Hall Ticket Number :										

R-19

Code: 19A542T

II B.Tech. II Semester Supplementary Examinations November 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
		UNIT–I			
1.	a)	Differentiate between best, average and worst case efficiency	7M	CO1	L4
	b)	Explain the concept of amortized analysis	7M	CO1	L2
		OR			
2.	a)	Explain properties of an algorithm with an example	7M	CO1	L2
	b)	Write the algorithm for matrix multiplication and find the time complexity of matrix multiplication	7M	CO1	L2
		UNIT–II			
3.	a)	Explain the general method of divide and conquer approach	7M	CO2	L2
	b)	Write the algorithm of binary search	7M	CO2	L2
		OR			
4.	a)	What are the advantages of divide and conquer	8M	CO2	L4
	b)	Write the best case ,average case time complexity of merge sort	6M	CO2	L2
		UNIT–III			
5.		Explain optimal binary search tree with the help of an example	14M	CO3	L2
		OR			
6.	a)	List the applications of dynamic programming	7M	CO3	L2
	b)	What is the time of O/1 Knapsack problem using dynamic programming	7M	CO3	L4
		UNIT–IV			
7.	a)	Explain in detail 4 queens problem	7M	CO4	L2
	b)	What are the applications of branch and bound method	7M	CO4	L4
		OR			
8.	a)	Explain in detail LC search algorithm in detail	7M	CO4	L2
	b)	What are the advantages of LC search algorithm	7M	CO4	L4
		UNIT–V			
9.		Illustrate the relationship among the NP,NP hard and NP complete in detail	14M	CO5	L3
		OR			
10.		State and Explain COOKS theorem in detail	14M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A543T

II B.Tech. II Semester Supplementary Examinations November 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)	What are the difference between NFA and DFA?	4M	CO1	L5
b)	Explain about Chomsky hierarchy of languages?	10M	CO1	L2
	OR			
2. a)	Prove or explain with the help of an algorithm that "Every NFA will have an equivalent DFA".	4M	CO1	L6
b)	Minimize the Finite automaton given below and show both the given and the reduced one are equivalent?	10M	CO1	L3
	UNIT–II			
3. a)	How to construct Regular Expressions from the given FA?	4M	CO2	L4
b)	Construct Finite Automaton to accept the Regular Expression (0 + 1) *(00+11) (0 + 1) *.	10M	CO2	L5
	OR			
4. a)	Simplify the Regular Expression Є + 1*(011)*(1*(011)*)*	4M	CO2	L3
b)	Construct a NFA for the regular expression (a+b)*abb and draw its equivalent DFA?	10M	CO2	L5
	UNIT–III			
5. a)	Convert the following CFG into Griebach Normal Form? S → XA | BB B → b | SB X → b A → a	10M	CO3	L6

b) Explain Pumping Lemma of CFL with an example? 4M CO3 L2

OR

6. a) Reduce the following grammar G into an equivalent grammar by removing useless symbols and useless productions from it?

S → aAa
A → Sb/bcc/DaA
C → abb/DD
E → ac
D → aDA 6M CO3 L6

b) Construct a regular grammar G generating the regular set represented by a*b(a+b)*? 8M CO3 L5

UNIT–IV

7. a) What are different types of PDA? 4M CO4 L4

b) Construct PDA that accepts the language L = $\{0^n1^m/n \neq m, n, m \geq 1\}$? 10M CO4 L5

OR

8. a) Let G be a CFG that generates the set of palindromes given by S → aSa / bSb / a / b

Find the PDA that accepts L(G) and simulate for input abbbbb?. 6M CO4 L3

b) Construct the PDA that recognizes the language

L={ $x=x^R$ / x belongs to {a, b}*} 8M CO4 L5

UNIT–V

9. a) Show that PCP is undecidable for words over a one symbol alphabet? 4M CO5 L3

b) Design a Turing Machine that accepts the language L = $\{ww^R/w \in \{a, b\}\}$. 10M CO5 L6

OR

10. a) Define Turing Machine formally; explain how Turing Machine can be used to compute integer functions? L1 6M CO5 L3

b) Design the Turing Machine to compute following function, show its transition diagram also f(x, y) = 2x + 3y where x and y are positive integers represented in unary? 8M CO5 L6

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Hall Ticket Number :										

R-19

Code: 19A544T

II B.Tech. II Semester Supplementary Examinations November 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.		Define multidimensional array? Write a java program for matrix multiplication.	14M	CO1	L2
		OR			
2.	a)	List and explain the java buzz words.	8M	CO1	L2
	b)	What is Byte code? Explain the various stages of programming in Java	6M	CO1	L2
		UNIT–II			
3.	a)	Explain with an example program the importance of interfaces in java programming.	7M	CO2	L3
	b)	What is polymorphism? Explain runtime polymorphism with a program.	7M	CO2	L3
		OR			
4.	a)	List the advantages of packages over classes.	7M	CO2	L1
	b)	Explain access specifiers in java in detail.	7M	CO2	L2
		UNIT–III			
5.		In how many ways a thread in java can be implemented? Explain each with example program.	14M	CO3	L3
		OR			
6.		What is an Exception? List out the keywords for exception handing and write steps to develop user defined exception.	14M	CO3	L3
		UNIT–IV			
7.	a)	Discuss about the instance variable and static variable capture using lambda.	7M	CO4	L5
	b)	What is a Generic Method? Illustrate Generic Method with an example program	7M	CO4	L3
		OR			
8.	a)	What are the three parts of a Lambda Expression? What is the type of Lambda Expression?	7M	CO4	L5
	b)	What are the restrictions on generics usage? Explain briefly.	7M	CO4	L2
		UNIT–V			
9.	a)	Write and explain the Collection interface.	7M	CO5	L2
	b)	Explain ArrayList class and explain following methods: i. add() ii. size() iii. equals() iv. remove()	7M	CO5	L2
		OR			
10.	a)	Give brief description about the LinkedList class in java Collection	7M	CO5	L2
	b)	Demonstrate stack operations using Stack legacy class.	7M	CO5	L3

