R2026	Sub. Code
	557101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

First Semester

Artificial Intelligence and Data Science

PRINCIPLES OF DATA SCIENCE AND ANALYTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct options.

1. ———— of the following are facets of data. (CO1, K1)
   (a) Volume, Velocity, Variety, Veracity, Value
   (b) Data Mining, Data Warehousing, Data Visualization
   (c) Data Preparation, Exploratory Data Analysis, Model Building
   (d) Descriptive Statistics, Inferential Statistics, Predictive Analytics

2. Which step of the Data Science Process involves specifying the objectives of the research? (CO1, K1)
   (a) Retrieving data
   (b) Data preparation
   (c) Defining research goals
   (d) Exploratory Data Analysis

3. ———— is a key benefit of data visualization for decision making. (CO2, K2)
   (a) It simplifies complex datasets
   (b) It eliminates the need for statistical analysis
   (c) It can only be understood by data scientists
   (d) It increases the complexity of decision-making processes

4. Which measure of central tendency is affected the most by outliers? (CO2, K2)

(a) Mean (b) Median

(c) Mode (d) Range

5. ———— statistical measure is used to quantify the strength and direction of the linear relationship between two quantitative variables. (CO3, K3)

(a) Mean

(b) Median

(c) Correlation coefficient

(d) Standard deviation

6. Which graphical method is commonly used to visualize the relationship between two variables in a scatter plot? (CO3, K3)

(a) Pie chart (b) Histogram

(c) Bar graph (d) Scatter plot

7. ———— operations can be performed using NumPy arrays. (CO4, K6)

(a) Aggregations

(b) Combining datasets

(c) Operating on strings

(d) Data indexing and selection

8. ———— is the primary data structure provided by Pandas for data manipulation. (CO4, K6)

(a) Series (b) Data Frame

(c) Array (d) List

9. How can errors be visualized in Matplotlib? (CO5, K5)

(a) Using line plots (b) Using scatter plots

(c) Using histograms (d) Using error bars

10. ———— type of plot is used to represent the distribution of a single variable. (CO5, K5)

(a) Line plot (b) Scatter plot

(c) Histogram (d) Contour plot

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Differentiate between Data Science and Bigdata. (CO1 K2)

Or

(b) Illustrate the procedure to describe data with tables and graphs. (CO1, K2)

12. (a) Describe the Benefits of Data Analytics. (CO2, K2)

Or

(b) Write short notes on Skewness and Kurtosis. (CO2, K2)

13. (a) Describe the properties of correlation in detail. (CO3, K3)

Or

(b) Write a detailed note on Spurious regression. (CO3, K3)

14. (a) Describe advantages and disadvantages of python. (CO4, K6)

Or

(b) Write a brief note on Pivot table usage in python. (CO4, K6)

15. (a) Write the procedure to create advanced scatterplots. (CO5, K5)

Or

(b) Difference between Matplotlib and Seaborn. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Illustrate the procedure of Data preparation in detail. (CO1, K2)

Or

(b) Explain how to describe and measure variability with formula. (CO1, K2)

17. (a) Explain the types of Data Analytics in detail with example. (CO2, K2)

Or

(b) Illustrate the graphical techniques available in data visualization. (CO2, K2)

18. (a) Illustrate about Correlation coefficients for quantitative data. (CO3, K3)

Or

(b) Explain in detail about multiple regression equations. (CO3, K3)

19. (a) Illustrate the operations of Numpy Arrays in detail. (CO4, K6)

Or

(b) Write the procedure to perform data manipulation operations using Pandas. (CO4, K6)

20. (a) Illustrate about visualizing errors in python. (CO5, K5)

Or

(b) Explain in detail about the procedure of importing Matplotlib. (CO5, K5)

R–2027

Sub. Code
557102

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Artificial Intelligence and Data Science

RELATIONAL DATABASE MANAGEMENT SYSTEM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. ———————— and schemas are key components of the database schema architecture, representing the actual data and structure. (CO1, K1)

   (a) Models (b) Tables
   (c) Instances (d) Queries

2. The component of the database system responsible for managing the physical storage of data is called the ———————— manager. (CO1, K2)

   (a) Query (b) Storage
   (c) Transaction (d) Security

3. To ensure data consistency, relational databases enforce ———————— constraints on the data. (CO2, K2)

   (a) Integrity (b) Privacy
   (c) Entity (d) Redundancy

4. The process of retrieving data from a relational database using a structured query is known as _____ relational data. (CO2, K2)

   (a) Inserting (b) Querying
   (c) Updating (d) Deleting

5. A basic SQL query follows the form: SELECT ———— FROM table_name WHERE condition. (CO3, K2)

(a) Table (b) Row

(c) Condition (d) None of the above

6. Aggregative operators in SQL, such as COUNT, AVG, SUM, MIN, and MAX, are used to perform operations on ———— of data. (CO3, K2)

(a) Rows (b) Groups

(c) Columns (d) Joins

7. ———— ensures that once a transaction is committed, it remains so, even in the event of a system failure. (CO4, K2)

(a) Isolation (b) Durability

(c) Serializability (d) Atomicity

8. Lock-based protocols use ———— to ensure that transactions can be executed safely in a concurrent environment. (CO4, K1)

(a) Timestamps (b) Permissions

(c) Locks (d) Triggers

9. ———— indexing, a tree structure is used to organize and retrieve data efficiently. (CO5, K2)

(a) Hash-based (b) Bitmap

(c) Tree-based (d) Secondary

10. In the context of Big Data, ———— refers to the high speed at which data is generated, collected, and analyzed. (CO5, K1)

(a) Volume (b) Velocity

(c) Variety (d) Veracity

Part B (5 × 5 = 25)

Answer **all** the following questions not more than 500 words each.

