

**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMMERCE, HUMAN SCIENCES AND EDUCATION  
DEPARTMENT OF MARKETING, LOGISTICS AND SPORT MANAGEMENT**

<b>QUALIFICATION: BACHELOR OF PROCUREMENT AND SUPPLY CHAIN MANAGEMENT</b>	
<b>QUALIFICATION CODE: 07BPSM</b>	<b>LEVEL: 6</b>
<b>COURSE CODE: FDA621S</b>	<b>COURSE NAME: FORECASTING AND DATA ANALYSIS</b>
<b>SESSION: NOVEMBER 2024</b>	<b>PAPER: THEORY</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	Mr Pius Shifeta FM, PM, DI EENHANA
<b>MODERATOR:</b>	Dr Gloria Tshoopara

**THIS EXAMINATION MEMORANDUM PAPER CONSISTS OF 7 PAGES (Including this front page)**

## Section A

### Question 1: Multiple Choice

[20 Marks]

There are ten multiple-choice questions with several possible choices; choose the best possible answer, e.g. 1.1 A. **Each question is worth two marks.**

1.1 Mr. Shifeta, the Demand Planner for Joshua Investment cc would like to understand the trend within the fluctuation of food items. He is determined to examine the raw data with the intention of drawing conclusions about the demand information. This is called..... (2 marks)

- a) Data Mining
- b) Data Management
- c) Data Analytics
- d) None of the above

1.2 At the beginning of the 2<sup>nd</sup> quarter for the current financial year, NUST Marketing Department experienced a huge drop in traffic on social media platform e.g. NUST Facebook Official Page. The marketing department is determined to discover the reasons behind such huge fluctuation. Which of the following data analysis technique can be applied? (2 marks)

- a) Diagnostic
- b) Predictive
- c) Prescriptive
- d) Descriptive

1.3 Mr. John sends an email to his supervisor informing him that, he will not be able to come to work tomorrow. This is an example of? (2 marks).

- a) unstructured data
- b) Structured data
- c) Semi-structured data
- d) None of the above

1.4 Which of the following is not an element of Collaborative Planning, Forecasting and Replenishment (CPFR)? (2 marks)

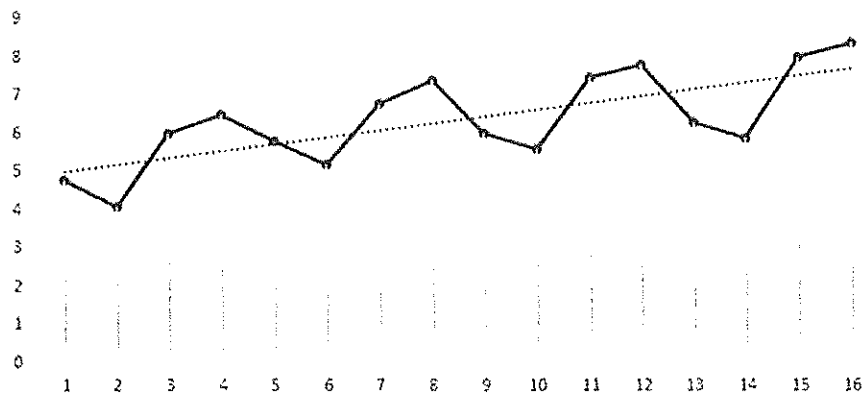
- a) Census building
- b) Performance management
- c) Continuous Monitoring and Revising
- d) All the above answers are correct

1.5 Mr. Shifeta is instructed to compile and submit an income statement at the end of the current financial year 2023/2024. This is an example of? (2 marks).

- a) Unstructured data
- b) Structured data
- c) Semi-structured data
- d) None of the above

1.6 The data in the below chart reveals:

(2 marks)



- a) Seasonality
- b) Trend
- c) Cyclic behaviour
- d) Both (a) and (b)
- e) Both (b) and (c)

1.7 From the table below, the Naïve forecast for May'23 is:

(2 marks)

Month	Actual demand	Forecast
Jan'23	92	
Feb'23	84	
Mar'23	102	
Apr'23	96	
May'23		

- a) 99
- b) 93.5
- c) 96
- d) 94

1.8 A business has decided to make use of the Weighted Moving Average Forecasting method to forecast and has assigned a weight of 0.6 to the most recent period and a weight of 0.4 to the less recent period. What is the forecast for Mar'23 for the chart indicated above? (2 marks)

- a) 87.2
- b) 88.8
- c) 91.2
- d) 94.8

1.9 Using the same table in 1.7, what is the forecast for Feb'23 using exponential smoothing. The forecast for Jan'23 was 98 and the smoothing factor is 0.2. (2 marks)