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Hall Ticket Number :										

R-19

Code: 19A545T

II B.Tech. II Semester Supplementary Examinations November 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)	Describe the differences between short-term, medium-term, and long-term scheduling.	7M	CO1	L4
	b)	Explain the direct and indirect process of communication using the message passing system?	7M	CO1	L2
		OR			
2.	a)	What is an Operating system? List and explain different Operating Systems Operations?	7M	CO1	L2
	b)	Why Operating System is known as Resource Manager. Explain the layered architecture of an Operating System	7M	CO1	L2
		UNIT–II			
3.		Elaborate on different Multithreading models?	14M	CO2	L2
		OR			
4.	a)	What are semaphores? Explain Binary and counting semaphores with example?	7M	CO2	L2
	b)	Elaborate on the race condition in process synchronization?	7M	CO2	L2
		UNIT–III			
5.	a)	Is it possible to have a deadlock involving only a single process? Explain your answer?	7M	CO3	L4
	b)	Explain the different methods to recover from the deadlock?	7M	CO3	L2
		OR			
6.	a)	What is a Safe State is Deadlock? Explain Banker's Algorithm for Deadlock Avoidance with a suitable example?	8M	CO3	L2
	b)	What is a deadlock? Explain in brief Deadlock Prevention?	6M	CO3	L2
		UNIT–IV			
7.		List and Discuss different Disk scheduling algorithms with suitable examples?	14M	CO4	L4
		OR			
8.		What is RAID? Explain different RAID levels with a neat diagram?	14M	CO4	L2
		UNIT–V			
9.	a)	Discuss the protection of operating systems using firewalls?	7M	CO5	L2
	b)	Discuss different types of standard security attacks.	7M	CO5	L2
		OR			
10.	a)	Draw and explain about PC bus structure?	7M	CO5	L2
	b)	Outline the significance of polling in I/O systems?	7M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19AC43T

II B.Tech. II Semester Supplementary Examinations November 2023

Probability and 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. Find the coefficient of correlation between industrial production and export using the following data and comment on the result.

Production (in crores tons):	55	56	58	59	60	60	62
Exports (in crores tons) :	35	38	38	39	44	43	45

14M CO1 L3

OR

2. Find the Spearman's rank correlation coefficient to the data:

X:	68	64	75	50	64	80	75	40	55	64
Y:	62	58	68	45	81	60	68	48	50	70

14M CO1 L3

UNIT–II

3. State and prove Addition theorem on probability for three events 14M CO2 L4

OR

4. A random variable X has the following probability function

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Find the value of K , (ii)Evaluate $p(0 < x < 5)$, (iii) Evaluate $p(x < 5)$ 14M CO2 L3

UNIT–III

5. If a random variable has a Poisson distribution such that P (1) = P(2) find (i) Mean of the distribution,(ii) P(4),(iii) $P(x \geq 1)$,(iv) $P(1 < x < 4)$ 14M CO3 L2

OR

6. A hospital switch board receives an averages of 4 emergency calls in a 10 minutes interval. What is the probability that (i) there are at most 2 emergency calls in a 10 minute interval (ii) there are exactly 3 emergency calls in a 10 minute interval? 14M CO3 L3

UNIT–IV

7. A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence? 14M CO4 L4

OR

8. The mean life of a sample of 10 electric bulbs was found to be 1456hours with S.D of 423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life 1280 hours with S.D. of 398 hours. Is there a significant difference between the means of two batches? 14M CO4 L4

UNIT–V

9. In a test given two groups of students, the marks obtained are as follows:

First Group :	18	20	36	50	49	36	34	49	41
Second Group:	29	28	26	35	30	44	46	-	-

Estimate the significance of the difference between the mean marks secured by the students of the above two groups. 14M CO4 L4

OR

10. 1000 students at college level were graded according to their IQ and economic condition of their home. Chose an appropriate test to find the any association between condition at home and I.Q.

economic condition	high	low	Total
Rich	460	140	600
Poor	240	160	400
Total	700	300	1000

14M CO4 L5

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Hall Ticket Number :										

R-19

Code: 19A541T

II B.Tech. II Semester Supplementary Examinations November 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.	a)	What is rationality? Define Rational agent.	7M	CO1	L1
	b)	Explain the Structure of Intelligent agents	7M	CO1	L2
		OR			
2.		Explain Goal Based Agent and Utility based Agent architecture with proper diagram.	14M	CO1	L2
		UNIT–II			
3.		Develop algorithms for Depth first and Breadth First search algorithms?	14M	CO2	L6
		OR			
4.		What are the constraints on a crypt arithmetic problem? Solve the following Crypt Arithmetic Problem: S E N D + M O R E = MONEY	14M	CO2	L1
		UNIT–III			
5.		Explain with an example (a) forward chaining (b) Backward chaining	14M	CO3	L2
		OR			
6.		Given the following set of facts, Prove that " Some who are intelligent can't read ". (i) Who ever can read is literal. (ii) Dolphins are not literate (iii) Some Dolphins are intelligent.	14M	CO3	L3
		UNIT–IV			
7.		What is Ontological Engineering? Explain with the diagram the upper ontology of the world	14M	CO4	L1
		OR			
8.		Briefly discuss about Hierarchical Planning	14M	CO4	L2
		UNIT–V			
9.		Explain Inference using full joint distribution	14M	CO5	L2
		OR			
10.		Briefly discuss about reasoning done using fuzzy logic.	14M	CO5	L2

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