

Hall Ticket Number :

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**R-19**

**Code: 19A545T**

II B.Tech. II Semester Supplementary Examinations April 2023

## Operating Systems

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks CO BL

### UNIT-I

1. a) What is the purpose of an operating system? What are its design goals? 7M CO1 L1  
b) What are the essential properties of the batch, real-time, and distributed operating system? 7M CO1 L1

OR

2. a) What is the purpose of interrupting? What are the differences between a trap and an interrupt? 7M CO1 L4  
b) What is distributed system? Explain with a neat diagram, how it is different from a computer network? 7M CO1 L4

### UNIT-II

3. a) Provide two programming examples in which multithreading does *not* provide better performance than a single-threaded solution. 7M CO2 L5  
b) Discuss in detail threading Issues? 7M CO2 L2

OR

4. a) Identify the Importance of Atomic transactions in executing critical sections? 7M CO2 L3  
b) Show that the two-phase locking protocol ensures conflict serializability? 7M CO2 L4

### UNIT-III

5. a) Explain different Contiguous Memory allocation strategies with a neat diagram? 7M CO3 L2  
b) Describe the parameters to be considered for evaluating a memory management strategy? 7M CO3 L4

OR

6. a) What is the optimistic assumption made in the deadlock-detection algorithm? How can this assumption be violated? 6M CO3 L4  
b) Explain the use of a resource allocation graph in detecting deadlocks with a suitable example? 8M CO3 L3

### UNIT-IV

7. a) What are points to be considered in file system design? Explain the following file allocation methods (i) Contiguous allocation (ii) i-node. 8M CO4 L2  
b) Why must the bit map for file allocation be kept on mass storage, rather than in main memory? 6M CO4 L2

OR

8. a) What is Mounting? Describe file system mounting with a neat diagram? 7M CO4 L3  
b) What is Directory? List and explain Directory implementation methods with a neat diagram? 7M CO4 L2

### UNIT-V

9. a) Discuss the strengths and weaknesses of implementing an access matrix using access lists that are associated with objects? 7M CO5 L2  
b) Write a short note on the Revocation of access rights? 7M CO5 L1

OR

10. a) How are the access-matrix facility and the role-based access-control facility similar? How do they differ? 7M CO5 L4  
b) Explain about domains of protection? 7M CO5 L3

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**R-19****Code: 19AC43T**

II B.Tech. II Semester Supplementary Examinations April 2023

**Probability & Statistics**

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

**UNIT-I**

1. Define median and mode. Discuss their relative merits and demerits. 14M CO1 L2

**OR**

2. Find the mean, median and mode for the following:

Weight(in gm)	0-10	10-20	20-30	30-40	40-50	50-60
No of articles	14	17	22	26	23	18

14M CO1 L2

**UNIT-II**

3. If two dice are throw , Find the probability of getting a sum is 10 14M CO2 L2

**OR**

4. Let the phase error in a tracking device have probability density

$$f(x) = \cos x, 0 < x < \pi/2$$

$$0, \text{ elsewhere}$$

find the probability that the (i) between 0 and  $\pi/4$  (ii) greater than  $\pi/3$  14M CO2 L3

**UNIT-III**

5. In a large consignment of electric bulbs 10% are defective. A random sample of 20 is taken for inspection. Find the probability that (i) All are good bulbs. (ii) At most there are three defective bulbs. (iii) Exactly there are three defective bulbs 14M CO3 L2

**OR**

6. If X is a normal variate with mean 30 and S.D. 5, find the probabilities that (i)  $26 < X < 40$  (ii)  $X > 45$  14M CO3 L3

**UNIT-IV**

7. A random sample of size 81 taken whose variance is 20.25 and mean is 32, construct 98% confidence interval 14M CO4 L4

**OR**

8. In a city A 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant at 0.05 level of significance? 14M CO4 L4

**UNIT-V**

9. Two random samples gave the following data size mean Variance

	Sample size	Mean	variance
Sample I	8	9.6	1.2
Sample II	11	16.5	2.5

Is the difference between means significant? 14M CO4 L4

**OR**

10. Random samples from two normal populations are given below.

Sample1	16	26	27	23	24	22
Sample2	33	42	35	32	28	31

Do the population variances differ significantly? 14M CO4 L4

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R-19

Code: 19A546T

II B.Tech. II Semester Supplementary Examinations April 2023

## Software Engineering

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks CO BL

### UNIT-I

1. a) Explain the importance of Unified Process in software engineering 7M CO1 L2  
b) Memorize the software process in water fall model 7M CO1 L1

OR

2. a) List the David Hooker software principles. 7M CO1 L1  
b) Discuss in detail about software process patterns. 7M CO1 L2

### UNIT-II

3. a) List the Thumb Rules for creating the analysis model. 5M CO2 L1  
b) explain about Domain analysis with a neat diagram 9M CO2 L2

OR

4. a) Identify the seven distinct tasks in requirements engineering 8M CO2 L2  
b) Discuss about Domain Analysis in detail 6M CO2 L2