11. (a) Compare file System vs DBMS. (CO1, K2)

Or

(b) Write a note on : (CO1, K2)

(i) Entities

(ii) Attributes

(iii) Entity Set

12. (a) Discuss about Querying Relational Data. (CO2, K2)

Or

(b) Explain Projection Operation with example. (CO2, K3)

13. (a) Write a brief note on Nested Queries. (CO3, K3)

Or

(b) What do you mean by Triggers? Explain. (CO3, K2)

14. (a) Compare Transaction Atomicity and Durability. (CO4, K3)

Or

(b) What is meant by Multiple Granularity? Explain. (CO4, K2)

15. (a) Differentiate Primary and Secondary Index. (CO5, K1)

Or

(b) Explain Four V's and its importance. (CO5, K2)

Part C (5 × 8 = 40)

Answer **all** the following questions not more than 1000 word each.

16. (a) Illustrate ER diagram with neat sketch. (CO1, K3)

Or

(b) Discuss about structure of DBMS in detail. (CO1, K2)

17. (a) Describe in detail about Tuple Relational Calculus in SQL. (CO2, K3)

Or

(b) How to destroy and Alter Tables? Explain in detail. (CO2, K4)

18. (a) Write a detailed note on FIRST, SECOND and THIRD Normal Form. (CO3, K3)

Or

(b) Discuss in detail about Aggregate Operators. (CO3, K5)

19. (a) Illustrate Transaction Model with neat sketch. (CO4, K2)

Or

(b) How to program Insert and Delete Operation in concurrency control? Explain. (CO4, K3)

20. (a) Discuss in detail about Hash based and Tree based Indexing. (CO5, K2)

Or

(b) Explain Vector Multiplication by Map Reduce in detail. (CO5, K3)

———————

R–2028	Sub. Code
	557103

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Artificial Intelligence and Data Science

PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which character is used in Python to make a single line comment? (CO1, K1)

   (a) / (b) //

   (c) # (d) !

2. Which of the following operators is the correct option for power (ab)? (CO1, K1)

   (a) a^b (b) a**b

   (c) a^^b (d) a^*b

3. List, tuple and range are the ———————— of Data Types. (CO2, K3)

   (a) Sequence types

   (b) Binary Types

   (c) Boolean Types

   (d) None of the mentioned above

4. Python Dictionary is used to store the data in a ———— format. (CO2, K3)

(a) Key value pair

(b) Group value pair

(c) Select value pair

(d) None of the mentioned above

5. The default delimiter character of a CSV file is : (CO3, K5)

(a) : (colon) (b) \\t (tab)

(c) , (comma) (d) ; (semi-colon)

6. The CSV files are ———————— files. (CO3, K5)

(a) Text (b) Binary

(c) Data (d) Python

7. Which of the following is NOT a method to handle missing data in pandas? (CO4, K2)

(a) fillna() (b) dropna()

(c) interpolate() (d) drop_missing_values()

8. What does NumPy stand for? (CO4, K1)

(a) Numerical Python

(b) Numeric Processing

(c) Numerical Processing

(d) None of the above

9. Which of the following Matplotlib functions is used to create a scatter plot? (CO5, K1)

(a) plot() (b) scatter()

(c) bar() (d) hist()

10. In matplotlib, which method is used to save a plot to a file? (CO5, K6)

(a) save() (b) save_fig()

(c) savefig() (d) export()

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Write a python program to find the given number is odd or even. (CO1, K1)

Or

(b) What are the features of python? (CO1, K1)

12. (a) Develop a program to find the largest among three number. (CO2, K3)

Or

(b) Explain the syntax of the following statements (CO2, K3)

(i) for loop

(ii) while loop

13. (a) Define Inheritance. Explain each category of inheritance with an example program. (CO3, K5)

Or

(b) Create a class employee with data members: name, department and salary. Create suitable methods for reading and printing employee information. (CO3, K5)

14. (a) How can you create a NumPy array from a Python list? (CO4, K1)

Or

(b) Build a Numpy array filled with all zeros. (CO4, K6)

15. (a) How do you add annotations and text to a plot in Matplotlib? (CO5, K6)

Or

(b) How do you handle missing or NaN values when plotting data with Matplotlib? (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 word each.

