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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - 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:-

(1.1) State what are Pandas primarily used for in Python? [CO1,K1]

1

- (a) Web development
- (b) Data manipulation and analysis
- (c) Game development
- (d) Networking

(1.2) State, a Series in Pandas is? [CO1,K1]

1

- (a) 1D structure
- (b) 2D table
- (c) Graph
- (d) Decision making

(1.3) State, what does re.findall() return ? [CO2,K1]

1

- (a) First match only
- (b) All matches in string
- (c) Replace text
- (d) Split text

(1.4) Identify, SQLite cursor is used to ? [CO2,K1]

1

- (a) Store database
- (b) Execute queries
- (c) Delete database
- (d) Create variables

(1.5) Identify, which database is file-based? [CO3,K1]

1

- (a) MongoDB
 - (b) MySQL
 - (c) SQLite
 - (d) Oracle
- (1.6) State, which is NOT a DML command? [CO3,K1] 1
- (a) CREATE
 - (b) INSERT
 - (c) UPDATE
 - (d) DELETE
- (1.7) State, what outlines the definition of 'Tokens' in NLP? [CO4,K1] 1
- (a) Computer networks
 - (b) NLP tasks
 - (c) Database
 - (d) OS
- (1.8) Identify the plan multi-threading in TF uses which module? [CO4,K1] 1
- (a) Optimizer
 - (b) Activation function
 - (c) Loss function
 - (d) Layer type
- (1.9) State, an agent in RL interacts with? [CO5,K1] 1
- (a) Data
 - (b) Environment
 - (c) Code
 - (d) Database
- (1.10) State which optimizer is commonly used for gradient descent optimization in TensorFlow? [CO5,K1] 1
- (a) Error
 - (b) Output
 - (c) Feedback signal
 - (d) Input

2. Attempt all parts:-

- (2.1) Define sensitivity analysis. Why perform sensitivity analysis in modeling? [CO1,K2] 2
- (2.2) Explain is a NoSQL database? Give one example? [CO2,K2] 2
- (2.3) Discuss what is SQLite? Is SQLite server-based or file-based? Write the command to create a new SQLite database? [CO3,K2] 2
- (2.4) Differentiate between global variables and local variables in TensorFlow? [CO4,K2] 2
- (2.5) Discuss the practical applications of autoencoders in deep learning? [CO5,K2] 2

SECTION-B

30

Answer any one of the following:-

(3.1)	Explain the concept of null hypothesis and alternative hypothesis with examples? [CO1,K2]	6
(3.2)	Discuss what does a p-value indicate? Explain its significance in hypothesis testing? [CO1,K2]	6
Answer any one of the following:-		
(3.3)	Discuss and write the steps to create, build, check, and install a custom R package? [CO2,K2]	6
(3.4)	Explain what is the plyr package used for in R and also discuss is plyr faster than dplyr, what does plyr stand for? [CO2,K2]	6
Answer any one of the following:-		
(3.5)	Discuss and write the steps to connect to a database, execute a query, and process results in Python? [CO3,K2]	6
(3.6)	Discuss different types of SQL commands with examples? [CO3,K2]	6
Answer any one of the following:-		
(3.7)	Discuss LSTM cell structure and the mathematical logic behind the forget gate? [CO4,K2]	6
(3.8)	Differentiate between standard RNNs and Advanced RNNs (GRU/LSTM)? [CO4,K4]	6
Answer any one of the following:-		
(3.9)	Explain neural network architecture in deep learning? [CO5,K2]	6
(3.10)	Explain optimization techniques used to minimize loss in deep learning models? [CO5,K2]	6
<u>SECTION-C</u>		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Define p-value. Explain its role in hypothesis testing and differentiate between p-value approach and critical value approach? [CO1,K2]	10
(4.2)	Describe Type I and Type II errors in hypothesis testing. Explain their probabilities, consequences, and relationship with power of the test? [CO1,K2]	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Discuss and elaborate on the framework of a Shiny app. Describe reactive programming, UI, and server logic with a working example? [CO2,K2]	10
(5.2)	Analyze the use of major dplyr verbs like filter(), select(), mutate(), summarize(), and group_by() for efficient data processing? [CO2,K4]	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Analyze the suitability of SQLite and MongoDB for different application scenarios? [CO3,K4]	10
(6.2)	Discuss and design a hybrid system combining relational and NoSQL databases and justify the approach? [CO3,K2]	10
7. Answer any <u>one</u> of the following:-		
(7.1)	Describe the architecture and workflow of TensorFlow Serving. Explain how to expose a model as a REST API endpoint? [CO4,K2]	10

- (7.2) Describe the process of managing data with TensorFlow Queues and Threads. Illustrate by writing a script to read a CSV file? [CO4,K2] 10
8. Answer any one of the following:-
- (8.1) Discuss how deep reinforcement learning is used to solve complex real-world problems. Illustrate with case studies? [CO5,K2] 10
- (8.2) Discuss convergence issues in deep learning models in detail. Explain their causes and remedial measures? [CO5,K2] 10

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