## FACULTY OF SCIENCE
### M.C.A. II– SEMESTER REGULAR/BACKLOG EXAMINATIONS, SEP- 2022
## ARTIFICIAL INTELLIGENCE
### PAPER –IV

Time: 3 Hours]                                                    [Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

### Section – A                                                   (5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Explain modules and functions of Python.
2. Define Iterative Deepening.
3. Discuss Axiomatic System.
4. Explain Expert System.
5. Explain Semantic Web.

### Section – B                                                   (5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Discuss control flow, function, lists and tuples in python.

(OR)

   b) Explain foundations of Artificial Intelligence and its applications.

7. a) Explain heuristic search techniques for problem solving.

(OR)

   b) Discuss about the Alpha Beta Pruning in detail.

8. a) Explain refutation in prepositional logic in detail.

(OR)

   b) Discuss the approaches to knowledge representation.

9. a) Explain different phases in building expert systems.

(OR)

   b) Explain Bayesian belief networks in detail.

10. a) Discuss case grammars in advance knowledge representation.

(OR)

    b) Explain sentence analysis phases in natural language processing.

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Code No.1725

Time: 3 Hours]                                                    [Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

Section   A                                    (5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Types of Machine Learning.
2. Explain Linear Regression.
3. Linear Classification.
4. What is Boosting?
5. What is GMMs explain.

Section – B                                    (5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) What is Bayesian learning ? Explain the features of Bayesian learning methods

(OR)

   b) What is Statistical Decision Theory? Explain in detail.

7. a) Explain Linear regression with example.

(OR)

   b) What is Partial Least Squares? Explain in detail.

8. a) What is support vector machine .Discuss in detail?

(OR)

   b) Write a detail note on naïve bayers' linear models?

9. a)  Define clustering. What are the different types of clustering explain in detail?

(OR)

   b) Explain in detail the concept of Kernel and K- Means?

10. a) What is reinforcement learning explain its detailed concepts?

(OR)

   b) What is Bayesian Network explain its detailed concepts?

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## FACULTY OF SCIENCE
### M.C.A. II– SEMESTER REGULAR/BACKLOG EXAMINATIONS, SEP- 2022
### OPERATIONS RESEARCH
#### PAPER –VI

Time: 3 Hours]　　　　　　　　　　　　　　　　　　　　[Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

#### Section – A

Answer the following questions in not more than **ONE** page each: (5x4=20)

1. Sensitivity Analysis
2. Transshipment Model
3. Zero–One Implicit Enumeration Algorithm
4. Dynamic Programming
5. Dominance Property

#### Section – B

Answer the following questions in not more than **FOUR** pages each: (5x10=50)

6. a) Solve the following LPP:

Minimize $Z = 20X_1 + 10X_2$

Subject to Constraints:

$X_1 + X_2 \le 40$
$3X_1 + X_2 \ge 30$
$4X_1 + 3X_2 \ge 60$
$X_1, X_2 \ge 0$

(OR)

b) Use graphical Method to solve the following LPP:

Max $Z = 3x_1 + 2x_2 + 5x_3$

Subject to:

$X_1 + 2X_2 + X_3 \le 430$
$3X_1 + 2X_3 \le 460$
$X_1 + 4X_3 \le 420$
$X_1, X_2, X_3 \ge 0$

7. a) Explain about:
　　i. Types of Transportation Problem
　　ii. Mathematical model of TP.

(OR)

b) Solve the following Transportation problem:

| Origin | Destination | | | | Capacity |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | |
| 1 | 20 | 22 | 17 | 4 | 120 |
| 2 | 24 | 37 | 9 | 7 | 70 |
| 3 | 32 | 37 | 20 | 15 | 50 |
| Requirement | 60 | 40 | 30 | 110 | 240 |

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8. a) What is Integer Programming? Explain the The Cutting-Plane Algorithm with an example.

(OR)

b) Consider the problem of assigning five operations to five machines. Solve the problem with the assignment costs given below:

| Operations | | | | | |
|---|---|---|---|---|---|
| Machines | I | II | III | IV | V |
| A | 16 | 13 | 17 | 19 | 20 |
| B | 14 | 12 | 13 | 16 | 17 |
| C | 14 | 11 | 12 | 17 | 18 |
| D | 5 | 5 | 8 | 8 | 11 |
| E | 5 | 3 | 8 | 8 | 10 |

9. a) Explain the applications of Dynamic Programming.