16. (a) Explain the data types in python. (CO1, K1)

Or

(b) Write short notes on types of operators in python with appropriate example. (CO1, K1)

17. (a) What is dictionary? Explain the methods available in dictionary. (CO2, K3)

Or

(b) Elucidate the string and its methods with example. (CO2, K3)

18. (a) Write a python program which calculates areas of square, rectangle, circle using Abstraction concept. (CO3, K5)

Or

(b) Describe the built-in class attributes. (CO3, K5)

19. (a) Explain different ways of creating Data Frames in Panda. (CO4, K6)

Or

(b) (i) What is pandas in Python?

(ii) How do you import pandas in Python?

(iii) What are the primary data structures in pandas? (CO4, K1)

20. (a) Explain how you can use Matplotlib with other Python libraries for data visualization. (CO5, K6)

Or

(b) With suitable example explain the procedure to create a plot using Matplotlib. (CO5, K6)

R–2029	Sub. Code
	557104

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Artificial Intelligence and Data Science

DISCRETE MATHEMATICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** the following objective type questions by choosing the correct option.

1. The connective "¬" represents ————————. (CO1, K1)

   (a) AND (b) OR

   (c) NOT (d) IMPLIES

2. If $n(A) = 20$ and $n(B) = 30$ and $(A \cup B)$ =40 then $n(A \cap B)$ is ————————. (CO1, K2)

   (a) 20 (b) 30

   (c) 40 (d) 10

3. The relation p defined on Z by $a\ p\ b \leftrightarrow a\,b$ is odd is ————————. (CO2, K1)

   (a) Reflexive and Symmetric

   (b) Reflexive but not symmetric

   (c) Symmetric but not reflexive

   (d) Neither reflexive nor symmetric

4. Let $f : A \to B$ and $g : B \to C$ be two functions such that (gof): $A \to C$ is onto then g is ————————. (CO2, K2)

(a) $1-1$ (b) onto

(c) $1-1$ and onto (d) neither one-one nor onto

5. An algebraic system $(A,*)$ is said to be a semi group if ————————. (CO3, K1)

(a) * is closed operation on A

(b) * is an associative operation, for all a,b,c in A

(c) Both (a) and (b)

(d) None of these

6. Lagrange's theorem specifies ————————. (CO3, K2)

(a) the order of semigroup is finite

(b) the order of the subgroup divides the order of the finite group

(c) the order of an abelian group is infinite

(d) the order of the semigroup is added to the order of the group

7. An ———————— matrix are the two main ways to represent a graph G with a matrix. (CO4, K1)

(a) Adjacency (b) Incidence

(c) Both (a) and (b) (d) None of the above

8. If T is a tree and includes all the vertices of G, then T is a ———————— tree of G. (CO4, K2)

(a) Spanning

(b) Minimum Spanning

(c) Maximum Spanning

(d) Average Spanning

9. Bayes' theorem is primarily used for ————————.

(CO5, K1)

(a) Finding probabilities of independent events

(b) Updating probabilities based on new evidence

(c) Calculating expected values

(d) Determining the sum of probabilities

10. If $P(A) = 0.3$ and $P(B \mid A) = 0.5$, then what is $P(A \cap B)$?

(CO5, K2)

(a) 0.15 (b) 0.8

(c) 0.5 (d) 0.3

Part B $(5 \times 5 = 25)$

Answer **all** questions not more than 500 words each.

11. (a) Construct the Truth Tables for following formulas:

(CO1, K3)

(i) $\left(\neg P \wedge \left(\neg Q \wedge R\right)\right) \vee (Q \wedge R) \vee (P \wedge R)$

(ii) $(P \wedge Q) \vee \left(\neg P \wedge Q\right) \vee \left(P \wedge \neg Q\right) \vee \left(\neg P \wedge \neg Q\right)$

Or

(b) Show that $P(x) \wedge (x)Q(x) \Rightarrow (\exists x)\ (P(x) \wedge Q(x))$.

(CO1, K2)

12. (a) Prove that $(A \wedge B) \times (C \wedge D) = (A \times C) \wedge (B \times D)$.

(CO2, K4)

Or

(b) Discuss the properties of Binary Relations in a set.

(CO2, K2)

13. (a) Show that the intersection of any two congruence relations on a set is also a congruence relation. (CO3, K2)

Or

(b) If $< G, * >$ is an abelian group, the for all $a, b \in G$ show that $(a * b)^n = a^n * b^n$. (CO3, K3)

14. (a) Given a directed tree representation of the following formula: (CO4, K2)

$$\left(P \vee \left(\neg P \wedge Q\right)\right) \wedge \left(\left(\neg P \vee Q\right) \wedge \neg R\right)$$

Form this representation to obtain the corresponding prefix formula.

Or

(b) Prove that in a simple Graph with n vertices is always even. (CO4, K3)

15. (a) Using binominal distribution calculate $P(x = 0)$, $P(x = 1)$ and hence $P(x \geq 2)$. (CO5, K3)

Or

(b) Discuss the property of Poisson Distribution function. (CO5, K4)

Part C $(5 \times 8 = 40)$

Answer **all** the questions not more than 1000 words each.

