

Total No. of Pages : 02

Roll No.

Total No. of Questions : 07

B.Sc. (Artificial Intelligence & Machine Learning) (Sem-1)

PROGRAMMING IN PYTHON

Subject Code : UGCA1914

M. Code : 79005

Date of Examination : 09-06-2023

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Define garbage collection.
- b) How are files renamed in python?
- c) What happens when an exception is raised in a program?
- d) Explain the utility of lambda functions.
- e) List the differences between lists and tuples.
- f) Differentiate between local and global variables.
- g) Write a program to find the larger of two numbers using if-else statement.
- h) Write a program to print first 10 numbers using while loop.
- i) What is slicing operator? How can you extract a substring from a given string?
- j) Write a program to perform string concatenation.

SECTION-B

2. Discuss various types of data types supported by Python. Write a program to demonstrate implicit and explicit data conversions.
3. Write a short note on the input-output functions available in Python. Write a program to input the address of a user. Display the result by breaking it in multiple lines.
4. Explain the syntax of for loop. With the help of an example explain the utility of range() in for loop.
5. What do you understand by the term arguments? How do we pass them to a function? *Arguments may be-passed in the form of expressions to the called function.* Justify this statement with the help of an example.
6. Write a detailed note on the os module. Explain the various methods in the os module that help programmers to work with directories
7. Write a detailed note on opening and closing files in Python. Write about the various access modes. Also, discuss the attributes of the File Object.

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Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (AI&ML) (Sem-2)

ENVIRONMENTAL SCIENCE

Subject Code : EVS102-18

M.Code : 79862

Date of Examination : 07-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Name three types of Ecological pyramids.
- b) Name four major layers of atmosphere.
- c) What is watershed management?
- d) What is meant by flow of energy in the ecosystem?
- e) What are natural resources? Give the classification on the basis of origin.
- f) Give two examples of Detritus food chains.
- g) What are acceptable noise levels for a hospital?
- h) What is water logging?
- i) Give the classification of "Indirect Values" of Bio-diversity.
- j) What is Bio-informatics?

SECTION-B

2. What is ecological succession? Explain types of Ecological succession.
3. What are landslides? What are the causes of landslides?
4. What is rain water harvesting? Discuss its advantages.
5. What is soil erosion? What are the agents of soil erosion?
6. What is the effect of depletion of ozone layer on human beings? Discuss.
7. What are 'Hot spots of Bio-diversity'? Name the hotspots of our country.

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INSTRUCTIONS TO CANDIDATES :
 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
 2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- Define statistics and probability
- Scope of statistics
- Primary data
- Statistical errors
- Rounding of data
- Methods of classification of data
- Types of tables.
- Bar Graph
- Prove that $AM \geq HM$
- Coefficient of Variation.

SECTION-B

00 JUN 2023

- What are the different methods for collection of the data? Write in detail the different methods for collecting primary data.
- What do you mean by classification of the data? Write in detail about tabular, diagrammatic and graphic presentation of the data.
- Batsman X and Batsman V scored following runs in a different innings displayed in a test series:
 Batsman X : 12 115 6 73 7 19 119 36 84 29
 Batsman Y : 47 12 76 42 4 51 37 48 13 0
 Find which of them better scorer and which batsman is more consistent batsman?
- Calculate mean, median, mode from the following data
 Marks less than: 80 70 60 50 40 30 20 10
 Number of students: 100 90 80 60 32 20 10 5
- If mean of the following series is 40 and total frequency is 100 then find the missing frequencies.

X	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
F	5	7	?	25	?	15	8	5

7. Determine the MEDIAN graphically for the following data.

Wages(Rs)	20-40	40-60	60-80	80-100	100-120	120-140	140-160
No. of Workers	4	6	10	16	12	7	3

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41

Roll No.

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem-2)
DATA STRUCTURES
Subject Code : UGCA-1915
M.Code : 79858
Date of Examination : 02-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write short notes on :
 - a. What is a graph?
 - b. What is the time complexity of searching in a binary search tree?
 - c. What is a hash table?
 - d. What is the time complexity of the bubble sort algorithm?
 - e. What is the time complexity of the quicksort algorithm in the worst-case scenario?
 - f. How does the merge sort algorithm work?
 - g. What is the difference between a stack and a queue?
 - h. What is the difference between a tree and a graph?
 - i. What is the time complexity of sorting using a quicksort algorithm?
 - j. What is the space complexity of a linked list?

