

Hall Ticket Number :										
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<b>R-20</b>
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**Code: 20DF2GT**

M.C.A. II Semester Supplementary Examinations April 2023

**Design and Analysis of Algorithms**

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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Marks CO BL

<b>UNIT-I</b>
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- |  |   |
|--|---|
| <p>1. a) Discuss the various asymptotic notations used for time complexity with a neat diagram.</p> <p>b) Calculate the space complexity of the following code:<br/>         Algorithm Sum (a,n)<br/>         {<br/>           S:=0;<br/>           for i:=1 to n do<br/>             S:=S+a[i];<br/>           return S;<br/>         }</p> | <p>8M    1    L3</p> <p>4M    1    L2</p> |
|--|---|

**OR**

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|--|---|
| <p>2. a) Write an algorithm to find the sum of n numbers using the recursive function.</p> <p>b) If positive function f(n) is given below as:<br/> <math>f(n) = a_m n^m + a_{m-1} n^{m-1} + \dots + a_2 n^2 + a_1 n^1 + a_0</math> then prove that<br/> <math>f(n) = O(n^m)</math></p> | <p>6M    1    L2</p> <p>6M    1    L3</p> |
|--|---|

<b>UNIT-II</b>
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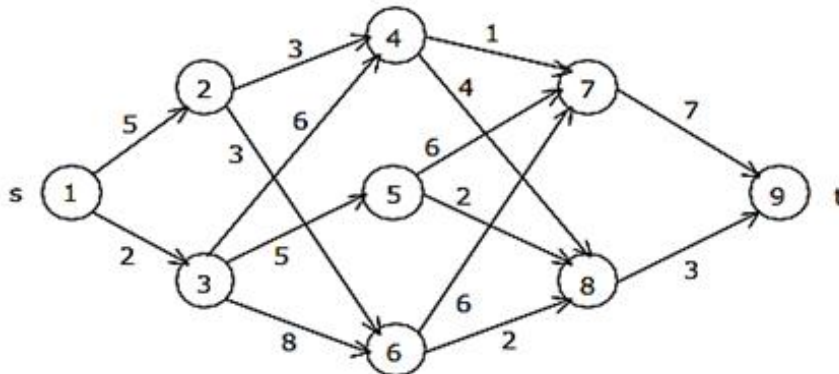
- |  |   |
|--|---|
| <p>3. a) Determine the running time of merge sort for<br/>           (i) Sorted Input<br/>           (ii) Reverse-ordered Input<br/>           (iii) Random-ordered Input</p> <p>b) Derive the best-case complexity of the Quicksort algorithm</p> | <p>6M    2    L2</p> <p>6M    2    L3</p> |
|--|---|

**OR**

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|--|---|
| <p>4. a) What is a stable sorting method? Is Quicksort a stable sorting method? Justify it.</p> <p>b) What is tree traversal? List and explain any three types of tree traversals.</p> | <p>6M    2    L2</p> <p>6M    2    L2</p> |
|--|---|

<b>UNIT-III</b>
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5. a) Find the minimum cost path from  $s$  to  $t$  in the multistage graph of five stages shown in the following figure using the forward approach.



10M 3 L3

- b) List the features of dynamic programming?

2M 3 L1

**OR**

6. a) Design and explain Dijkstra's algorithm
- b) Write the difference between Prim's and Kruskal's approaches to obtain a minimum spanning tree.

6M 3 L2

6M 3 L3

<b>UNIT-IV</b>
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7. a) Let  $w = \{11, 13, 24, 7\}$  and  $m = 31$ . Find all possible subsets of  $w$  that sum to  $m$ . Draw the portion of the state space tree that is generated.

8M 4 L3

- b) What do you mean by bounding function?

4M 4 L1

**OR**

8. a) Draw and explain the state space tree for the 4-queens problem that is generated during backtracking.
- b) State the principle of backtracking.

10M 4 L3

2M 4 L1

<b>UNIT-V</b>
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9. a) State and prove Cook's theorem.
- b) What is a decision problem?

