

(6 pages)

. No. :

Code No. : 6661

Sub. Code : ZCIM11

M.Sc. (CBCS) EXAMINATION, NOVEMBER 2022.

First Semester

Computer Science with Artificial Intelligence

ARTIFICIAL INTELLIGENCE

(For those who joined in July 2022 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is the common language for Artificial Intelligence? _____
(a) Python (b) Java
(c) PHP (d) None
2. One of the few hard and fast results to come out of the first three decades of AI research is that intelligence requires _____
(a) data (b) knowledge
(c) Both (a) and (b) (d) None

3. A _____ is a area of the search space in which a whole set of neighbouring states have the same value.
- (a) Plateau (b) ridge
(c) local maximum (d) None
4. _____ is a way of combining the advantages of both depth first and breadth first search into a single method
- (a) Hill climbing (b) Generate and Text
(c) Best First Search (d) All the above
5. Inference engines work on the principle of _____
- (a) Backward chaining (b) Forward chaining
(c) Both (a) and (b) (d) None
6. Which is also called single inference rule?

- (a) Reference (b) Resolution
(c) Reform (d) None

7. _____ are designed to solve complex problems by reasoning through bodies of knowledge.
- (a) Computer systems (b) Expert systems
(c) Operating systems (d) None
8. The _____ represents facts and rules
- (a) Knowledge Base (b) Inference Engine
(c) Operating system (d) None
9. one statement of more than one statement executed repeatedly is called _____
- (a) Iteration (b) Recursion
(c) Both (a) and (b) (d) None
10. Collection of elements of same datatype is called _____
- (a) Function (b) Pointer
(c) Array (d) None

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) List out the characteristics of a problem. Explain any one.

Or

- (b) Write short note on problem solving agent.

12. (a) What do you mean by simulated Annealing?

Or

- (b) Define and give a brief note on alpha-beta pruning.

13. (a) How to represent Propositional logic?

Or

- (b) What is knowledge representation?

14. (a) Write short note on MYCIN.

Or

- (b) Give a brief note on PROSPECTOR.

15. (a) Write down any one conditional statement in prolog.

Or

- (b) Define array. Give a short note on it.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) What is an AI technique? Explain.

Or

- (b) Write short note on the following:

- (i) Knowledge based Agents
- ii) State space search

17. (a) With an algorithm to explain Best First Search.

Or

- (b) Discuss in detail about Minimax Search Procedure in Game playing.

18. (a) Illustrate forward and Backward chaining in first order Logic.

Or

- (b) Discuss in detail about Inference and Reasoning patterns in propositional logic.

19. (a) What is Expert system? Write down the architecture of Expert system.

Or

(b) Write down the role of Expert systems and give a brief note on knowledge acquisition.

20. (a) What is recursion? Explain with an example program.

Or

(b) List out and explain the different types of Numeric functions available in prolog.

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Reg. No. :

Code No. : 6662

Sub. Code : ZCIM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Computer Science with Artificial Intelligence

DESIGN AND ANALYSIS OF ALGORITHMS

(For those who joined in July 2022 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. An abstract data type that supports the operations insert, delete and search is called a _____
(a) Graph (b) Dictionary
(c) Both (a) and (b) (d) None

2. Last In First Out: _____
(a) Queue (b) Priority Queue
(c) Stack (d) None

3. To solve any recurrence relation is called _____ method
- (a) substitution (b) general
(c) repetition (d) quick loop sort
4. The average computing time $T_A(n)$ of _____ is
- (a) $O(n^2)$ (b) $O(n^3)$
(c) $O(n)$ (d) None
5. TVSP stands for _____
- (a) Tree vertex splitting problem
(b) Travelling salesman problem
(c) Tree vertex salesman problem
(d) None
6. If $G = (V, E)$ be an undirected connected graph. A sub graph $t = (V, E^1)$ of G is a _____ of G iff t is a tree
- (a) Binary tree
(b) Spanning tree
(c) Weighted tree
(d) None

7. A _____ schedule is a schedule in which the processing of a task of any processor is not terminated until the task is complete
- (a) preemptive (b) non preemptive
(c) both (a) and (b) (d) none
8. BFS stands for _____
- (a) Back Tracking first search
(b) Back First Search
(c) Binary First Search
(d) Breadth First Search
9. We are given n distinct positive numbers and we desire to find all combinations of these numbers whose sums are m . This is called _____
- (a) product of subsets (b) product of numbers
(c) sum of numbers (d) sum of subsets
10. The _____ optimization problem asks for the smallest integer m for which the graph G can be coloured
- (a) Multistage (b) M-colorability
(c) Both (a) and (b) (d) None

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) What is Recursion? Write a code for Tower of Hanoi problem.