SECTION-B

2. What is the difference between a pointer and an array in C++ and how can pointer arithmetic be used to manipulate the elements of an array?
3. What is a stack in data structures and what are its main operations? How can a stack be implemented using an array or a linked list?
4. What is a linked list in data structures and how does it differ from an array? What are the main operations on a linked list, and how can they be implemented?
5. How can a binary tree be represented in memory, and what are the main operations that can be performed on a binary tree? What is the time complexity of these operations, and how can balancing techniques such as AVL trees be used to improve the performance of a binary search tree?
6. What is a graph in data structures and what are the different types of graphs? How can a graph be represented using an adjacency matrix or an adjacency list, and what are the advantages and disadvantages of each representation?
7. How do different types of searching algorithms in data structures differ in terms of time complexity and space complexity? Can you provide an example of linear search and binary search?

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Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (Artificial Intelligence & Machine Learning) (Sem-5)

R PROGRAMMING

Subject Code : UGCA 1946

M.Code : 92411

Date of Examination : 31-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Define the following with suitable example :

- a) Common vector operations
- b) Matrix versus Vector
- c) Recursive lists
- d) Boolean operators
- e) Return values
- f) Accessing the internet
- g) Strsplit() function
- h) Regular expression
- i) Customizing graphs
- j) Random number seed.

SECTION-B

2. Explain the different types of decision making statements provided by R. Give suitable examples.
3. Discuss the general matrix operations. Write a program to add two matrices and display the result.
4. What is the significance of lists? Write a program to access the various elements present in a list.
5. Differentiate between S3 and S4 classes. Define the role of default values for arguments.
6. Write the syntax of any three string manipulation functions. Give suitable examples.
7. List the principles of debugging. How random sampling is done?

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Total No. of Pages : 02

B.Sc (AI & ML) (Sem-2)

PERATING SYSTEMS

Subject Code : UGCA-192

M.Code : 79857

of Examination: 30-05-2003

UI Examination: 30-05-2

ATES :

- QUESTIONS: 1. A group of 100 people consisting of TEN questions carrying TEN marks.

SECTION-A

- ent view of Operating System.
 stem?
 ing system.
 ating system
 es of an operating system.
 ges of the multiprogramming?
 y Spooling?
 block?

SECTION-B

- e and non-preemptive scheduling

...the same concept...

- B.Sc (AI & ML) (Sem-2)**
PERATING SYSTEMS
Subject Code : UGCA-192
M.Code : 79857
of Examination: 30-05-2
- ATES :**
ORY consisting of TEN que

e and non-preemptive scheduling

Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (AI and ML) (Sem.-4)

DATA SCIENCE

Subject Code : UGCA-1978

M. Code : 91707

Date of Examination : 26-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) What is Data Science?
- b) What are the various sources of data?
- c) Define cross validation.
- d) What are the characteristics of visual variables?
- e) Define data formats.
- f) What is parsing of data?
- g) Differentiate between residual plot and distribution plot.
- h) What is homogeneous and heterogeneous data?
- i) Write some applications of Data Science.
- j) How can generalization error be calculated?

00 JUN 2023

SECTION-B

2. What is a Data Science Life Cycle? Describe with the help of suitable diagram.
3. Why is data cleaning required? Discuss some methods of data cleaning by taking suitable examples.
4. Discuss some major data security issues.
5. What makes data visualization good? Discuss the significance of choosing appropriate visual encodings.
6. What is regression? What are the various regression models? Also give their applications.
7. Differentiate between overfitting and underfitting. Give its significance in model selection.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.-6)

BIG DATA ANALYTICS

Subject Code : UGCA2006

M.Code : 93655

Date of Examination : 18-05-23

Time : 3 Hrs.

Max. Marks : 60

SECTION-B

2. Discuss the various application areas of big data.
3. Explain the various components of Hadoop ecosystem.
4. Describe the advantages and disadvantages of Apache Pig.
5. Discuss the various Pig operators for data analysis.
6. What are the various Hadoop fs commands?
7. Give examples of split, filter and cogroup operators.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Data analytics
- b) Hadoop
- c) MapReduce
- d) Copyrolocal command
- e) Grunt shell
- f) Eval functions
- g) Bag function
- h) Setrep command
- i) Rereplication
- j) Safemode of Namenode.