10M 5 L4

2M 5 L1

**OR**

10. a) Discuss the approximation algorithms for NP-hard problems.
- b) Define NP-hard and list any two properties of NP-problem

8M 5 L3

4M 5 L2

\*\*\*END\*\*\*

Hall Ticket Number :

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**R-20**

**Code: 20DF2ET**

M.C.A. II Semester Supplementary Examinations April 2023

## Management Information Systems

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Define MIS. Explain how the management, information and system are related to computers.	6M	CO1	L1
b) Write a short note on Decision Support System.	6M	CO1	L2
<b>OR</b>			
2. a) Describe emerging issues and concepts in information system.	6M	CO1	L1
b) What are the characteristics of MIS? Explain its significance in the organization.	6M	CO1	L1
<b>UNIT-II</b>			
3. a) What is Decision Making? Why this is difficult? Discuss.	6M	CO2	L3
b) Differentiate in detail between MIS and DSS.	6M	CO2	L1
<b>OR</b>			
4. What do mean by organization and information characteristics? List some characteristics of both and explain in short why they are important concerns for managers as its relevance to MIS?	12M	CO2	L3
<b>UNIT-III</b>			
5. Explain how management science techniques are useful for making decision rules.	12M	CO3	L2
<b>OR</b>			
6. a) Discuss different software development models in detail.	6M	CO3	L4
b) How to analyze the information needs of any project?	6M	CO3	L4
<b>UNIT-IV</b>			
7. a) What are the different structured analysis tools used in system analysis? Explain their uses and their limitations.	6M	CO4	L5
b) How to compute degree of automation of each operation?	6M	CO4	L4
<b>OR</b>			
8. a) What are the factors should be considered in forms design? Discuss.	6M	CO4	L1
b) How the designer obtaining information for the design of the MIS. Explain.	6M	CO4	L2
<b>UNIT-V</b>			
9. a) Discuss the major concepts and issues in information systems.	6M	CO5	L2
b) Write in detail the steps taken in MIS evaluation.	6M	CO5	L5
<b>OR</b>			
10. a) What are the procedures to be develop for implementation of MIS? Explain.	6M	CO5	L2
b) Briefly explain about environmental change and the internal problems related to MIS maintenance.	6M	CO5	L1

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Hall Ticket Number :

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**R-20**

**Code: 20DF21T**

M.C.A. II Semester Supplementary Examinations April 2023

## Operating Systems

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Discuss in brief on the evolution of Operating Systems	6M	CO1	L2
b) Explain in brief about Batch, Multi Programmed Systems	6M	CO1	L2
<b>OR</b>			
2. Discuss in detail about the simple and layered approach of OS	12M	CO1	L2
<b>UNIT-II</b>			
3. a) What is a Process State? Explain in detail about the Process States	6M	CO2	L1
b) What is meant by scheduling of a process? Explain the following scheduling algorithms in detail: i. FIFO ii. Round-robin	6M	CO2	L2
<b>OR</b>			
4. What is meant by Process Synchronization? Explain the means of process synchronization using semaphores?	12M	CO2	L2
<b>UNIT-III</b>			
5. a) What are the means of recovering from a deadlock? Explain?	6M	CO3	L2
b) Explain how to avoid deadlock?	6M	CO3	L2
<b>OR</b>			
6. Explain the means by which deadlock can be handled	12M	CO3	L2
<b>UNIT-IV</b>			
7. Explain in detail about the following: a. Demand Paging b. Segmentation	12M	CO4	L2
<b>OR</b>			
8. a) Discuss in detail about FIFO Page replacement Algorithm.	6M		L2
b) Consider the page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3 with 4 page frames. Find number of page faults	6M	CO4	L3
<b>UNIT-V</b>			
9. a) Explain in detail about System and Network Threats	6M	CO5	L2
b) What is System Protection? Explain the Goals of Protection	6M	CO5	L1
<b>OR</b>			
10. a) What are the Principles of Protection in OS	6M	CO5	L1
b) What is Access matrix? Explain in detail with and example	6M	CO5	L1

