

D-2029

Sub. Code

51811

DISTANCE EDUCATION

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.**

First Semester

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

(CBCS 2021 Calendar Year onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is meant by the AI problem?
2. Define the initial state in a problem space.
3. What is the generate-and-test strategy?
4. Define local maxima in hill climbing.
5. What is a representation mapping?
6. Give a short note on conceptual graphs.
7. Define an ISA relationship with an example.
8. Distinguish between forward reasoning and backward reasoning.
9. What is learning in AI?
10. Identify the use of genetic learning.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the criteria for success in AI techniques with examples.

Or

- (b) Describe the working of a production rule.

12. (a) Differentiate between steepest-ascent and simple hill climbing.

Or

- (b) Explore how constraint satisfaction can be used in scheduling problems.

13. (a) Compare procedural and declarative knowledge.

Or

- (b) Discuss the frame-based representation technique.

14. (a) Detail the importance of representing simple facts in logic.

Or

- (b) Analyze how inference mechanisms operate in AI.

15. (a) Outline the concept of rote learning with examples.

Or

- (b) Illustrate explanation-based learning with a case study.

PART C — ($3 \times 10 = 30$ marks)

Answer any **THREE** questions.

16. Describe the state space search process with an example and diagram.
 17. Analyze the working of best-first search with a step-by-step example.
 18. Discuss issues in knowledge representation and how they can be addressed.
 19. Explain matching and control knowledge in AI reasoning.
 20. Compare and contrast supervised, unsupervised, and reinforcement learning.
-

D-2030

Sub. Code

51812

DISTANCE EDUCATION

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.**

First Semester

**RELATIONAL DATABASE MANAGEMENT SYSTEM
(RDBMS)**

(CBCS 2021 Calendar Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is a data model?
2. List any two advantages of using DBMS over file systems.
3. Define: Cardinality and Degree of a relation.
4. What is a weak entity? Give an example.
5. Mention the purpose of the GROUP BY clause in SQL.
6. What is the difference between WHERE and HAVING clause?
7. Define: Relational Algebra.
8. What is the use of tuple variables in Relational Calculus?
9. Mention two important features of Distributed Databases.
10. What are the uses of hashing in databases?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the levels of data abstraction in a database system.

Or

- (b) Describe the role and responsibilities of a database user.

12. (a) Explain the steps involved in ER to table conversion with an example.

Or

- (b) Discuss different types of keys in a relational model.

13. (a) Write and explain any five SQL commands for data manipulation.

Or

- (b) Explain the usage of subqueries in FROM clause with an example.

14. (a) What are the different types of operations in Relational Algebra? Explain any five.

Or

- (b) Differences between Relational Algebra and Calculus.

15. (a) Explain functional dependency with examples.

Or

- (b) What are the properties of transactions? Explain the same.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the architecture of DBMS and its components.
 17. Explain the Normalization process up to 3NF with examples.
 18. Elaborate on the SQL Joins with syntax and output explanation.
 19. Explain any two Concurrency control techniques in detail.
 20. Explain the RAID levels and advantages.
-

D-2031

Sub. Code

51813

DISTANCE EDUCATION

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.

First Semester

R PROGRAMMING

(CBCS 2021 Calendar Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Mention different data types in R.
2. What is an expression in R?
3. What is a user-defined function in R?
4. Identify the purpose of merging lists.
5. Define a factor in R.
6. How do you check the structure of a data frame?
7. How can you load a package into the R environment?
8. What is the method to read a CSV file in R?
9. How do you connect R with a MySQL database?
10. Outline the use of line graphs in R.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Describe how to set up the R environment..

Or

- (b) Elaborate on the operator types supported in R and their uses.

12. (a) Summarize common string manipulation techniques in R.

Or

- (b) Write a function that accepts a vector, multiplies all elements by 2, and returns the result.

13. (a) Discuss the creation and usage of matrices in R.

Or

- (b) Create a data frame for student details and extract names using R.

14. (a) Explain how to reshape data frames using melt and cast.

Or

- (b) Find the differences between reading CSV and Excel files.

15. (a) Enumerate the steps to create a scatter plot in R.

Or

- (b) Create a table and insert sample data into MySQL using R.

PART C — ($3 \times 10 = 30$ marks)

Answer any **THREE** questions.

16. Explain all types of loops in R programming with examples.
 17. Discuss the creation, manipulation, and advantages of using vectors in R.
 18. Write an essay on arrays in R: creation, naming, and operations with examples.
 19. Describe how file handling supports data analysis workflows in R.
 20. Compare pie charts, bar charts, and histograms in terms of usage.
-

D-2032

Sub. Code

51821

DISTANCE EDUCATION

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.**

Second Semester

Distance Education

FUNDAMENTALS OF MACHINE LEARNING

(CBCS 2021 Calender Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define: Features and Labels in Machine Learning.
2. What is the difference between AI and ML?
3. State the usage of the Training and Testing datasets.
4. What is a statistical learning framework?
5. Write any two key differences between parametric and non-parametric methods.
6. What is pruning in Decision Tree classification?
7. Mention two distance measures used in clustering.
8. Define: Markov Decision Process.
9. Mention any two software tools used in ML development.
10. What is the role of Dropout in Deep Learning?

