NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMMERCE, HUMAN SCIENCES AND EDUCATION

DEPARTMENT OF MARKETING, LOGISTICS AND SPORT MANAGEMENT

QUALIFICATION: PROCUREMENT & SUPPLY CHAIN MANAGEMENT, LOGISTICS & SUPPLY CHAIN MANAGEMENT	
QUALIFICATION CODE: 07BPSM, 07BLSC	**LEVEL:** 6
COURSE CODE: FDA621S	**COURSE NAME:** FORECASTING AND DATA ANALYSIS
SESSION: OCT/NOV 2025	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR	Ms Shinana Paulina

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly. 4. Round of all numerical answers to **two** (2) decimal places if possible

THIS QUESTION PAPER CONSISTS OF 7 PAGES (Including this front page)

SECTION A **[30 MARKS]**

QUESTION 1: MULTIPLE CHOICE **[20 MARKS]**

There are ten multiple-choice questions with several possible choices; choose the best possible answer, e.g. 1. A) **Each question is worth two marks.**

1.1 Which of the following best defines forecasting in a business context? [2]

A) Predicting financial statements using previous year's tax reports.
B) Estimating future events or trends based on current and historical data.
C) Managing current inventory based on supplier contracts.
D) Planning marketing campaigns using customer reviews.

1.2 What is the primary purpose of forecasting in strategic business planning? [2]

A) Minimizing tax liabilities.
B) Improving employee morale.
C) Making informed decisions based on future expectations.
D) Maximizing current year profits.

1.3 Which of the following is a qualitative forecasting method? [2]

A) Moving Average
B) Simple Linear Regression
C) Delphi Method
D) Exponential Smoothing

1.4 Which forecasting technique is most suitable when there is little historical data? [2]

A) Time-series analysis
B) Delphi Method
C) Exponential Smoothing
D) Regression Analysis

1.5 In which business function is forecasting particularly critical for inventory control? [2]

A) Marketing
B) Supply Chain Management
C) Human Resources
D) Customer Support

1.6 What is the main difference between qualitative and quantitative forecasting methods?[2]

A) Qualitative methods are more accurate.
B) Quantitative methods require expert opinions.
C) Qualitative methods rely on subjective judgment, while quantitative methods rely on numerical data.
D) Quantitative methods are used only for short-term planning.

1.7 A company planning a new product launch in an unpredictable market should most likely use: [2]

A) Moving Average
B) Exponential Smoothing
C) Delphi Method
D) Linear Regression

1.8 Which of the following components of time series describes regular patterns repeating over fixed intervals? [2]

A) Trend
B) Seasonality
C) Cyclical variation
D) Irregular variation

1.9 In Exploratory Data Analysis (EDA), which tool is most commonly used to identify trends and patterns? [2]

A) Histograms
B) Box plots
C) Scatter plots
D) Line graphs

1.10 A forecast model shows a high R^2 value but a non-significant p-value. What does this imply? [2]

A) The model is valid and can be used for decision-making.
B) The model explains variation well but the predictor may not be statistically significant.
C) The model has multicollinearity issues.
D) The model should be used only for long-term forecasting.

QUESTION 2: Match Scenario to Forecasting Technique **[10]**

Match each *forecasting problem* to the *most suitable quantitative model.*

Scenario	Appropriate Model / Technique
1. A business with steady but random monthly demand wants a simple average forecast.	**A)** Multiple Linear Regression
2. A clothing store gives more importance to recent sales than older data.	**B)** Simple Exponential Smoothing
3. A stationery supplier with stable demand applies a model that continuously updates forecasts as new data arrives.	**C)** Simple Moving Average
4. A car dealer notices a consistent upward trend in sales and wants a model that adjusts for trend over time.	**D)** Weighted Moving Average
5. A chain of restaurants wants to estimate how advertising expenditure and location population affect monthly sales.	**E)** Exponential Smoothing with Trend Adjustment

SECTION B: STRUCTURE QUESTIONS **[70 MARKS]**

QUESTION 3 **[30 Marks]**

BrightStar Beverages Ltd. produces a popular line of fruit juices distributed across Namibia. The company's sales have shown steady but fluctuating growth due to promotional campaigns and seasonal effects. The management team wants to improve sales forecasting accuracy to plan production and inventory more effectively.

The following data represent **monthly sales (in units)** for the last 8 months:

Month	Sales (Units)
January	250
February	270
March	260
April	290
May	310
June	300
July	320
August	340
Sept	?