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Hall Ticket Number :										
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<b>R-20</b>
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**Code: 20DF22T**

M.C.A. II Semester Supplementary Examinations April 2023

**Python Programming**

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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Marks	CO	Blooms Level
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**UNIT-I**

- |   |    |     |    |
|---|----|-----|----|
| 1. a) What is an operator and explain about the arithmetic operators and assignment operators in Python with example. | 6M | CO1 | L1 |
| b) Compare input and output statements in Python with examples.   | 6M | CO1 | L2 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 2. a) Explain the features of Python programming language in detail | 6M | CO1 | L2 |
| b) Explain in detail about data types of Python.                    | 6M | CO1 | L2 |

**UNIT-II**

- |   |    |     |    |
|---|----|-----|----|
| 3. a) Write a program in Python to convert decimal number into binary, octal and hexadecimal number system in Python. | 6M | CO2 | L3 |
| b) Develop a Python program whether a given number is prime or not.   | 6M | CO2 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 4. a) Write a Python program that given number is palindrome or not                                       | 6M | CO2 | L3 |
| b) What is local and global scope of variable in python? Explain the different scenarios with an example. | 6M | CO2 | L1 |

**UNIT-III**

- |  |    |     |    |
|--|----|-----|----|
| 5. a) Explain multiple views of an object with suitable example. | 6M | CO3 | L2 |
| b) Explain how functions can return results with an example.     | 6M | CO3 | L2 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 6. a) Discuss about<br>i) Positional arguments      ii) Variable length arguments | 6M | CO3 | L6 |
| b) Write a Python program to implement Towers of Hanoi problem using recursion.   | 6M | CO3 | L3 |

**UNIT-IV**

- |  |    |     |    |
|--|----|-----|----|
| 7. a) Write about Python modules with examples         | 6M | CO4 | L3 |
| b) Create a Python program to merging two dictionaries | 6M | CO4 | L6 |

**OR**

- |  |     |     |    |
|--|-----|-----|----|
| 8. Discuss the following methods on dictionary<br>i) index()    ii) sorted()    iii) max() | 12M | CO4 | L6 |
|--|-----|-----|----|

**UNIT-V**

- |  |     |     |    |
|--|-----|-----|----|
| 9. Explain the following with examples.<br>i. Polymorphism    ii. Inheritance    iii. Abstract class | 12M | CO5 | L2 |
|--|-----|-----|----|

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 10. a) Classify the relationship between a class and an object? Explain this with two suitable examples. | 6M | CO5 | L4 |
| b) List different methods of realizing polymorphism and explain them with suitable example.              | 6M | CO5 | L4 |

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Hall Ticket Number :

**R-20**

**Code: 20DF23T**

M.C.A. II Semester Supplementary Examinations April 2023

## Software Engineering

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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	Marks	CO	BL
<b>UNIT-I</b>			
1. a) Recall the general principles of software engineering practices.	6M	1	L2
b) Discuss the difference between system engineering and software engineering.	6M	1	L2
<b>OR</b>			
2. a) Explain agile process model.	6M	1	L2
b) List down the advantages of agile process.	6M	1	L2
<b>UNIT-II</b>			
3. a) Explain evolutionary process model with a neat diagram.	6M	2	L2
b) List down the advantages and disadvantages of evolutionary model.	6M	2	L2
<b>OR</b>			
4. a) Write down the differences between functional requirements and non-functional requirements.	6M	2	L3
b) List down a minimum of three categories under non-functional requirements and elaborate the same.	6M	2	L3
<b>UNIT-III</b>			
5. a) What is a class diagram and discuss the need of the same.	6M	3	L2
b) Identify minimum of three classes for the online movie ticket booking application and mention the attribute layer and the operation layer for all the classes.	6M	3	L2
<b>OR</b>			
6. a) Give a detailed report on modular decomposition styles.	6M	3	L3
b) List the major necessity of doing a design for software, highlight the objective of design phase in software development.	6M	3	L3
<b>UNIT-IV</b>			
7. a) Software inspection is the most important aspect in software development. Justify the statement.	6M	4	L3
b) Identify and elaborate the key areas in planning a software development.	6M	4	L3
<b>OR</b>			
8. a) Classify the difference between unit testing and integration testing.	6M	4	L2
b) Write the procedures in ensuring the quality of a software application.	6M	4	L2
<b>UNIT-V</b>			
9. a) How do you ensure that project duration and staffing are the major factors that avoids risks in software development?	6M	5	L3
b) Define risk analysis and elaborate the procedure of analyzing the risks in software development.	6M	5	L3
<b>OR</b>			
10. a) Discuss the need of COCOMO II model.	6M	5	L2
b) Planning a software development is the major role of the management in an organization, list down the areas to be bothered in making a plan for software development.	6M	5	L2

