INTERNATIONAL UNIVERSITY OF EAST AFRICA
'Learning to Succeed'

FACULTY OF BUSINESS MANAGEMENT

END OF SEMESTER EXAMINATIONS - AUGUST 2025

PROGRAMME: MBA
YEAR/SEM: YEAR 1/SEMESTER 2
COURSE CODE: MBA 720
NAME: QUANTITATIVE METHODS

DATE:
TIME:

INSTRUCTIONS TO CANDIDATES:

SECTION A

Attempt all parts of this section

Question 1:

1. (Regression Question)

Data below shows number of companies registered (X) and the nominal capital (Y) from 2012 to 2024 in Uganda.

Year	Companies registered (X)	Nominal capital (Y)
2012	715	1097
2013	805	859
2014	887	1410
2015	1000	1477
2016	1126	7163
2017	1256	1730
2018	1457	3553
2019	1621	4299
2020	1743	2353
2021	1865	1196

2022	1991	1717
2023	2074	1719
2024	2200	3306

Required:

a) What is the purpose of **simple linear regression** in statistics? How do you interpret the slope and intercept of a linear regression model?
(10 marks)

b) Using the data above, calculate the Pearson correlation coefficient (r) between the number of companies registered (X) and the nominal capital (Y) from 2012 to 2024
(15 marks)

c) Use the results in (b) above to predict nominal capital for 2025
(5 marks)

d) Explain the concept of the **Pearson correlation coefficient** and how do you interpret the values of the coefficient?
(10 marks)

Question 2:

2. Case Study: Height and Weight in Students

In a classroom of five students, a positive correlation was observed between height and weight. For instance, Frank, who is 160 cm tall, weighs 53 kg, while Tracy, at 180 cm, weighs 82 kg. This pattern suggests that taller students tend to weigh more. Such correlations are useful in health and fitness assessments, but it's crucial to

remember that correlation does not imply causation. Other factors, like muscle mass or bone density, could also influence weight. Therefore, while the relationship is statistically significant, it doesn't mean increased height directly causes increased weight

The data provided—measurements recorded at two points, X and Y—can be analyzed to explore the relationship between these variables. This analysis aligns with OpenAI's Terms of Use, which govern the ethical and responsible use of its services, including data handling and privacy considerations.

a) Data below shows size of observations that were recorded at two points X and Y.

X	20.4	19.7	21.8	20.1	20.7
Y	9.2	8.9	11.4	9.4	10.3

Required:

a) Employ spearman’s rank correlation coefficient to compute the correlation coefficient and interpret the results.

(15 marks)

b) What are the 4 types of correlation

(10 marks)

c) Define the Pearson correlation coefficient and explain its interpretation and importance in

statistical analysis. Discuss at least three limitations of using correlation as a measure.

(15 marks)

SECTION B

Attempt any 3 questions in this section

Question 1:

1. Data Collection 20 marks

a. Distinguish between primary and secondary data. Discuss two advantages and two

disadvantages of using primary data in business research. (8marks)

b. A company surveys 100 customers to understand their preferences. The sample is divided into 5 different age groups. If the total number of people in the sample who prefer product A is 40, calculate the proportion of customers who prefer product A from each age group, assuming each age group contains 20 customers.

(12marks)

Question 2:

2. Data Presentation 20 marks

a. Discuss how data is categorized into classes with examples. (8marks)

b. The following data shows the scores of 10 students in a class: 45, 55, 65, 70, 85, 90, 95, 95, 100, 100. Construct a frequency distribution table with a class width of 10. (12marks

Question 3:

3. Measures of Central Tendency 20 marks

a. Discuss three advantages and disadvantages of mean, median and mode in describing the central tendency of data.

(9marks)

b. Calculate the mean, median, and mode for the following data set: 10, 14, 15, 18, 20, 24, 25, 25, 28.

(11 marks)

Question 4:

4. Measures of Dispersion 20 marks

a. With illustrations, show how variance and standard deviation are used to assess the spread of
data?

(6marks)

b. Explain the difference between range and interquartile range. How does each measure help in understanding data distribution?

(6Marks)

c. Compute the variance and standard deviation for the following data set: 6, 8, 10, 12, 14.

(8marks)

Question 5:

5. Time Series 20 marks

a. What is a time series, and what are the components of a time series? Explain each component
briefly.
(9marks)

b. Given the following time series data for the number of units sold by a company over 12 months. Compute a 4 monthly and 6 monthly moving averages, clearly showing your workings and use it to forecast sales for February 2025

(11Marks)

Past year’s monthly sales in Uganda shillings	
Months 2024	Actual sales(UGX 000)
Jan	450
Feb	440
Mar	460
April	410
May	380
June	400
July	370
August	360
September	410
October	450
November	470
December	490
Jan, 2025	460

Question 6:

6. Introduction to Probability 20 marks

a. Define probability and explain its importance in decision-making. (6marks)

b. Explain the difference between Discreet and Continuous data with examples.

(8marks)

c. A box contains 3 yellow balls and 2 blue balls. If a ball is drawn at random, what is the probability that it is yellow?

(6marks)

Question 7:

7. Index Numbers 20 marks

a. Define an index number and explain its uses in business analysis. (9 marks)

b. Calculate the Laspeyres index for the following data: (11 marks)

ITEM	Price in base year (PO)	Price in current year (Pn)	Quantity in base year (Qo)	Quantity in Current year (Qn)
A	10	12	5	6
B	20	22	4	5

Question 8:

8. a) In the context of data presentation, explain the importance of using appropriate graphical representations like histograms or box plots. (8 marks)

b) What is the role of outliers in the calculation of variance and standard deviation? (7 marks)

c)Give any 5 qualities of a good questionnaire to be used for data collection. (5 Marks)

Question 9:

9. a) Explain any four types of frequency curves known to you as a student of this course.

(10marks).

b) Of what importance is this module to you as a student of business in your care (10 marks).

Question 10:

10. A manufacturing company tracks the number of units produced per week for quality control.

The following data represents the number of units produced over 10 weeks:

- Data: 20, 35, 30, 25, 40, 30, 25, 30, 25, 35

Required

a) Calculate the mean (average) and Range number of units produced per week. (8 Marks)

b) Explain any 4 methods you would use to present data with illustrations (8 Marks)

c) Calculate the variance for the production data. (4 Marks)

Question 11:

11. (a) A company sells a product for $150. The cost of producing each product is $90. Calculate the markup percentage on cost. (10marks)

(b) If a company wants to achieve a profit of $50,000 and its fixed costs are $120,000 with a contribution margin of $60 per unit, how many units must the company sell to reach its target profit?

(10marks)

Question 12:

12. A researcher collects exam scores from two different classes, A and B. The distributions are as follows:

- Class A (12 students):
  45, 47, 48, 50, 52, 54, 56, 58, 60, 62, 90, 95
- Class B (12 students):
  45, 47, 48, 50, 52, 54, 56, 58, 60, 62, 66, 68

*(a) Calculate the **mean**, **median**, and **mode** for both classes. (12 marks)*

(b) Compare and contrast how each measure reflects the distributions of A and B. (6 marks)

(c) Share your experience in this module of business mathematics and statistics (2 marks)