Or

- (b) Define Tree. List out the different terminologies used in Tree.

12. (a) Write algorithm for merge sort.

Or

- (b) Write down the code for straight forward maximum and minimum.

13. (a) Write down the algorithm for greedy method control abstraction for the subset paradigm.

Or

- (b) What do you mean by container loading problem?

14. (a) Describe the concept of string editing.

Or

- (b) Define the terms: inorder, preorder and postorder traversal.

15. (a) How to estimate the efficiency of backtracking?

Or

- (b) Write a program for bounding function.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) With an example, explain stack and queue in detail.

Or

- (b) Define and explain the usage of priority queues.

17. (a) How do you sort elements using Quick sort?

Or

- (b) How to search an element in set of 'n' elements using Binary search?

18. (a) Illustrate the usage of Kruskal's algorithm.

Or

- (b) Expand and explain about TVSP.

19. (a) How to solve the travelling salesperson problem?

Or

(b) With an algorithm explain BFS.

20. (a) How to tackle eight queens problem?

Or

(b) Determine the order of magnitude of the worst case computing time for the backtracking procedure that finds all Hamiltonian cycles.

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Reg. No. :

Code No. : 6663

Sub. Code : ZCIM 13

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Computer Science with Artificial Intelligence

PYTHON FOR DATA SCIENCE

(For those who joined in July 2022 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. A _____ allows structured control of sequence of application statements such as loops and conditional tests.
(a) Control statement (b) Pointer
(c) Array (d) None

2. Which of the following is not a standard or built in datatype in python?
- (a) Numeric (b) Boolean
(c) Set, Dictionary (d) Character
3. Numpy stands for _____
- (a) Number python (b) Numerical python
(c) Numbers of python (d) None
4. How do we install Numpy in the system?
- (a) install numpy
(b) pip install python numpy
(c) pip install numpy
(d) pip install numpy python
5. In the _____ methods or functions must have the same name and different signatures.
- (a) method overloading (b) method overriding
(c) inheritance (d) abstraction

6. Python Dictionary is used to store the data in _____
- (a) Key value pair (b) Set value pair
(c) Tuple value pair (d) None
7. How can we change the shape of the Numpy array in Python?
- (a) By shape (b) By reshape
(c) By change (d) By modify
8. Which one the widget is not in python?
- (a) Button (b) Radio Button
(c) Text Area (d) Label
9. Which of the following databases is not supported by python?
- (a) SQLite (b) MySQL
(c) Sybase (d) INGRES
10. Function name for cumulative product of non-NA values _____
- (a) Cumprod (b) Cumsum
(c) Both (a) and (b) (d) None

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Differentiate: Intermediate mode versus script mode.

Or

- (b) Write short note on Literals and Identifiers available in Python.

12. (a) What do you mean by Indexing and Negative Indexing?

Or

- (b) How to create a Pandas Data Frame? Give an example.

13. (a) Write a Python program to demonstrate the use of super () function.

Or

- (b) Describe the methods in Python Dictionaries.

14. (a) What do you mean by Data Wrangling?

Or

- (b) How do you merge the datasets?

15. (a) Discuss about Group wise operations are handled in Python.

Or

- (b) Write a Python code to insert and delete a record from Employee Database.

PART C — (5 × 8 = 40 marks)

Answer ALL the questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Discuss in detail about the different types of datatypes available in Python.

Or

- (b) Illustrate the different types of control flow statements available in python.

17. (a) Comment on: “The slicing operation on list with examples”.

Or

- (b) Explain any five mathematical functions in Numpy with suitable example.