16. (a) Obtain principal Disjunction Normal Forms of: (CO1, K6)

(i) $\neg P \vee Q$

(ii) $(P \wedge Q) \vee \left(\neg P \wedge R\right) \vee (Q \wedge R)$

(iii) $P \rightarrow \left((P \rightarrow Q) \wedge \neg\left(\neg Q \vee \neg P\right)\right)$

Or

(b) Show that $S \vee R$ is Tautologically implied by $(P \vee Q) \wedge (P \to R) \wedge (Q \to S)$. (CO1, K6)

17. (a) Let A be the set of factors of a particular positive integer m and let $\leq$ be the relation divides, i.e., (CO2, K5)

$\leq = \{< x, y > | \, x \in A \wedge y \in A \wedge (x \text{ divides } y)\}$ Draw Hasse diagrams for

(i) $m = 2$

(ii) $m = 6$

(iii) $m = 30$

Or

(b) Given A = {2,3,4}, B = {1,2} and C = {4,5,6} find $A + B$, $B + C$, $A + B + C$ and $(A + B) + (B + C)$. (CO2, K5)

18. (a) Statement every finite semigroup has an idempotent. (CO3, K3)

Or

(b) Let $< s, * >$ be a semigroup and $z \in S$ be a left zero. Statement for any x ∈ S, x ∈ z is also a left zero. (CO3, K4)

19. (a) From the adjacency matrix of a simple diagram, how will you determine whether it is a directed tree? If it is a directed tree, how will you determine its root and terminal nodes? (CO4, K2)

Or

(b) Prove that there is one and only one path between every pair of vertices in a tree. (CO4, K3)

20. (a) State and prove Baye's theorem. (CO5, K2)

Or

(b) Explain the relationship between Exponential and Poisson Distribution. (CO5, K3)

———————

R2030	Sub. Code
	557552

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Artificial Intelligence and Data Science

Elective – ADVANCED JAVA PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. _____ is NOT a principle of OOPS. (CO1, K1)

   (a) Polymorphism (b) Inheritance

   (c) Encapsulation (d) Compilation

2. Which feature does Java have that differentiates it from C and C++? (CO1, K2)

   (a) Low-level programming capabilities

   (b) Platform independence via JVM

   (c) Pointers

   (d) Operator overloading

3. _____ keyword is used to define a class in Java. (CO2, K1)

   (a) class (b) def

   (c) create (d) new

4. How do you create an object of a class named Car? (CO2, K2)

(a) Car myCar;

(b) Car myCar = new Car( );

(c) New Car myCar;

(d) myCar = Car( );

5. Which method is used to obtain metadata about the database in JDBC? (CO3, K1)

(a) getConnection( ) (b) getMetaData( )

(c) getStatement( ) (d) getDatabaselnfo( )

6. _____ method is used to retrieve data from a ResultSet. (CO3, K2)

(a) getData( ) (b) fetch( )

(c) getString( ) (d) read( )

7. RMI stands for _____ (CO4, K1)

(a) Remote Method Invocation

(b) Remote Machine Interaction

(c) Real-time Method Integration

(d) Remote Memory Interface

8. _____exception is thrown when a client attempts to look up a name that is not bound in the RMI Registry. (CO4, K2)

(a) Remote Exception

(b) Not Bound Exception

(c) Malformed URL Exception

(d) Security Exception

9. _____ class is used to create a button in AWT. (CO5, K1)

(a) Button (b) JButton

(c) JButtonControl (d) ActionButton

10. AWT stands for _____. (CO5, K1)

(a) Advanced Window Toolkit

(b) Abstract Window Toolkit

(c) Applet Window Toolkit

(d) Application Window Toolkit

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) How Java differs from C and C++? (CO1, K1)

Or

(b) Write a Java program on Fibonacci Series. (CO1, K5)

12. (a) Write a note on Wrapper Classes. (CO2, K1)

Or

(b) Elaborate about static members with example. (CO2, K2)

13. (a) Explain the purpose of Meta Data Function in JDBC. (CO3, K2)

Or

(b) Describe about SQL warning structure in JDBC. (CO3, K3)

14. (a) Discuss the role of RMI registry. (CO4, K2)

Or

(b) Describe the components of RMI application. (CO4, K2)

15. (a) Describe JButton class with example program. (CO5, K2)

Or

(b) How to detect End-of-file? Explain. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1,000 words each.