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SECTION-B

2. a. Explain the univariate and multivariate decision trees.
- b. How does ID3 algorithm work? Discuss its drawbacks too?
3. a. Differentiate between supervised and unsupervised learning.
- b. What is clustering? How does the K-means clustering work?
4. Consider the following training set that classifies the output variable play tennis as Yes or No depending upon weather conditions such as Outlook, Temperature, Humidity, and Windy Status.

S. No.	Outlook	Temperature	Humidity	Windy	Play Tennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rainy	Mild	High	Weak	Yes
5	Rainy	Cool	Normal	Weak	Yes
6	Rainy	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rainy	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rainy	Mild	High	Strong	No

Using Naive Bayes Classifier, classify whether, on a Rainy, Cool, High Humidity, and Windy day, we can play tennis or not.

5. a. What are linearly separable systems? Explain at least two machine learning methods of this category.
- b. What is an artificial neural network? Discuss its architecture and explain all components.

2 | M-91706

(S3)-641

Total No. of Pages : 03

Roll No.

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.-4)

MACHINE LEARNING

Subject Code : UGCA-1977

M.Code : 91706

Date of Examination : 19-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :
 - a. Write a short note on two instance-based learning techniques.
 - b. What are the conditions to consider while designing a learning system?
 - c. When do we apply Machine Learning?
 - d. Explain the meaning of support vectors in SVM using an example.
 - e. Write the mathematics for Radial Basis Function.
 - f. Name four types of reinforcement learning techniques.
 - g. Define Perceptron. How do you train a perceptron?
 - h. How does backpropagation help in improving the model training?
 - i. What is the meaning of Naive in the Naive Bayes Classifier?
 - j. Explain the concept of Population and Chromosome in Genetic Algorithm.

1 | M-91706

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6. a. What are various models of evolution and learning in machine learning?
- b. Explain the working of Genetic Algorithms in detail.
7. a. Discuss two methods to select a value of K in the KNN algorithm.
- b. We have data from the questionnaires survey (to ask people's opinions) and objective testing with two attributes (acid durability and strength) to classify whether a special paper tissue is good or not. Here are four training samples :

X1 = Acid Durability (seconds)	X2 = Strength (kg/sq. meter)	Class
7	7	Bad
7	4	Bad
3	4	Good
1	4	Good

Now the factory produces a new paper tissue that passes laboratory tests with $X1 = 3$ and $X2 = 7$. Without another expensive survey, what is the classification of this new tissue?

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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.-6)

BIG DATA ANALYTICS

Subject Code : UGCA2006

M.Code : 93655

Date of Examination : 18-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Data analytics
- b) Hadoop
- c) MapReduce
- d) Copyto local command
- e) Grunt shell
- f) Eval functions
- g) Bag function
- h) Setrep command
- i) Rereplication
- j) Safemode of Namenode.

SECTION-B

2. Discuss the various application areas of big data.
3. Explain the various components of Hadoop ecosystem.
4. Describe the advantages and disadvantages of Apache Pig.
5. Discuss the various Pig operators for data analysis.
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21 M-93655

(S3)-522

21 M-93655

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06 JUN 2028

Roll No. Total No. of Pages : 03

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.-4)

MACHINE LEARNING

Subject Code : UGCA-1977

M. Code : 91706

Date of Examination : 19-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

- Write briefly :
 - Write a short note on two instance-based learning techniques.
 - What are the conditions to consider while designing a learning system?
 - When do we apply Machine Learning?
 - Explain the meaning of support vectors in SVM using an example.
 - Write the mathematics for Radial Basis Function.
 - Name four types of reinforcement learning techniques.
 - Define Perceptron. How do you train a perceptron?
 - How does backpropagation help in improving the model training?
 - What is the meaning of Naive in the Naive Bayes Classifier?
 - Explain the concept of Population and Chromosome in Genetic Algorithm.

SECTION-B

- Explain the univariate and multivariate decision trees.
 - How does ID3 algorithm work? Discuss its drawbacks too?
- Differentiate between supervised and unsupervised learning.
 - What is clustering? How does the K-means clustering work?
- Consider the following training set that classifies the output variable play tennis as Yes or No depending upon weather conditions such as Outlook, Temperature, Humidity, and Windy Status.

