Stepping up his production to an average of 6 1/2 (six and half) machines per day, he finds that he has to reduce the price to $16 500 per machine in order to sell all that he produces. Using a linear curve find:

i.   The profit function   [8]
ii. Breakeven point   [3]
iii. Economic Order Quantity.   [3]
iv. The total profit expected.   [3]

b) A OK MART Zimbabwe owns a lease on a certain property in Britain. It may sell the lease for US$ 18000 or it may drill this property for exploring gas. Various possible drilling results were obtained after a research conducted by engineers. The data is given in the following table:

Possible results	Probability	Outcome
Dry well	0.10	100 000
Oil well	0.20	50 000
Gas well	0.30	90 000
Oil and gas consideration	0.40	200 000

i.   Construct a decision tree diagram for the above problem   [4]
ii. Determine the Expected Monetary Value (EMV) for the company   [2]
iii. What is your suggestion for the company, selling or drilling?   [2]

6. a) In order to determine whether boys or girls got into trouble more often at school, the following data in percentages was gathered.

	Got in trouble	No trouble
Girls	25	56
Boys	86	19

Required:

Is there a link between the sex of a student and getting into trouble at school? Test at 5% significance level.

   [15]

b) The accounting department of a bank randomly selected 100 accounts and examined them for errors. The following results were obtained:

Number of errors	0	1	2	3
Number of accounts	36	40	19	5

Test at 5% whether the distribution of errors is the poison distribution.

   [10]

END OF PAPER