16. (a) Discuss in detail about Operators and their types. (CO1, K2)

Or

(b) Write a detailed note on Decision making with IF and SWITCH statements with example. (CO1, K1)

17. (a) Discuss about Package in detail with example. (CO2, K2

Or

(b) Write a Java program to display Employee details using class and object. (CO2, K3)

18. (a) How Exception Handling is implemented in JDBC? Explain. (CO3, K4)

Or

(b) Write the procedure to connect JDBC database with Java application in detail. (CO3, K5)

19. (a) What are the steps to build Client/Server Application using RMI. (CO4, K2)

Or

(b) Why the concept of serialization in RMI is important? Explain. (CO4, K2)

20. (a) Explain the various drawing methods in the content of Graphics. (CO5, K1)

Or

(b) Describe how to create Multi-pane interface using JTabbedPane. (CO5, K3)

———————

R2031	Sub. Code
	557301

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Artificial Intelligence and Data Science

BIG DATA ANALYTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. _____ containing a defined data type. (CO1, K1)

   (a) Structured data

   (b) Unstructured data

   (c) Semi Structured data

   (d) Table

2. _____ can perform massively parallelingest and custom analysis for web traffic parsing. (CO1, K2)

   (a) Alpine Miner (b) OpenRefine

   (c) Data Wrangler (d) Hadoop

3. _____ software uses a command-line interface (CLI) (CO2, K2)

   (a) C (b) C++

   (c) R (d) IoS

4. _____ is a group of functions sharing the same name but behaving differently depending on the number and the type of arguments they receive. (CO2, K2)

(a) Generic function (b) Inheritance

(c) Abstraction (d) Module

5. _____ is a modeling technique in which the penalty is proportional to the sum of the absolute values of the coefficients. (CO3, K6)

(a) Linear Regression (b) Lasso Regression

(c) Logical Regression (d) None

6. _____ refers to the problem of finding hidden structure within unlabeled data. (CO3, K6)

(a) Supervised (b) Unsupervised

(c) Semi supervised (d) None

7. _____ are all examples of ensemble methods that use multiple models to obtain better predictive performance (CO4, K6)

(a) Bagging (b) Boosting

(c) Random forest (d) None

8. _____ is a class of ensemble methods using decision tree classifiers (CO4, K6)

(a) Random forest (b) Tree

(c) Graph (d) Regression

9. _____ to store data in a distributed system.(CO5, K6)

(a) Hadoop Distributed File System (HDFS)

(b) MapReduce

(c) YARN

(d) None

10. _____ is an example of the NoSQL. (CO5, K6)

(a) Oracle

(b) MS Access

(c) SQL

(d) HBase

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) What are the three characteristics of Big Data, and what are the main considerations in processing Big Data? (CO1, K1)

Or

(b) Explain the differences between BI and Data Science. (CO1, K2)

12. (a) How many sections does a box-and-whisker divide the data into? What are these sections? (CO2, K2)

Or

(b) List out the differences between Data Exploration and Presentation. (CO2, K2)

13. (a) Approaches to improve Apriori's efficiency. (CO3, K6)

Or

(b) If the probability of an event occurring is 0.4, then (i) What is the odds ratio? (ii) What is the log odds ratio? (CO3, K6)

14. (a) Explain the trade-offs for precision recall. (CO4, K6)

Or

(b) What is a caveat of IDF? How does TFIDF address the problem? (CO4, K6)

15. (a) Use MapReduce in Hadoop to perform a word count on the specified dataset. (CO5, K6)

Or

(b) Compare and contrast Hadoop Pig, Hive, and HBase. (CO5, K6)

Part C ($5 \times 8 = 40$)

Answer **all** questions not more than 1,000 words each.

16. (a) Describe the challenges of the current analytical architecture for data scientists. (CO1, K1)

Or

(b) What are the key skill sets and behavioral characteristics of data scientist? (CO1, K2)

17. (a) With suitable example explain R Graphical User Interfaces. (CO2, K2)

Or

(b) Explain NOIR Attribute Types. (CO2, K2)

18. (a) (i) What is the Apriori property? (CO3, K6)

(ii) Following is a list of five transactions that Include items A, B, C and D:

T1 : {A, B, C}

T2 : {A, C}

T3 : {B, C}

T4 : {A, D}

T5 : {A, C, D}

Which item sets satisfy the minimum support of 0.5?

Or

(b) How are interesting rules identified? How are interesting rules distinguished from coincidental rules? (CO3, K6)

19. (a) Explain ARIMA Models. (CO4, K6)

Or

(b) For a binary classification, describe the possible values of entropy. On what conditions does entropy reach its minimum and maximum values? (CO4, K6)

20. (a) Develop and test a user-defined aggregate to calculate n factorial (n!), where n is an integer. (CO5, K6)

Or

(b) Describe four common deliverables for an analytics project. (CO5, K6)

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R2032	Sub. Code
	557302

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Artificial Intelligence and Data Science

DATA VISUALIZATION

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. Which of the following charts is most suitable for visualizing a correlation between three continuous variables? (CO1,K1)
   (a) Bar chart (b) Line chart
   (c) Bubble chart (d) Pie chart

2. What is the primary purpose of gridlines in charts? (CO1, K3)
   (a) To add aesthetic value to the chart
   (b) To divide the chart into equal segments
   (c) To aid in the visual alignment of data points with the axes, making it easier to read values
   (d) To label the axes

3. Which of the following is NOT a tool commonly used for programmatic data visualization? (CO2, K4)
   (a) D3.js (b) Tableau
   (c) Matplotlib (d) Microsoft Word

4. Which programming language is D3.js based on? (CO2, K3)
   (a) Java (b) Python
   (c) JavaScript (d) C++

5. What does D3 in D3.js stand for? (CO3, K4)
   (a) Data Driven Design
   (b) Data Display Documentation
   (c) Data-Driven Documents
   (d) Dynamic Data Display