- a) 98
- b) 94.24
- c) 88
- d) 96.8

1.10 The 4-month moving average forecast for May'23 in the below table is: (2 marks)

Month	Actual demand	Forecast
Jan'23	92	
Feb'23	84	
Mar'23	102	
Apr'23	96	
May'23		

- a) 94
- b) 93.5
- c) 93
- d) 92.5

**Question 2: True/False****[20 Marks]****NB: Only write the question number and the correct answer, e.g. 1. True**

1. Data analytics is the science of examining raw data to conclude that information.
2. In forecasting, data analytics must consist of data from internal sources only.
3. Defining a problem is the most difficult part of the forecast, as one needs to talk to everyone involved in collecting data, maintaining databases, and using the forecasts for future planning.
4. Product improvement is not regarded as a new product in forecasting as historical data of the older version is used.
5. The product life cycle must be considered when forecasting products at each stage.
6. Before-after retail simulation overstates the true market potential; thus, the forecaster must discount results.
7. The unconstrained forecast is typically a forecast that is not limited by operational constraints such as capacity, materials, or cash flow. Hence, it requires adjustments or constrained to align with the operational realities of the business.
8. Mean Absolute Deviation (MAD) measures the average absolute error between the forecasted and actual values, helping to identify any bias in the forecast.
9. Tracking Signal determines if your forecasting model works effectively by monitoring the cumulative deviation between actual and forecasted values.
10. Mean Absolute Percent Error (MAPE) measures forecast accuracy by weighing errors based on relative error in percentage terms.
11. Mean Square Error (MSE) gives more weight to larger errors, making it sensitive to outliers and not weighting all errors evenly.
12. Analysis and prediction often require department collaboration to gather data and insights for more accurate forecasting.
13. Human resources frequently use forecasting to predict hiring requirements, helping organisations plan their workforce needs.
14. Residuals in regression analysis measure the forecast error by comparing actual and forecasted outcomes.
15. A 0.0025 significance level in regression indicates a 0.25% chance that the relationship between variables occurred by chance.
16. A positive relationship between the dependent and independent variables means they move in the same direction, not opposite.
17. The best-fit line in regression analysis uses the formula  $y = a + bx$ , where "a" and "b" are coefficients.
18. The independent variable, called the explanatory variable, explains, or influences the dependent variable.
19. Multiple regression is often necessary, even when investigating the effects of a single independent variable, to account for potential confounding factors.
20. Different forecasting models may require varying amounts of data, and some may be data-intensive compared to others.

**SECTION A SUB-TOTAL: 40 MARKS**

**Section B (60 marks)****Question 3****[46 Marks]**

Below are the six-month sales for the number of chip rolls sold at the NUST main campus cafeteria for 2024.

Months	Sales	Forecast
Jan	450	410
Feb	1095	
Mar	1518	
Apr	1563	
May	1584	
Jun	895	
July	?	

**NB: you must show your calculations to be awarded full marks, and please round your answers to two decimal places.**

3.1 Use **Exponential Smoothing with  $\alpha=0.05$**  to forecast for July using the above data. [6 marks]

3.2 Compute and interpret below for exponential smoothing.

- a) MAD [4 marks]
- b) MSE [4 marks]
- c) MAPE [4 marks]
- d) Tracking Signal [4 marks]

3.3 Use **three months moving average** to forecast for July sales using the above data. [4 marks]

3.4 Compute and interpret below for the 3-month moving average.

- a) MAD [4 marks]
- b) MSE [4 marks]
- c) MAPE [4 marks]
- d) Tracking Signal [4 marks]

3.5 Which forecasting method will you recommend and why? [2 marks]

3.6 What underlying behaviors/ patterns can you conclude from the data provided? [2 marks]

## QUESTION 4

[14 MARKS]

### SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.951455168
R Square	0.905266938
Adjusted R Square	0.878200348
Standard Error	3.875118544
Observations	10

### ANOVA

	df	SS	MS	F	Significance F
Regression	2	1004.484194	502.2421	33.44592	0.000261671
Residual	7	105.1158061	15.01654		
Total	9	1109.6			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	23.15614055	15.96717882	1.450234	0.190278	-14.60023771	60.91251881	-14.60023771	60.91251881
IQ	0.509433962	0.180809403	2.817519	0.025865	0.081887664	0.93698026	0.081887664	0.93698026
Study hours	0.467133657	0.171960196	2.716522	0.029916	0.060512407	0.873754908	0.060512407	0.873754908

### RESIDUAL OUTPUT

Observation	Predicted Test score	Residuals
1	100.8493955	-0.849395549
2	94.82261891	0.177381087
3	90.87221783	1.127782172
4	85.98937973	4.010620269
5	83.44220992	1.55779008
6	83.44220992	-3.44220992
7	78.55937182	-0.559371822
8	76.22370354	-1.223703536
9	66.45802734	5.541972658
10	71.34086544	-6.340865439

Student	Test score	# of classes attended	Study hours
1	100	125	30
2	95	104	40
3	92	110	25
4	90	105	20
5	85	100	20
6	80	100	20
7	78	95	15
8	75	95	10
9	72	85	0
10	65	90	5

The above data shows the regression summary output for students' performance based on class attended and the number of hours they have studied at a confidence level of 95%; please interpret below.

- a) R square [3 marks]
- b) Significance [3 marks]
- c) Coefficients [3 marks]
- d) Residuals [5 marks]

SECTION B SUB-TOTAL 60 MARKS

GRAND TOTAL: 100 MARKS