18. (a) Write short note on Dictionary operations.

Or

- (b) Write Python program to demonstrate multiple inheritance.

19. (a) Using suitable examples, discuss about regular expressions.

Or

(b) Write short note on the following:

(i) Pivoting

(ii) Widgets

20. (a) What are the advantages of Data Visualization?

Or

(b) Comment on the types of databases that the Python supports.

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Reg. No. :

Code No. : 6664

Sub. Code : ZCIM 14

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Computer Science with Artificial Intelligence

DATA SCIENCE AND BIG DATA ANALYTICS

(For those who joined in July 2022 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. Textual data files with a erratic data formats can be formatted with effort, tools, and time _____ data.

(a) Structured (b) Semi structured

(c) Quasi-structured (d) Unstructured

2. Which of the following are data repository?
- (a) Spreadsheets (b) Data warehouses
(c) Analytic Sandbox (d) All the above
3. _____ is a programming language and software framework for statistical analysis and graphics.
- (a) C (b) R
(c) C++ (d) None
4. The _____ function is an example of generic function.
- (a) Summary () (b) read.delim ()
(c) Both (a) and (b) (d) None
5. A _____ refers to a point that corresponds to the center of mass for an object.
- (a) Centroid (b) Midpoint
(c) Both (a) and (b) (d) None

6. _____ takes a bottom up iterative approach to Uncovering the frequent itemsets.
- (a) Regression Analysis (b) Apriori Algorithm
(c) Classification Model (d) None
7. A _____ uses a tree structure to specify sequences of decisions and consequences.
- (a) Binary Tree (b) Binary Search Tree
(c) Decision tree (d) None
8. Which of the components are available in a time series?
- (a) Trend and Seasonality
(b) Cyclic
(c) Random
(d) All the above
9. Map step contains _____
- (a) Applies an operation to a piece of data
(b) Provides some intermediate output
(c) Both (a) and (b)
(d) None

10. _____ determines the reduces that receive keys and the corresponding list of values.
- (a) Partitioner (b) Filter
(c) Hive (d) None

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) What is driving data deluge?

Or

- (b) Tabulate the different types of Data repositories from an analyst perspective.

12. (a) Give a brief note on R programming.

Or

- (b) What do you mean by Type I and Type II Errors?

13. (a) Define and give a brief note on 'confidence'.

Or

- (b) Differentiate: Linear versus Logistic Regression.

14. (a) What is meant by Smoothing?

Or

(b) Why do we use ARIMA model?

15. (a) Write a note on UseCase.

Or

(b) Write short note on Apache Hadoop.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) With neat diagram, explain the typical current analytical architecture.

Or

(b) Explain Data preparation with neat diagram.

17. (a) Briefly explain Wilcoxon Rank-Sum Test.

Or

(b) Illustrate Exploratory Data Analysis in detail.

18. (a) What do you mean by K-Means clustering? Explain.

Or

(b) Discuss in detail about Apriori Algorithm.

19. (a) Define Decision Tree. How to Evaluate Decision tree?

Or

- (b) What is Text analysis? What are the steps involved in Text analysis? Explain with an example.

20. (a) Describe in detail about SQL Essentials with its relationship diagram.

Or

- (b) Write short on the basics of Data Visualization.
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Reg. No. :

Code No.: 6665

Sub. Code: ZCIM 15

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022

First Semester

Computer Science with Artificial Intelligence

MATHEMATICAL FOUNDATION
FOR DATA ANALYTICS

(For those who joined in July 2022 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Machine learning is C subset of which of the following _____.
 - (a) Artificial Intelligence
 - (b) Deep learning
 - (c) Data learning
 - (d) All of the above

2. Among the following option identify the one which is not a type of learning _____.
- (a) Semi unsupervised learning
 - (b) Supervised learning
 - (c) Reinforcement learning
 - (d) Un supervised learning
3. How many types of Gradient Descent are these?
- (a) 4
 - (b) 3
 - (c) 2
 - (d) 1
4. _____ the algorithm follows a straight path towards the minimum.
- (a) Batch Gradient Descent
 - (b) Stochastic Gradient Descent
 - (c) Mini Batch Gradient Descent
 - (d) None of the above
5. If a square matrix B is skew symmetric then _____.
- (a) $B' = +B$
 - (b) $B' = B'$
 - (c) $B' = -B$
 - (d) $B' = B$