6. What is a common use case for D3.js? (CO3, K2)
   (a) Building server-side applications
   (b) Creating interactive data visualizations for web pages
   (c) Developing mobile applications
   (d) Designing static images for print media

7. Which library is widely used for creating interactive and animated charts in web browsers? (CO4, K5)
   (a) D3.js
   (b) Microsoft Excel
   (c) Adobe Photoshop
   (d) Microsoft PowerPoint

8. Which of the following is a disadvantage of using excessive animations in charts? (CO4, K4)
   (a) It helps to highlight important data
   (b) It makes the chart too slow to load and can distract users
   (c) It improves user engagement
   (d) It simplifies the data representation

9. Which type of dashboard is most suitable for monitoring real-time data, such as website traffic or network activity? (CO5, K5)
   (a) Analytical dashboard
   (b) Strategic dashboard
   (c) Operational dashboard
   (d) Tactical dashboard

10. What is the primary purpose of an information dashboard? (CO5, K6)

(a) To display raw data in tables

(b) To provide quick and actionable insights at a glance

(c) To replace all forms of business reports

(d) To show historical data trends only

Part B $(5 \times 5 = 25)$

Answer **all** the questions not more than 500 words each.

11. (a) Write short note about Making use of HTML5 CANVAS. (CO1, K1)

Or

(b) Write about following charting Primitives: (i) Pie Charts, (ii) Area Charts. (CO1, K3)

12. (a) How to draw A Simple Colunm Chart using Google charts API? (CO2, K4)

Or

(b) How to Build a basic table? What is Semantic Table Markup? (CO2, K3)

13. (a) Explain main components of D3.js. (CO3, K4)

Or

(b) Explain Various Functions in D3.js. (CO3, K2)

14. (a) How to make interactive button? Explain with example. (CO4, K5)

Or

(b) Explain select and append command in D3.js with example. (CO4, K4)

15. (a) What are the key Factors of Data Visualization? (CO5, K5)

Or

(b) Differentiate between Linear Scale and Ordinal Scale. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1,000 words each.

16. (a) Explain about Acquiring and Visualizing Data. (CO1, K1)

Or

(b) Explain in detail about the Applications of Data Visualization. (CO1, K3)

17. (a) Explain about adding Animation to your Canvas chart. (CO2, K4)

Or

(b) Explain about Styling your data table for better data visualization. (CO2, K3)

18. (a) Explain about Making selections, changing selection's attribute in D3.js. (CO3, K4)

Or

(b) Explain data-joins in D3.js with example. (CO3, K2)

19. (a) How to add Play button to the page? Explain with example. (CO4, K4)

Or

(b) Describe Loading and Filtering External Data in data visualization. (CO4, K5)

20. (a) Develop Following Program Using HTML5 and JavaScript Read JSON Data and draw Data Table. (CO5, K5)

Or

(b) Enlist Dashboard design issues in Data Visualization. (CO5, K6)

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R2033	Sub. Code
	557303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Artificial Intelligence

VIRTUAL REALITY AND AUGMENTED REALITY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following is the most essential hardware for experiencing virtual reality? (CO1, K1)
   (a) Monitor
   (b) Keyboard
   (c) Head-Mounted Display (HMD)
   (d) Mouse

2. In VR, the sense of being physically present in a non-physical world is called ————————. (CO1, K1)
   (a) Interaction (b) Immersion
   (c) Simulation (d) Reality

3. ———————— is an output interface in Virtual Reality. (CO2, K1)
   (a) Motion Tracker (b) 3D Scanner
   (c) Haptic Device (d) Video-Based Input

4. ———————— technique is used to optimize rendering large-scale environments in Virtual Reality. (CO2, K2)
   (a) Real-time rendering
   (b) Level of Detail (LOD)
   (c) Depth buffering
   (d) Texture mapping

5. What is the primary advantage of using 3D menus in Virtual Reality? (CO3, K1)

(a) They simulate physical properties

(b) They provide an immersive way to interact with options and settings

(c) They track hand gestures

(d) They are used for body tracking

6. ———— technique is used to simulate real-world physical properties in Virtual Reality. (CO3, K2)

(a) Geometric Modeling

(b) Behavior Simulation

(c) Physically Based Simulation

(d) Motion Capture

7. ———— is a key component in the structure of an Augmented Reality system. (CO4, K1)

(a) Cloud Storage (b) Sensors

(c) Blockchain (d) Machine Learning

8. Customization in AR allows users to ————. (CO4, K2)

(a) Modify hardware settings

(b) Tailor AR experiences based on user preferences and environments

(c) Control the physical movement of AR devices

(d) Track real-time social interactions

9. ———— is a development tool used in Virtual Reality. (CO5, K1)

(a) Unity (b) Blockchain

(c) Hadoop (d) Python

10. Which framework is widely used for real-time rendering in VR? (CO5, K2)

(a) OpenAI (b) Unreal Engine

(c) Vega (d) TensorFlow

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Describe the fundamental Concepts of Virtual Reality. (CO1, K2)