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Using Naive Bayes Classifier, classify whether, on a Rainy, Cool, High Humidity, and Windy day, we can play tennis or not.

- What are linearly separable systems? Explain at least two machine learning methods of this category.
 - What is an artificial neural network? Discuss its architecture and explain all components.

6. a. What are various models of evolution and learning in machine learning?
- b. Explain the working of Genetic Algorithms in detail.
7. a. Discuss two methods to select a value of K in the KNN algorithm.
- b. We have data from the questionnaire survey (to ask people's opinions) and objective testing with two attributes (acid durability and strength) to classify whether a special paper tissue is good or not. Here are four training samples :

X1 = Acid Durability (seconds)	X2 = Strength (kg/sq. meter)	Class
7	7	Bad
7	4	Bad
3	4	Good
1	4	Good

Now the factory produces a new paper tissue that passes laboratory tests with $X1 = 3$ and $X2 = 7$. Without another expensive survey, what is the classification of this new tissue?

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Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (AI & ML) (Sem.-3)
ARTIFICIAL INTELLIGENCE
Subject Code : UGCA-1973
M.Code : 90349

Date of Examination : 18-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a. What do you mean by Agent?
- b. What is knowledge representation?
- c. Explain predicate logic.
- d. What is Heuristic search?
- e. What is need of AI?
- f. What do you mean by utility theory?
- g. What is a backward search?
- h. Define event.
- i. Define built-in predicates.
- j. What do you mean by LISP?

SECTION-B

2. What do you mean by AI? Explain contribution of AI in various fields.
3. Explain evolutionary search algorithms with suitable examples.
4. What do you mean by reasoning? Explain foundations of knowledge representation and reasoning in detail.
5. Explain elementary game theory in detail with suitable example.
6. What is the significance of Expert System; explain its architecture in detail.
7. Explain PROLOG in detail with suitable examples.

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13

Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (AI & ML) (Sem.-3)
ARTIFICIAL INTELLIGENCE

Subject Code : UGCA-1973

M.Code : 90349

Date of Examination : 18-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a. What do you mean by Agent?
- b. What is knowledge representation?
- c. Explain predicate logic.
- d. What is Heuristic search?
- e. What is need of AI?
- f. What do you mean by utility theory?
- g. What is a backward search?
- h. Define event.
- i. Define built-in predicates.
- j. What do you mean by LISP?

SECTION-B

2. What do you mean by AI? Explain contribution of AI in various fields.
3. Explain evolutionary search algorithms with suitable examples.
4. What do you mean by reasoning? Explain foundations of knowledge representation and reasoning in detail.
5. Explain elementary game theory in detail with suitable example.
6. What is the significance of Expert System; explain its architecture in detail.
7. Explain PROLOG in detail with suitable examples.

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Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (Artificial Intelligence & Machine Learning) (Sem.-3)

DATABASE MANAGEMENT SYSTEMS

Subject Code : UGCA-1922

M.Code : 90351

Date of Examination : 16-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Database Management System
- b) DML vs. DDL
- c) Stored Functions
- d) SQL Fundamental
- e) Multi-Valued Dependency
- f) Second Normal Form
- g) Referential Integrity
- h) Database Security
- i) ER Model
- j) Database Recovery.

00 JUN 2023

SECTION-B

2. What are data models and its types?
3. Explain relational calculus with examples.
4. What is Normalization? Explain BCNF with example.
5. Explain distributed databases and its design.
6. Explain Concurrency Management System and its problems.
7. What is cursor and its use? Write the SQL code for cursor considering suitable example.

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Roll No.

Total No. of Questions : 07

Total No. of Pages : 02

B.Sc. (AI & ML) (Sem.-6)
BUSINESS INTELLIGENCE
Subject Code : UGCA2016

M.Code : 93651

Date of Examination : 16-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Knowledge
- b) Mathematical model
- c) Decision support system
- d) Data mining
- e) Relational marketing
- f) Logistic planning
- g) Data reduction
- h) Expert system
- i) Knowledge engineering
- j) Supply chain optimization.

SECTION-B

2. Differentiate between data and information.
3. Describe the evolution of information systems.
4. Discuss the various clustering methods.
5. Explain the logistic and production models.
6. Give details of various approaches to knowledge management.
7. Draw and explain the various components of an expert system.

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