NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATICS

DEPARTMENT OF INFORMATICS

QUALIFICATION : BACHELOR OF INFORMATICS, BACHELOR OF COMPUTER SCIENCE	
QUALIFICATION CODE: 07BAIT, 07BCMS	**LEVEL:** 6
COURSE: DATA ANALYTICS	**COURSE CODE:** DTA621S
DATE: NOVEMBER 2022	**SESSION:** 1
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	Dr. JACOB ONGALA

THIS QUESTION PAPER CONSISTS OF 8 PAGES

(Including this front page)

INSTRUCTIONS

- Answer ALL questions in Question1, Question2, Question3, Question 4 and Question 5
- NUST examinations rules apply
- DO NOT open this examination cover until you are instructed to do so.
- DO NOT FORGET to write down your student number at the designated places in the examination page

Question1: MULTIPLE QUESTIONS (20 MARKS MAXIMUM 1 MARK FOR EACH CORRECT ANSWER)

Answer all questions. Select ONLY ONE BEST ASWER to each questions.

1. **Who has overall accountability for compliance with the GDPR?**
   a) Data subject,
   b) The Data Controller,
   c) Data processor,
   d) ICO

2. **The process of quantifying data is referred to a**
   a) Decoding
   b) Structure
   c) Enumeration
   d) Coding

3. **Are used when we want to visually examine the relationship between two quantitative variables.**
   a. Bar graph
   b. Scatterplot
   c. Line graph
   d. Pie chart

4. **A graph that uses vertical bars to represent data is called a ____.**
   a) Bar graph
   b) Line graph
   c) Scatterplot
   d) All of the mentioned above

5. **What is the name given by the GDPR for the deletion of all personal data?**
   a) The right to be forgotten
   b) The right to withdraw consent
   c) The right to access
   d) The right to objection

6. **This is the process of removal of noise from the dataset and helping in knowing the features that are important of to build a machine learning**
    a) Smoothing
    b) Data aggregation
    c) Discretization
    d) Normalisation

7. **This is the type of research that It answers key questions such as "how many, "how much" and "how often".**
    a) Quantitative
    b) Qualitative
    c) Nominal
    d) Category

8. **This is not an examples of continuous data:**
    a) The amount of time required to complete a project.
    b) The weight of children.
    c) The square footage of a two-bedroom house.
    d) The number of injections or vaccine you received in your lie

9. **Which statements is true about ordinal data**
    a) You cannot do arithmetic with ordinal numbers because they only show sequence.
    b) Ordinal variables are considered as "in between" qualitative and quantitative data
    c) The ordinal data is qualitative data for which the values are ordered.
    d) All of the above

10. **To predict a quantity value. use ___**
    a) Regression
    b) Clustering
    c) Classification
    d) Dimensionality reduction

11. **How do machine learning algorithms make more precise predictions?**

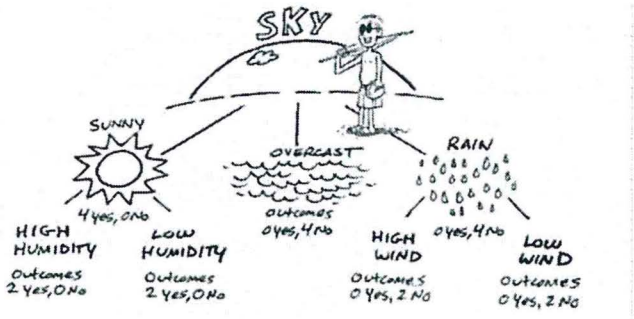
a) The algorithms are typically run more powerful servers.

b) The algorithms are better at seeing patterns in the data.

c) Machine learning servers can host larger databases.

d) The algorithms can run on unstructured data

12. **What does this image illustrate?**



a) A decision tree

b) Reinforcement learning

c) K-nearest neighbour

d) A clear trend line

13. **When must high risk data security breaches be reported to the ICO?**

a) Within 24 hours

b) Within 72 hours

c) Within 36 hours

d) A week

14. **Once the GDPR takes effect, serious breaches could result in fines of what percentage of the company's global annual turnover?**

a) 20 %,

b) 10%,

c) 2 %

d) 4%

15. **In this method, the representation of the data is made smaller by reducing the volume**
    a) Numerosity Reduction
    b) Dimensionality reduction
    c) Data compression
    d) Data reduction

16. **This is created by placing the sequence inside the square brackets**
    a) List
    b) String
    c) Dictionary
    d) Tuples

17. **Which one is not true about Standard Deviation**
    a) Most commonly used measure of variation
    b) Shows variation about the mean
    c) Can be used to compare two or more sets of data measured in different units
    d) Is the square root of the variance?

18. **You want to identify global weather patterns that may have been affected by climate change. To do so, you want to use machine learning algorithms to find patterns that would otherwise be imperceptible to a human meteorologist. What is the place to start?**
    a) Find labelled data of sunny days so that the machine will learn to identify bad weather.
    b) Use unsupervised learning have the machine look for anomalies in a massive weather database.
    c) Create a training set of unusual patterns and ask the machine learning algorithms to classify them.
    d) Create a training set of normal weather and have the machine look for similar patterns.

19. Why is naive Bayes called naive?

a) It naively assumes that you will have no data.

b) It does not even try to create accurate predictions.

c) It naively assumes that the predictors are independent from one another.

d) It naively assumes that all the predictors depend on one another.

20. What is one reason not to use the same data for both your training set and your testing set?

a. You will almost certainly underfit the model.

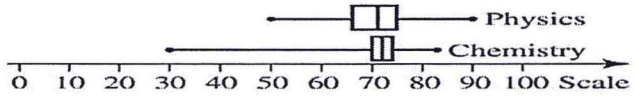
b. You will pick the wrong algorithm.

c. You might not have enough data for both.

d. You will almost certainly overfitt the model.

Question 2 **[10 Marks]**

Look at the following boxplots about Liina's performance in physics and chemistry and answer the following questions.



(a) State the median mark for each subject. (2)

(b) Find the range of marks in each subject. (2)

(c) Calculate the interquartile for Physics. (3)

(d) What are the three benefits of using a box plot during data cleaning in a normal distribution data? (3)

Question 3 **[32 Marks]**

a) What does Skewed and Symmetric distribution on a data set means (4)

b) List and explain the methods of data transformation. (8)

c) Pre-processing of data is mainly to check the data quality. Explain 5 of the elements of pre-processing (10)

d) Using Examples, explain the process of Data Science (10)

Question 4 **[18 Marks]**

a) What is Overfitting, and How can you avoid It? (4)

b) What is the difference between Supervised and Unsupervised Machine Learning? (4)

c) What is Bias and Variance in a Machine Learning Model (4)

d) Name 6 key pieces of information to be contained in privacy notices based on the GDPR (6)

Question 5 **[20 Marks]**

4.1 Based on the Jupiter notebook, explain what the following command means

a) df. dtypes (2)

b) df.shape (2)

c) df.drop duplicates() (2)

d) df.samples(frac=0.5) (2)

e) df.tail(10) (2)

4.2 write a command in Jupiter notebook that will allow you to perform the following tasks

a) Count number of rows with each unique values of (2)

b) Sum the values of each object in a data frame. (2)

c) Combine two columns named df1 and df2 (2)

d) Sort the index of the dataframe (2)

e) Select row 10 to 20 (2)

THE END OF EXAM