### UNIT-III

5. a) Describe about Modularity in design concepts 7M CO3 L2  
b) Discuss about the Deployment level design elements 7M CO3 L2

OR

6. a) Describe about Cohesion and Coupling 10M CO3 L2  
b) Discuss about the component level design guidelines 4M CO3 L2

### UNIT-IV

7. a) Define Testing. Contrast the differences between verification and validation 7M CO4 L1  
b) Demonstrate the testing process with a neat diagram 7M CO4 L3

OR

8. a) Differentiate between Stronger Vs Weaker Testing 7M CO4 L4  
b) Implement an Equivalence Class Partitioning in Black-Box Testing 7M CO4 L3

### UNIT-V

9. a) Define Risk. Discuss about Risk Identification and Risk assessment. 7M CO5 L1  
b) List the principle activities of software configuration management 7M CO5 L1

OR

10. Analyze the levels of SEI CMM model. Also give the differences between ISO 9000 and SEI CMM. 14M CO5 L4

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

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**R-19**

**Code: 19A541T**

II B.Tech. II Semester Supplementary Examinations April 2023

## Artificial Intelligence

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

### UNIT-I

1. List and discuss the four basic kinds of agents. 14M CO1 L1
- OR**
2. a) Define Artificial Intelligence 4M CO1 L1  
b) Explain in detail the properties of Task Environments 10M CO1 L2

### UNIT-II

3. What is A\* search? Explain various stages of A\* search with an example 14M CO2 L1
- OR**
4. a) What is uniform cost search? 7M CO2 L1  
b) What is Constraint satisfaction problem? Explain with example 7M CO2 L1

### UNIT-III

5. Define the term knowledge. What is the role of knowledge in Artificial Intelligence? Explain various techniques of knowledge representation. Define the term knowledge. 14M CO3 L1
- OR**
6. a) Define the syntactic elements of first-Order logic 7M CO3 L1  
b) Illustrate the use of first-order logic to represent knowledge 7M CO3 L3

### UNIT-IV

7. a) Explain the concept of planning with state space search with an example 7M CO4 L2  
b) Discuss the significance of ontology 7M CO4 L2
- OR**
8. a) List out the planning terminologies and components of planning 7M CO4 L1  
b) What are the ways in which incomplete and incorrect information's can be handled in planning 7M CO4 L1

### UNIT-V

9. a) Explain the connection between  $\forall$  and  $\exists$  7M CO5 L2  
b) What are quantifiers? explain 7M CO5 L1
- OR**
10. Discuss about Bayesian Theory and Bayesian Network 14M CO5 L2

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R-19

Code: 19A542T

II B.Tech. II Semester Supplementary Examinations April 2023

## Design and Analysis of Algorithms

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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	Marks	CO	BL
<b>UNIT-I</b>			
1. a) Write an algorithm for finding n natural numbers	7M	CO1	1
b) Explain the algorithm for Fibonacci sequence of n numbers	7M	CO1	2
<b>OR</b>			
2. a) Compare and contrast between iterative and recursive process	7M	CO1	5
b) How do we analyze algorithms? Explain	7M	CO1	5
<b>UNIT-II</b>			
3. Explain about prims algorithm with an example	14M	CO2	2
<b>OR</b>			
4. a) What are the applications of greedy method	7M	CO2	2
b) Explain the general method of greedy method	7M	CO2	2
<b>UNIT-III</b>			
5. a) What does dynamic programming have in common with divide and conquer	7M	CO3	4
b) Explain the applications of dynamic programming	7M	CO3	2
<b>OR</b>			
6. Explain about Travelling sales person problem using dynamic programming	14M	CO3	2
<b>UNIT-IV</b>			
7. a) Write in detail 8 queens problem	7M	CO4	4
b) Explain the control abstraction for back tracking method	7M	CO4	2
<b>OR</b>			
8. a) Explain properties of LC search	7M	CO4	2
b) Write the control abstraction of LC branch and bound method	7M	CO4	4
<b>UNIT-V</b>			
9. a) Explain in detail the classes of P and NP with examples	7M	CO5	2
b) Explain the strategy to prove that a problem is NP hard in detail	7M	CO5	2
<b>OR</b>			
10. State and Explain COOKS theorem in detail	14M	CO5	1,2

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**R-19**

**Code: 19A543T**

II B.Tech. II Semester Supplementary Examinations April 2023

**Formal Languages and Automata Theory**

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks    CO    BL

**UNIT-I**

- |   |    |     |    |
|---|----|-----|----|
| 1. a) Define Alphabets, Strings and Languages with examples?  | 6M | CO1 | L1 |
| b) Construct DFA equivalent to the following NFA. Show the acceptance of the string 00011 on both the Fas. Assume that q0 is the start state and q3 is final state? |    |     |    |