PART B – (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b)

11. (a) Explain the process of Data Preprocessing with suitable steps.

Or

- (b) Compare Machine Learning vs Artificial Intelligence with appropriate examples.

12. (a) Explain Cross-validation and its importance in ML model evaluation.

Or

- (b) Discuss parametric and non-parametric methods with two examples each.

13. (a) Explain the working of k-Nearest Neighbor (k-NN) algorithm.

Or

- (b) Write short notes on Neural Network classification and backpropagation.

14. (a) What are the different types of clustering techniques? Explain.

Or

- (b) Write a note on density-based clustering with an example.

15. (a) Explain Reinforcement Learning using Monte Carlo methods.

Or

- (b) Explain the architecture and features of Convolutional Neural Networks (CNN).

PART C – (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the entire process of building and evaluating a Machine Learning model.
 17. Discuss any five supervised learning algorithms with their use cases.
 18. Explain the role of software tools like Weka, TensorFlow, and Keras in ML development.
 19. Write in detail about Autoencoders and their role in unsupervised deep learning.
 20. Explain Recurrent Neural Networks and Time Series Forecasting with an example.
-

D-2033

Sub. Code

51822

DISTANCE EDUCATION

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.

Second Semester

PRINCIPLES OF SOFT COMPUTING

(CBCS 2021 Calendar Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define hard computing with one example.
2. What are the constituents of soft computing?
3. Mention two applications of Artificial Neural Networks. .
4. What is the purpose of fuzzification?
5. State any two characteristics of fuzzy relations.
6. Define: Genetic Algorithm.
7. What are fuzzy rules? Give one example.
8. What is an ART network used for?
9. What is the difference between crisp set and fuzzy set?
10. Write any two advantages of using fuzzy inference systems.

PART B – (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b)

11. (a) Basic terminologies and applications of ANN.
Or
(b) Compare soft computing and hard computing.
12. (a) Explain Hopfield Network.
Or
(b) Discuss Backpropagation Network.
13. (a) Write about Counter Propagation Network.
Or
(b) What is Learning rules in SOM?. Explain.
14. (a) Discuss Membership Functions (MFs).
Or
(b) Brief about Defuzzification Methods.
15. (a) Explain Genetic Operators.
Or
(b) Discuss Fuzzy Logic Control System (FLC).

PART C – (3 × 10 = 30 marks)

Answer ANY THREE questions.

16. Elaborate on the characteristics and components of ADALINE and MADALINE Networks.
17. Explain any one Associative Memory Networks with its working, matrix representation.
18. Discuss the various forms of Fuzzy Arithmetic & Extension Principle with numerical examples.

19. Explain the rule formation and logical flow of Fuzzy & Approximate Reasoning.
 20. Explain the concepts of GA Encoding, Selection, and Mutation in detail.
-

D-2034

Sub. Code

51823

DISTANCE EDUCATION

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING EXAMINATION, MAY 2026.**

Second Semester

PYTHON PROGRAMMING

(CBCS 2021 – Calender Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How do you install Python on Windows?
2. What is the use of the printf() function?
3. Define parameters and arguments.
4. How do you traverse a string?
5. What is a list in Python?
6. How do you create a tuple?
7. Identify the use of the 'in' and 'not in' operators with sets.
8. What is a dictionary in Python?
9. Mention the use of NumPy.
10. What is Sympy in Python?

SECTION B – (5 × 5 = 25 marks)

Answer ALL questions, choosing by either (a) or (b)

11. (a) State the purpose of break and continue statements.
- Or
- (b) Explain decision control statements with examples.
12. (a) Differentiate between local and global variables with examples.
- Or
- (b) Write a note on string concatenation and replication.
13. (a) Discuss built-in functions that can be used with lists.
- Or
- (b) Describe how to sort and traverse a tuple. Give Python Code.
14. (a) Demonstrate set union and intersection operations.
- Or
- (b) Explore the use of key-value pairs in dictionaries.
15. (a) Write a note on Matplotlib and its visualizations.
- Or
- (b) Write a Python script to write data into a text file.

SECTION C – (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the use of operators and expressions with examples.
17. Explain functions in Python, their types and their applications.

18. Evaluate in detail about list creation, access and manipulation.
 19. Examine dictionary class methods and their applications.
 20. Describe file handling in Python with examples for text input/output.
-