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Hall Ticket Number :

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**R-20**

**Code: 20DF24T**

M.C.A. II Semester Supplementary Examinations April 2023

## Computer Networks

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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Marks CO BL

### UNIT-I

- |       |   |    |   |   |
|-------|---|----|---|---|
| 1. a) | Explain OSI reference architecture in detail.   | 8M | 1 | 2 |
| b)    | What is a network? Explain the different parameters for measuring the performance of a network? | 4M | 1 | 2 |

**OR**

- |       |  |    |   |   |
|-------|--|----|---|---|
| 2. a) | Differentiate between OSI and TCP /IP reference models.                          | 6M | 1 | 2 |
| b)    | Define Encapsulation and Peer to Peer communication in the layered architecture. | 6M | 1 | 1 |

### UNIT-II

- |       |  |    |   |   |
|-------|--|----|---|---|
| 3. a) | Compare the throughput of pure aloha and slotted aloha | 6M | 2 | 5 |
| b)    | What are the various types of error detection methods? | 6M | 2 | 2 |

**OR**

- |       |  |    |   |   |
|-------|--|----|---|---|
| 4. a) | Illustrate are the design issues of Data Link Layer? Explain                         | 6M | 2 | 3 |
| b)    | What is the need of Framing? Explain character stuffing and bit stuffing for framing | 6M | 2 | 2 |

### UNIT-III

- |       |  |    |   |   |
|-------|--|----|---|---|
| 5. a) | What are the static routing algorithms? Explain the concept of flooding. | 6M | 3 | 2 |
| b)    | Discuss about Link State Routing in detail.                              | 6M | 3 | 2 |

**OR**

- |       |  |    |   |   |
|-------|--|----|---|---|
| 6. a) | Give brief description about Internetwork Routing. | 6M | 3 | 2 |
| b)    | Write a note on Tunneling in detail.               | 6M | 3 | 2 |

### UNIT-IV

- |       |  |    |   |   |
|-------|--|----|---|---|
| 7. a) | Discuss about TCP and UDP Protocols            | 6M | 4 | 2 |
| b)    | Explain in detail about Connection management. | 6M | 4 | 1 |

**OR**

- |       |  |    |   |   |
|-------|--|----|---|---|
| 8. a) | Discuss about the header format of UDP.  | 6M | 4 | 2 |
| b)    | Explain the Real Time Transport Protocol | 6M | 4 | 1 |

### UNIT-V

- |       |  |    |   |   |
|-------|--|----|---|---|
| 9. a) | How DNS service maps domain names to IP addresses. | 6M | 5 | 2 |
| b)    | Discuss about Advanced Encryption Standard (AES)   | 6M | 5 | 2 |

**OR**

- |        |   |    |   |     |
|--------|---|----|---|-----|
| 10. a) | Explain about Entity Authentication in detail.                                | 6M | 5 | 1   |
| b)     | What is a name server? List and explain the features of various name servers. | 6M | 5 | 1&2 |

\*\*\*END\*\*\*