	0	1
q0	{q0,q1}	{q0}
q1	-	{q2}
q2	-	{q3}
q3	-	-

10M    CO1    L5

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 2. a) Compare and contrast Moore Machine with Melay Machine?   | 5M | CO1 | L5 |
| b) Design a DFA that accepts the language over the alphabet, = {0, 1, 2} where the decimal equivalent of the language is divisible by 3? |    |     |    |

9M    CO1    L6

**UNIT-II**

- |  |    |     |    |
|--|----|-----|----|
| 3. a) Explain the closure properties of regular languages?                 | 6M | CO2 | L2 |
| b) Construct a Finite Automata for the regular expression?<br>(0+1)(1+10)* |    |     |    |

8M    CO2    L5

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 4. a) Define a Regular expression. Find regular expressions for the following languages over the alphabet {a, b}.<br>i. All strings of odd length<br>ii. All strings that end with either ab or b<br>iii. All strings that contain even number of a's | 8M | CO2 | L5 |
| b) Show that the Language L = {a <sup>i<sup>2</sup></sup> / i 1} is not regular?  | 6M | CO2 | L6 |

**UNIT-III**

- |  |    |     |    |
|--|----|-----|----|
| 5. a) List the closure properties of Context Free Languages? | 6M | CO3 | L1 |
|--|----|-----|----|

b) Explain minimization of CFG with the following example?

S aA | aBB  
 A aAA |  
 B bB | bbC  
 C B

8M CO3 L2

**OR**

6. a) Construct a FA recognizing the following regular grammar?

S aS/bA/b  
 A aA/bS/a

6M CO3 L5

b) Convert the given CFG to CNF?

S aAs/ a  
 A SbA/SS/ba

8M CO3 L6

**UNIT-IV**

7. a) Write and explain about Push Down Automata? 4M CO4 L1

b) Construct a PDA that accepts the language  $L = \{wcw^R/w \in \{a, b\}^*\}$ ? 10M CO4 L5

**OR**

8. a) Describe equivalence of CFL and PDA with appropriate example? 6M CO4 L2

b) Design PDA to accept the following CFG?

S AA/a  
 A SA/b

8M CO4 L6

**UNIT-V**

9. a) Write short notes on Liner Bounded Automaton? 6M CO5 L4

b) Design Turing's Machine to accept the language  $L = \{a^n b^n c^n / n \geq 1\}$ . Also give the graphical representation and Instantaneous description (ID) for the input "aabbcc"? 10M CO5 L6

**OR**

10. a) Write and explain about Counter machines? 6M CO5 L2

b) Design a TM for  $L = \{0^n 1^n \mid n \geq 1\}$  8M CO5 L6

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**R-19**

**Code: 19A544T**

II B.Tech. II Semester Supplementary Examinations April 2023

**Object Oriented Programming using JAVA**

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

**UNIT-I**

- |   |    |   |     |
|---|----|---|-----|
| 1. a) Explain the benefits and applications of OOPs | 7M | 1 | 2   |
| b) List and explain the java buzz words.            | 7M | 1 | 1,2 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 2. a) Write a java program to find any given number is palindrome or not | 8M | 1 | 3 |
| b) Explain the importance of byte code in java programming               | 6M | 1 | 2 |

**UNIT-II**

- |  |    |   |   |
|--|----|---|---|
| 3. a) Write a program to demonstrate static variables, methods and blocks. | 7M | 2 | 3 |
| b) Explain the differences between abstract class and interface            | 7M | 2 | 2 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 4. a) Differentiate between method overloading and method overriding with an example. | 7M | 2 | 2 |
| b) Explain the keywords this, static, super and final with one example each.          | 7M | 2 | 2 |

**UNIT-III**

- |  |    |   |     |
|--|----|---|-----|
| 5. a) Write a java program to display the priority of a thread.        | 7M | 3 | 3   |
| b) What is an exception? In what way it is differ from error? Explain. | 7M | 3 | 1,2 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 6. a) With the help of an example, explain multithreading by extending Thread class | 7M | 3 | 2 |
| b) Distinguish between final and finally keywords                                   | 7M | 3 | 2 |

**UNIT-IV**

- |  |    |   |   |
|--|----|---|---|
| 7. a) Write about the different lambda parameter passing techniques. | 7M | 4 | 3 |
| b) Give brief description about the java's generic classes.          | 7M | 4 | 1 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 8. a) What are the restrictions on generics usage? Explain briefly. | 7M | 4 | 2 |
| b) Explain predefine functional interfaces.                         | 7M | 4 | 2 |

**UNIT-V**

- |   |    |   |   |
|---|----|---|---|
| 9. a) Explain the differences between Vector and Arrays. Explain the methods in Vector class. | 7M | 5 | 2 |
| b) Explain various interfaces used in Collection framework?                                   | 7M | 5 | 2 |

**OR**

- |  |    |   |     |
|--|----|---|-----|
| 10. a) Explain the importance of Hash set interface in java      | 7M | 5 | 2   |
| b) What is Scanner class? Describe the details of Scanner class. | 7M | 5 | 1,2 |

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