Or

(b) What are the primary features of Virtual Reality? Explain. (CO1, K2)

12. (a) Describe the role of sensors in Virtual Reality and how they enhance user interaction. (CO2, K2)

Or

(b) What is the importance of real-time rendering in Virtual Reality? (CO2, K3)

13. (a) Discuss the role of geometric modeling in Virtual Reality. (CO3, K2)

Or

(b) What is body tracking in Virtual Reality, and how does it improve user interaction? (CO3, K3)

14. (a) How is geo-location used in AR technology? Explain. (CO4, K1)

Or

(b) Discuss the key technologies involved in the development of Augmented Reality. (CO4, K2)

15. (a) What are some of the key development tools used in Virtual Reality? (CO5, K2)

Or

(b) Explain the role of VR technology in enhancing physical exercises and gaming experiences. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Illustrate the Components of Virtual Reality. (CO1, K2)

Or

(b) Describe the present development in Virtual Reality. (CO1, K2)

17. (a) Explain the various input and output devices in Virtual Reality. (CO2, K2)

Or

(b) Discuss the fundamentals of computer graphics in Virtual Reality. (CO2, K1)

18. (a) Discuss the significance of physically based simulation in Virtual Reality and its impact on the realism of the virtual environment. (CO3, K4)

Or

(b) Explain the various interactive techniques used in Virtual Reality, including body tracking, hand gestures, 3D menus, and object grasp. (CO3, K2)

19. (a) Illustrate the structure of an Augmented Reality system and its key components. (CO4, K2)

Or

(b) Explain the concept of Augmented City Maps and how they integrate with AR technologies for navigation and real-world interactions. (CO4, K3)

20. (a) Discuss the X3D standard in detail. How does it support the development of Virtual Reality applications? (CO5, K4)

Or

(b) Explain the application of Virtual Reality in digital entertainment, particularly in film, TV production, and gaming. (CO5, K5)

R2034	Sub. Code
	557304

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Artificial Intelligence and Data Science

INTERNET OF THINGS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions by choosing the correct option.

1. What is the primary purpose of NETCONF? (CO1, K2)

   (a) To facilitate network troubleshooting

   (b) To provide a way to manage network devices and configurations

   (c) To encrypt network traffic

   (d) To monitor network performance

2. What is a primary application of M2M technology in IoT? (CO1, K2)

   (a) Social media interaction

   (b) Remote monitoring of industrial equipment

   (c) Web browsing

   (d) Video streaming

3. In IoT architecture, the network layer is responsible for (CO2, K4)

(a) Data visualization

(b) Collecting raw data from sensors

(c) Facilitating communication between devices and cloud services

(d) Storing and managing data

4. In IoT architecture, what is the significance of using YANG? (CO2, K4)

(a) It visualizes data for user interfaces.

(b) It defines data models used for network configurations.

(c) It provides real-time data processing capabilities.

(d) It encrypts communication between devices.

5. Which of the following is a primary difference between Raspberry Pi and Arduino? (CO3, K4)

(a) Raspberry Pi is a microcontroller; Arduino is a microprocessor

(b) Raspberry Pi runs a full operating system, while Arduino runs on firmware.

(c) Arduino has more GPIO pins than Raspberry Pi.

(d) Raspberry Pi is only used for robotics, while Arduino is for IoT applications.

6. When using Raspberry Pi for IoT projects, what is a popular programming language used for data processing and web applications? (CO3, K4)

(a) HTML (b) Python

(c) C# (d) Ruby

7. Which of the following best describes an IoT endpoint? (CO4, K2)

(a) A device that stores data

(b) A device or node that collects data and sends it to the cloud or another device

(c) A software application used to manage IoT devices

(d) A network component that secures data transmission

8. Which of the following is a key benefit of using cloud computing for IoT? (CO4, K2)

(a) Increased local storage capacity

(b) Scalability and flexibility in handling data

(c) Reduced need for internet connectivity

(d) Simplified device design

9. Which of the following cloud platforms is widely used for IoT solutions? (CO5, K5)

(a) Amazon Web Services

(b) Google Drive

(c) Dropbox

(d) Microsoft Word

10. Which of the following tools is commonly used for data analytics in IoT applications? (CO5, K5)

(a) Microsoft Word

(b) Google Sheets

(c) Apache Hadoop

(d) AWS

Part B $(5 \times 5 = 25)$

Answer **all** the questions not more than 500 words each

11. (a) Define IoT. List out the Features of IoT. (CO1, K2)

Or

(b) Write about the IoT enabling technologies (CO1, K2)

12. (a) Explore the security challenges in IoT architecture. (CO2, K4)

Or

(b) Describe the role of the middleware layer in IoT architecture. (CO2, K4)

13. (a) Analyze the use of ZigBee. (CO3, K4)

Or

(b) Tabulate the protocol stacks utilizing IEEE 802.15.4. (CO3, K4)

14. (a) Illustrate the block diagram of IoT Device. (CO4, K2)

