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**Unit-II**

2. (a) What is Package ? Define its type and write a program to explain user defined package.
- (b) What is Super keyword ? Explain the purpose of super keyword and write a program to explain its uses.
- (c) What is nested class ? Explain its different types and write a program to find factorial of given number using nested class.

**Unit-III**

3. (a) What do you mean by Exception ? Explain its type.
- (b) What is thread synchronization ? How can we synchronize our code ? Explain with example.
- (c) Write the process of defining user defined thread.

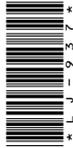
**Unit-IV**

4. (a) Explain string immutability and string Buffer class.
- (b) What is collection interface ? Define different types of collection interface and differentiate collection and array.
- (c) What is Array List Class ? Explain its method and write suitable program.

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**Unit-V**

5. (a) What is Event Delegation Model?  
Explain in brief.
- (b) Explain any five swing components.
- (c) What is JDBC ? Write a process to establish connection with JDBC with example.
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**LJ-937**

**MCA**

2nd Semester Examination, Jan.-June, 2021

Paper - III

Data Structure and Algorithms

*Time* : Three Hours]      [*Maximum Marks* : 100

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**Note** : Answer any **two** parts from each question. All questions carry equal marks.

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**Unit-I**

1. (a) What is array? Explain array memory addressing schemes with suitable example.
- (b) Explain doubly linked list with example.
- (c) Explain how to derive complexity of algorithm with the help of all notations.

**Unit-II**

2. (a) Explain stack and write algorithms for push and pop operations.

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- (b) What is a circular queue? Write an algorithm for insertion and deletion operation on circular queues.
- (c) Convert the following infix expression to prefix expression and give various steps in evaluating using stacks.

$$(5 * 3 \uparrow 2) / (3 + (7 + 3) / 10)$$

### Unit-III

- 3. (a) What is a Binary Search Tree? Explain it with a suitable example.
- (b) Explain AVL tree with suitable example.
- (c) Discuss various tree traversal techniques. Give proper example also.

### Unit-IV

- 4. (a) Differentiate between depth first search and breadth first search.
- (b) Write Dijkstra's shortest path algorithm.
- (c) Explain minimum cost spanning tree with example.

### Unit-V

- 5. (a) Explain the various techniques used to build hash function with suitable examples.
- (b) What is merging? Explain the merge sort with its algorithm and discuss the complexity for it.

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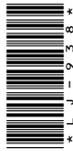
(c) Write short notes on any **two** of the following :

(i) Binary Search

(ii) Radix sort

(iii) Heap sort

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**LJ-938**

**MCA**

2nd Semester Examination, Jan.-June, 2021

Elective - I

Paper - IV

Computer Graphics

*Time* : Three Hours]      [*Maximum Marks* : 100

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**Note** : Answer any **two** parts from each question. All questions carry equal marks.

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**Unit-I**

1. (a) Discuss about different interactive picture construction techniques.
- (b) Write short notes on the following :
  - (i) Plasma panel display
  - (ii) Input devices for graphics
- (c) What do you understand by Refresh Cathode-Ray tubes ? Discuss in detail.

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**Unit-II**

2. (a) Briefly describe the boundary fill and flood fill algorithm.
- (b) Discuss about Bresenham's circle algorithms and midpoint circle algorithm.
- (c) Explain attributes of output primitives.

**Unit-III**

3. (a) Explain the Cohen-Sutherland line clipping algorithm with example.
- (b) Develop a text clipping algorithm that clips individual characters.
- (c) Explain the Weiler-Atherton polygon clipping.

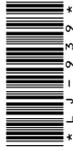
**Unit-IV**

4. (a) Obtain a transformation matrix for rotating an object about a specified pivot point.
- (b) Determine a sequence of basic transformations that are equivalent to the Y-direction shearing matrix.
- (c) Discuss the various two dimensional basic transformations with suitable example.

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**Unit-V**

5. (a) Discuss about different Projection techniques.
- (b) What do you understand by Homogeneous clipping ? Explain in detail.
- (c) Write short notes on the following :
- (i) Depth buffer methods
  - (ii) Scan line method
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**LJ-939**

**MCA**

2nd Semester Examination, Jan.-June, 2021

Elective - II

Paper - V

Internet of Things

*Time* : Three Hours]      [*Maximum Marks* : 100

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**Note** : Answer any **two** parts from each question. All questions carry equal marks.

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**Unit-I**

1. (a) Describe IoT architectural view in detail.
- (b) What do you mean by IoT? Explain components required to design IoT device with example.
- (c) Write short notes on any **two** of the following :
  - (i) XaaS
  - (ii) M2M
  - (iii) IoT analytics

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**Unit-II**

2. (a) Explain IoT reference model and architecture.
- (b) Explain the following terms :
  - (i) Functional view and information view
  - (ii) Deployment and operational view
- (c) Discuss the design constraints in IoT.

**Unit-III**

3. (a) What is IP addressing ? Why IPV6 are required to implement the concept of IoT ?
- (b) Describe 6LOWPAN and 6TiSCH in IoT.
- (c) Write short notes on any **two** of the following :
  - (i) Z-Wave
  - (ii) Zigbee smart energy
  - (iii) CORPL

**Unit-IV**

4. (a) Explain with example of MQTT protocol. What is the role of MQTT protocol in IoT ?
- (b) Explain IoT privacy and security solutions.

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(c) Write short notes on any **two** of the following :

(i) MPTCP

(ii) AMQP

(iii) CoAP

(iv) DTLS

#### Unit-V

5. (a) Explain ETSI M2M functional architecture with a neat diagram.

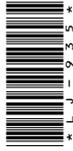
(b) Describe MAC 802.15.4 and BBF security in IoT protocol.

(c) Write short notes on any **two** of the following :

(i) OMA

(ii) RPL

(iii) Application of IoT



**LJ-935**

**MCA**

2nd Semester Examination, Jan.-June, 2021

Paper - I

Programming in Python

*Time* : Three Hours]      [*Maximum Marks* : 100

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**Note** : Answer any **two** parts from each question. All questions carry equal marks.

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**Unit-I**

1. (a) Explain about the python interpreter and IDLE interface.
- (b) Explain the identifiers, keywords and variables in python with example.
- (c) Discuss different data types and sequence supported by python.

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**Unit-II**

2. (a) What do you understand by operators in python? Explain with example.
- (b) Write a python program to check the given year is leap year or not.
- (c) Write a python program to determine whether the given string is palindrome or not.

**Unit-III**

3. (a) Discuss the relation between tuples and list, tuples and dictionaries in detail.
- (b) Illustrate the following set methods with example :
  - (i) intersection()
  - (ii) union()
  - (iii) issubclass()
  - (iv) update()
  - (v) discard()
- (c) Write a program that accept a sentence and calculate the number of digits, uppercase and lowercase letters.

**Unit-IV**

4. (a) What is function ? Discuss different types of function supported by python with example.

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- (b) Write short notes on the following :
  - (i) Fruitful and void function
  - (ii) Anonymous function
  - (iii) Recursion
- (c) Write a python program to illustrate diamond problem with the help of function.

#### Unit-V

- 5. (a) Write a python program to calculate area and perimeter of different shapes using polymorphism.
  - (b) Discuss exceptions handling methods in python with example.
  - (c) What do you understand by inheritance ? Explain with example.
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