Required

a) Using Weighted Moving Average (WMA) with weights 0.5, 0.3, and 0.2 (most recent month given highest weight), compute the forecast for September. [5 marks]
b) Using Exponential Smoothing with a smoothing constant $\alpha = 0.3$ and an initial forecast for February of 250 units, compute forecasts up to August. [5 marks]
c) Calculate the below for all the two methods used in a and b above (starting from April - August)
   i) MAD [8 marks]
   ii) MAPE [8 marks]
   iii) Tracking Signal (TS) [4 marks]

QUESTION 4 **[20 Marks]**

NamPower Appliances Ltd., a local electronics distributor in Windhoek, is analyzing the effect of advertising expenditure on monthly sales of its newly launched smart kettles. Management believes that increased advertising will directly boost sales volume. The company collected the following data for the past 10 months:

Month	Advertising Expenditure(N$'000) (X)	Sales (Number of Units sold) (Y)
1	10	25
2	15	30
3	20	38
4	25	45
5	30	48
6	35	55
7	40	60
8	45	65
9	50	70
10	55	78

Required:

a) Show the data graphically in a scatter plot. [4 marks]
b) Fit a simple linear regression model of Sales (Y) on Advertising Expenditure (X), $\hat{Y} = a + bX$ [8 marks]
c) Using your regression equation, estimate the expected sales when advertising expenditure is N$18,000. [2 marks]
d) Interpret the meaning of the regression coefficient b in the context of this business scenario. [3 marks]
e) Calculate the correlation coefficient R and comment on whether advertising appears to have a strong effect. [3 marks]

Question 5: Case Scenario: Determinants of House Prices in Windhoek [20 MARKS]

You are a market researcher working for a real estate firm in Windhoek. The firm wants to understand the main factors influencing house prices to guide property valuation and investment strategy. You are given a dataset of 24 recently sold houses in various suburbs of Windhoek. The research focuses on five independent variables believed to influence house prices.

Variables in the dataset:

Variable	Description	Type
Price (Y)	Selling price of the house (in Namibian dollars)	Dependent variable
Bedrooms (X_1)	Number of bedrooms	Quantitative
HouseSize (X_2)	Total floor area (m^2)	Quantitative
PlotSize (X_3)	Land/plot size (m^2)	Quantitative
DistanceCBD (X_4)	Distance from CBD (km)	Quantitative
Age (X_5)	Age of the house (years)	Quantitative

Dataset:

House	Bedrooms	HouseSize(m^2)	PlotSize(m^2)	DistanceCBD(km)	Age (yrs)	Price (N$'000 000)
1	2	95	350	4.5	20	11.5
2	3	120	400	6	15	14.5
3	3	135	450	5	12	16
4	4	160	480	8	10	18
5	4	175	500	7.5	8	19.5
6	5	210	600	10	5	22
7	3	140	420	6.5	18	15.2
8	2	100	300	3.5	25	11
9	4	185	550	9	7	20.5
10	3	130	410	5.5	14	15.8
11	5	220	650	11	4	23.5
12	4	190	520	8.5	6	21
13	2	110	310	3	22	11.8
14	3	145	430	6	16	15.6
15	4	170	490	7	9	18.8
16	5	200	580	9.5	6	22.5
17	3	125	400	4	17	15
18	4	180	540	8	11	20
19	5	230	700	12	3	24.8
20	3	140	420	5	13	15.5
21	4	185	560	8.5	7	20.6
22	5	215	620	10	4	23.2
23	2	105	320	3.5	24	11.2
24	3	135	450	6	14	16

You have run a multiple regression in Excel with Price (in Hundred thousand Namibian dollars) as the dependent variable. Here is the output:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.997
R Square	0.994
Adjusted R Square	0.992
Standard Error	0.364
Observations	24

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*	
Regression	5	393.159	78.632	594.555	0.000	
Residual	18	2.381	0.132			
Total	23	395.540				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	6.299	1.762	3.576	0.002	2.598	10.000
Bedrooms	0.580	0.376	1.543	0.140	-0.210	1.371
HouseSize (m^2)	0.045	0.011	4.099	0.001	0.022	0.068
PlotSize (m^2)	0.010	0.004	2.143	0.046	0.000	0.019
DistanceCBD (km)	-0.090	0.140	-0.643	0.528	-0.384	0.204
Age (yrs)	-0.147	0.042	-3.456	0.003	-0.236	-0.057

a) Write the regression model from the Output summary [5 marks]

b) Interpret the House size, Plot Size and Age of the house coefficients in the context of the Windhoek housing market. [6 marks]

c) Predict the price of a house with the following characteristics: [4 marks]
   Bedrooms = 4
   HouseSize = 180 m^2
   PlotSize = 480 m^2
   DistanceCBD = 7 km
   Age = 10 years

d) Comment on model performance using R^2 and Significance F. [5 marks]

==========END==========