Or

(b) Analyze the interfaces in Raspberry Pi. (CO4, K2)

15. (a) Briefly explain Cloud architecture for IoT. (CO5, K5)

Or

(b) Explain the IoT design constraints (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Describe various functional blocks of IoT. (CO1, K4)

Or

(b) Explain the IoT protocols with block diagram. (CO1, K2)

17. (a) Describe IoT reference model. (CO2, K4)

Or

(b) Explain IETF architecture for IoT. (CO2, K4)

18. (a) Analyze in detail the IoT Application protocol and their characteristics with suitable illustration. (CO3, K4)

Or

(b) Explain in detail about the architecture of Zigbee. (CO3, K4)

19. (a) Analyze and explain in detail Programming Raspberry Pi with python by giving suitable example. (CO4, K2)

Or

(b) Explain in brief the basic building block and layers in IoT system with diagram. (CO4, K2)

20. (a) Prepare an IoT strategy for smart city and design the layered architecture for implementing smart cities. (CO5, K5)

Or

(b) Write a short note on Data Analytics for IoT. (CO5, K5)

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R2035	Sub. Code
	557559

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Artificial Intelligence And Data Science

Elective: SOCIAL MEDIA ANALYTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option

1. What is Social Media Analytics primarily used for? (CO1, K2)

   (a) Scheduling social media posts

   (b) Collecting, Analyzing, and interpreting data from social media platforms

   (c) Designing social media profiles

   (d) Blocking unwanted followers

2. What is the primary function of a web analytics platform? (CO1, K2)

   (a) Designing websites

   (b) Tracking and reporting website traffic

   (c) Developing mobile applications

   (d) Creating marketing content

3. What is the purpose of the <script>tag in HTML? (CO2, K4)

(a) To define CSS styles

(b) To include JavaScript code in an HTML document

(c) To link an external HTML page

(d) To create hyperlinks in a webpage

4. What is the primary goal of web analytics? (CO2, K4)

(a) To design and develop websites

(b) To measure, analyze, and optimize web traffic and user behavior

(c) To create marketing strategies for social media

(d) To manage website hosting and security

5. Which metric measures the percentage of visitors who leave a site after viewing only one page? (CO3, K4)

(a) Pageviews (b) Conversion Rate

(c) Bounce Rate (d) Click-Through Rate (CTR)

6. What is micro-text in the context of NLP? (CO3, K4)

(a) Text that consists of large documents with complex sentences

(b) Short, informal text such as tweets, SMS, or social media posts

(c) Text extracted from books and research papers

(d) Text with structured grammar and syntax

7. What was the primary purpose of Google Website Optimizer? (CO4, K2)

(a) To create new websites

(b) To optimize speed and performance

(c) To run A/B and multivariate tests for website optimization

(d) To analyze website traffic

8. Which of the following sources would contribute to organic traffic? (CO4, K2)

(a) Google search results

(b) Paid search ads

(c) Email campaigns

(d) Display advertising

9. Which of the following is a key benefit of conducting heuristic evaluations? (CO5, K5)

(a) They require extensive user research

(b) They can be conducted quickly and with minimal resources

(c) The guarantee a perfect user interface

(d) They focus solely on aesthetic design

10. Which of the following metrics is most commonly associated Web Analytics 1.0? (CO5, K5)

(a) Social shares

(b) Conversion rate

(c) Page views and unique visitors

(d) Customer lifetime value

Part B $(5 \times 5 = 25)$

Answer **all** the questions not more than 500 words each

11. (a) Explain Application of SMA in different social media platforms. (CO1, K2)

Or

(b) Write a short note on social media platforms (CO1, K2)

12. (a) Explain the Web logs (CO2, K4)

Or

(b) Explain Panel Based measurement (CO2, K4)

13. (a) Define Web crawling. Enlist its roles (CO3, K4)

Or

(b) Write a short note on Web analytics tools (CO3, K4)

14. (a) Briefly explain categories of traffic (CO4, K2)

Or

(b) Explain Google website optimizer (CO4, K2)

15. (a) Enlist benefits of surveys. (CO5, K5)

Or

(b) Narrate the limitations of Web analytics 1.0 (CO5, K5)

Part C (5 × 8 = 40)

Answer **ALL** the questions not more than 1000 words each

16. (a) Discuss the role of SMA in Small and large organization (CO1, K2)

Or

(b) Describe the need of web analytics in detail (CO1, K2)

17. (a) Elaborate on ISP based measurement, (CO2, K4)

Or

(b) Discuss Link Coding Issues. (CO2, K4)

18. (a) Elaborate ob Common Web Metrics (CO3, K4)

Or

(b) Explain Natural Language Processing Techniques for Micro-text Analysis (CO3, K4)

19. (a) Elaborate on Social Network Analysis (CO4, K2)

Or

(b) Discuss Measuring and analyzing social campaigns (CO4, K2)

20. (a) What is heuristic evaluations? Enlist benefits of heuristic evaluations (CO5, K5)

Or

(b) Discuss website traffic analysis in detail (CO5, K5)

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