(OR)

b) Solve the following linear programming Problem through Dynamic Programming:

Max $3 X_1 + 2 X_2$

Subject to;

$X_1 - X_2 \le 1$
$X_1 + X_2 \ge 3$
$X_1 \ge 0, X_2 \ge 0$

10. a) Explain about:
　　i. Game with Mixed Strategies
　　ii. Linear Programming Approach for Game Theory.

(OR)

b) Find the best strategy and the value of the following game:

| | | B | | |
|---|---|---|---|---|
| | | I | II | III |
| A | I | -1 | -2 | 8 |
| | II | 7 | 5 | -1 |
| | III | 6 | 0 | 12 |

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M.C.A. II– SEMESTER REGULAR/BACKLOG EXAMINATIONS, SEP- 2022

## OPERATING SYSTEMS
### PAPER –I

Time: 3 Hours]

[Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

Section – A  (5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Define process and its states.
2. Explain Segmentation.
3. Explain Mass Storage Structure.
4. Explain Accesses Matrix.
5. Explain Kernel Modules.

Section – B  (5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Explain process scheduling principles and different scheduling methods.

(OR)

   b) What is Deadlock? What are the conditions for occurrence of deadlock?

7. a) Explain contiguous memory allocation in memory management.

(OR)

   b) Explain Paging. Write about different page replacement algorithms.

8. a) Explain different file allocation methods in detail.

(OR)

   b) Explain directory implementation of file system in detail.

9. a) Discuss the Access Control and Access Rights of System Protection.

(OR)

   b) Write about cryptography and user authentication in detail.

10. a) Explain design principles of LINUX system.

(OR)

   b) Describe system components of windows -7 in detail.

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### M.C.A. II– SEMESTER REGULAR/BACKLOG EXAMINATIONS, SEP- 2022
## DATABASE MANAGEMENT SYSTEM
### PAPER II

Time: 3 Hours]            [Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

### Section – A          (5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Write the Applications of Database System.
2. Explain aggregate functions.
3. Explain Integrity constraints.
4. Explain Static Hishing.
5. Write about lock based protocols.

### Section – B          (5x10 50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Describe object based and semi structure data bases.

(OR)

    b) Define ER Model. Explain database design for banking enterprises using ER diagrams.

7. a) Explain structure of relational databases in detail.

(OR)

    b) Describe base structure of SQL Queries and set operations in detail.

8. a) Explain data types and schemas of SQL in detail.

(OR)

    b) Define atomic domains and first normal form in detail.

9. a) Discuss comparison of ordered indexing and hashing.

(OR)

    b) Explain testing for serializability in detail.

10. a) What is Concurrency Control? Describe validation based protocols.

(OR)

    b) Explain advanced recovery techniques in detail.

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Code No.1723

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M.C.A. I SEMESTER REGULAR/BACKLOG EXAMINATIONS, SEP- 2022

### DESIGN AND ANALYSIS OF ALGORITHMS

PAPER –III

Time: 3 Hours]                                                                    [Max. Marks: 70

Note: Answer all the following questions from Section – A and Section – B

<u>Section – A</u>                                                       (5x4=20)

Answer the following questions in not more than **ONE** page each:

1.  Explain priority queues.
2.  Explain tree vertex splitting.
3.  Define binary tree.
4.  Discuss about Hamiltonial cycles.
5.  Explain Cooks theorem.

<u>Section – B</u>                                                       (5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a)  Explain Algorithm and its performance analyses in detail.

(OR)

  b)  Discuss stacks, queues and trees.

7. a)  Explain merge sort with divide and conquer method.

(OR)

  b)  Discuss Knapsack problem using greeding method.

8. a)  Explain the traveling sales person problem in detail.

(OR)

  b)  Explain different traversal techniques for binary trees.

9. a)  Explain 8-Queens Problem with Back Tracking.

(OR)

  b)  Discuss 0/1 Knapsack Problem with Branch and Bound.

10.a)  Discuss NP Hard Scheduling Problems.

(OR)

  b)  Explain NP Hard Code Generation.

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