6. Find the values of X, Y, Z and W from the below condition $5[x \ y \ z \ w] = [2 \ B \ 10 \ 2x + y] + [Z \ 7 \ 5 \ w]$

_____.

- (a) $x = 1, y = 3, z = 4, w = 0$
- (b) $x = 2, y = 3, z = 8, w = 1$
- (c) $x = 1, y = 2, z = 3, w = 1$
- (d) $x = 1, y = 2, z = 4, w = 1$

7. Two columns of vectors V and W , each with 7 elements consider the following code.

```
z = 0 for i = 1 : 7 z = z + v(i) * w(i)
```

end

which of the following vectorizations correctly compute z ?

- (a) $z = \text{sum}(V * W)$
- (b) $z = W * V$
- (c) $z = V * W'$
- (d) $z = W * V'$
- (e) Both (a) and (b)

8. Determine Algebra and Geometric multiplicity of

the following matrix $\begin{bmatrix} 2 & 4 & -4 \\ 0 & 4 & 2 \\ -2 & 4 & 4 \end{bmatrix}$ _____.

- (a) 1, 2
- (b) 1, 3
- (c) 2, 2
- (d) 2, 1

9. Which of the following statement is correct?
- (a) Every zero matrix is a square matrix
 - (b) A matrix has a numerical value
 - (c) A unit matrix is a diagonal matrix
 - (d) All of the above
10. Two unit vectors are inclined at an angle so that their resultant is also a unit vector the angle is _____.
- (a) 30°
 - (b) 60°
 - (c) 120°
 - (d) 150°

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) What is the importance of Machine learning?
- Or
- (b) What is supervised learning? Where is supervised learning used?
12. (a) $f : R^n \rightarrow R$, Convex and differentiable. Solve $\min_{x \in R^n} f(x)$.
- Or
- (b) Write a short note on Forward stagewise regression.

13. (a) The following matrix shows the results of the college swimming meet :

$$\begin{bmatrix} 2 & 0 & 3 & 1 \\ 0 & 3 & 3 & 4 \\ 5 & 3 & 0 & 1 \\ 2 & 3 & 4 & 4 \end{bmatrix}$$

- (i) Write down the 2×4 matrix which represents the results of team *A* and *D*.
- (ii) Write down the column vectors which represents at the results if team first place 4th places.

Or

- (b) Find x and y if

$$\begin{pmatrix} x+y & 2 \\ 1 & x-y \end{pmatrix} = \begin{pmatrix} 3 & 2 \\ 1 & 7 \end{pmatrix}.$$

14. (a) Why do we use Octave?

Or

- (b) How do we represent octave?

15. (a) How to load data in to octave?

Or

- (b) Give a brief note on visualisation.

PART C — (5 × 8 = 40 marks)

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

16. (a) Describe Machine learnings model Representation and its types.

Or

- (b) Differentiate between supervised and unsupervised machine learning techniques.

17. (a) Explain in detail about Minima and Maxima in Gradient Descent.

Or

- (b) Discuss the procedure to receive linear approximation in Gradient Descent.

18. (a) If $a = 3i - j + 2k$, $b = 2i + j - k$, $c = i - 2j + 2k$ find $(a \times b) \times c$ and $a \times (b \times c)$ and hence show that $(a \times b) \times c \neq a \times (b \times c)$.

Or

- (b) $A = \begin{pmatrix} 2 & -3 & 1 \\ 4 & 2 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & -2 & 4 \\ 1 & 3 & -5 \end{pmatrix}$ show that $(A + B)' = A' + B'$.

19. (a) What are the Arithmetic and Logical operations done on Octave?

Or

(b) What is Diagonal matrix? How to create Diagonal matrix? Give an example.

20. (a) How to find Maximum and Minimum value in Octave?

Or

(b) How do you implement vector on octave? Give a brief note on Victimisation.
