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Printed Page:-4 **Subject Code:- AMICSAI0713**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
M.Tech Integrated
SEM: VII - THEORY EXAMINATION (2025 - 2026)
Subject: Programming for Data Analytics

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. List down the following is not a method to read data into a DataFrame in Pandas? (CO1,K1) 1

(a) pd.read_csv()
(b) pd.read_excel()
(c) pd.read_table()
(d) pd.read_html()

1-b. Select the correct answer to check the data types of the columns in a DataFrame in pandas? (CO1,K1) 1

(a) df.columns
(b) df.dtypes
(c) df.shape
(d) df.describe()

1-c. The Dplyr function used to select specific columns is (CO2, K2) 1

(a) select()
(b) mutate()
(c) arrange()
(d) filter()

1-d. Exploratory Data Analysis (EDA) involves (CO2, K2) 1

(a) Building predictive models
(b) Importing data
(c) Understanding data patterns
(d) Writing packages

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1-e. The Python module used to connect SQLite databases is _____.(CO3, K1) 1

(a) mysql.connector
(b) sqlite3
(c) psycopg2
(d) pymongo

1-f. INSERT INTO students VALUES (...) is a _____ command.(CO3, K1) 1

(a) DML
(b) DDL
(c) DCL
(d) XML

1-g. Tick correct choice for the following is a type of TensorFlow API?(CO4, K2) 1

(a) Estimators
(b) Keras
(c) Layers
(d) All of the above

1-h. Select right option of the following is a common problem in training a CNN? (CO4, K2) 1

(a) Overfitting
(b) Underfitting
(c) Gradient vanishing
(d) All of the above

1-i. List of the following is NOT a commonly used activation function in deep learning?(CO5,K1) 1

(a) Sigmoid
(b) Tanh
(c) Linear
(d) None of these

1-j. Select right one of the following is a commonly used loss function in deep learning for binary classification tasks?(CO5,K2) 1

(a) Mean squared error
(b) Binary cross-entropy
(c) Categorical cross-entropy
(d) Noise error

2. Attempt all parts:-

2.a. List down steps to create a scatter plot using matplotlib in Python?(CO1,K1) 2

2.b. Define the use of distinct() in respect of R with example. (CO2,K1) 2

2.c. Define SQLite and its purpose in Python applications.(CO3, K1) 2

2.d. Specify the purpose of a softmax activation function in TensorFlow? (CO4, K2) 2

2.e. Explain concept of transfer learning?(CO5,K2) 2

SECTION-B 30

3. Attempt all parts:-

3.a. Answer any <u>one</u> of the following:-

3.a.(i)	Define Pandas Series and DataFrame. How do they differ in structure and usage? Give one simple example of each. (CO1,K1)	6
3.a.(ii)	Evaluate how hypothesis testing can be used to verify business assumptions. Provide one example scenario. (CO1,K5)	6

3.b. Answer any one of the following:-

3.b.(i)	Discuss how Dplyr functions such as filter(), select(), mutate(), and summarize() contribute to efficient data manipulation in R..(CO2, K2)	6
3.b.(ii)	Evaluate the use of Stringr's regular expression functions (str_detect, str_replace, str_extract) for preprocessing text data in real-world projects..(CO2, K5)	6

3.c. Answer any one of the following:-

3.c.(i)	Describe the complete process of connecting a Python program to an SQLite database and performing multiple queries through a cursor object.(CO3, K2)	6
3.c.(ii)	Elaborate the concept of DDL and DML operations in SQLite with Python code examples showing their practical use.(CO3, K4)	6

3.d. Answer any one of the following:-

3.d.(i)	Explain the process of building a simple linear regression model using TensorFlow.(CO4,K3)	6
3.d.(ii)	Specift convolutional neural network, and how is it used in image recognition tasks in TensorFlow?(CO4, K2)	6

3.e. Answer any one of the following:-

3.e.(i)	Discuss the concept of deep neural network architectures and their applications in deep learning.(CO5,K2)	6
3.e.(ii)	Explain the concept of adversarial attacks in deep neural networks and discuss some techniques to defend against them.(CO5,K2)	6

<u>SECTION-C</u> 50

4. Answer any <u>one</u> of the following:-

4-a.	Demonstrate how to calculate mean, median, variance, and standard deviation using Pandas for a given dataset. Explain the significance of these statistics. (CO1,K3)	10
4-b.	Design a workflow in Python or R to import, clean, transform, and summarize a large dataset for further analysis. Include libraries and functions used at each step (CO1,K6).	10

5. Answer any <u>one</u> of the following:-

5-a.	Illustrate concept of List in R? Explain creation, accessing and manipulation of List with example in R.(CO2,K2)	10
5-b.	Analyze how R-Shiny enhances interactivity and user engagement in data-driven applications. Discuss its architecture and advantages over static dashboards.(CO2, K5)	10

6. Answer any <u>one</u> of the following:-

6-a.	Elaborate the concept of exception hierarchy in SQLite and describe different approaches to handle operational, integrity, and programming errors in Python.(CO3, K3)	10

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6-b.	Explain the structure, components, and workflow of MongoDB, emphasizing its flexibility and schema-less design in comparison to SQLite.(CO3, K2)	10

7. Answer any one of the following:-

7-a.	Explain concept to visualize the filters learned by a convolutional layer in a CNN using Python?(CO4,K2)	10
7-b.	A customer service chatbot needs to understand user messages. Explain how TensorFlow can be used for text preprocessing, embedding, and sequence prediction.(CO4, K3)	10

8. Answer any one of the following:-

8-a.	Explain that some emerging trends in deep neural networks, such as transfer learning, meta-learning, and neural architecture search, and how are they being applied in practice?(CO5,K2)	10
8-b.	Explain some common architectures used in GANs, such as deep convolutional GANs and Wasserstein GANs, and how are they used in practice? (CO5,K2)	10