Hall Ticket Number :										

R-20

Code: 20A445T

II B.Tech. II Semester Supplementary Examinations December 2023

Microprocessor and Interfacing

(Common to CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	Summarize the functioning of INTR pin in 8086.	CO1	L2
b)	Specify the format of ICW1 in 8259 PIC.	CO2	L6
c)	What is mode 0 operation of 8255?	CO3	L6
d)	Enlist the enhanced instruction set of 80386.	CO4	L2
e)	Draw the control register of 80386.	CO5	L2

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Explain string instructions supported by 8086 processor?	6M	C01	L2
b)	Give the instruction sequence that compares the first 10 bytes beginning at STRG1with the first ten bytes beginning at STRG 2 and branches to MATCH if they are equal, otherwise continues in sequence?	6M	C01	L2
	OR			
3. a)	Briefly explain about following instructions of 8086 i. ADD ii. NEG iii. AAM iv. DIV	6M	C01	L2
b)	Explain with simple examples how the string manipulation instructions in 8086 are useful in block transfer of data.	6M	C01	L2
	UNIT–II			
4.	What do you mean by a DMA data transfer? Explain the implementation in 8086 system using 8257 DMA controller.	12M	C02	L6
	OR			
5. a)	How DRAM's are different from SRAM's? Why DRAMs are said to employ address multiplexing?	6M	CO2	L6

	b)	What are the conditions that will cause EU to enter a 'Wait State' in 8086?	6M	CO2	L2

UNIT–III

6.	a)	Explain about the control word formats of 8255? Explain the importance of bit set / reset facilities?	6M	CO3	L6
	b)	Give an interfacing diagram, which shows the connections between 8086 and 8259.	6M	CO3	L6

OR

7.	a)	Distinguish between Mode set control word and BSR control Word of 8255?	6M	CO3	L6
	b)	Explain how an ADC is connected to 8086 using the ports of 8255? Give relevant interface diagram?	6M	CO3	L6

UNIT–IV

8.		Explain the operation of 8251 in Asynchronous mode of communication.	6M	CO4	L6
		Write short note on RS-232C standard.	6M	CO4	L6

OR

9.	a)	Draw and explain Command and Mode word formats of 8251.	6M	CO4	L6
	b)	Write initialization instructions to setup 8251 for asynchronous mode, 300baud and 7 bit character with no parity.	6M	CO4	L6

UNIT–V

10.	a)	What are the salient features of 80286 in real address mode?	6M	CO5	L2
	b)	Enlist the priority of bus usage in 80286.	6M	CO5	L2

OR

11.	a)	Draw and discus the paging mechanism of 80386 in details.	6M	CO5	L2
	b)	Explain the physical address formation in real address mode of 80386.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A543T

II B.Tech. II Semester Supplementary Examinations December 2023

Operating Systems

(Common to CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ALL the following short answer questions (5 X 2 = 10M)		
a)	What are Operating system Services?	**CO1**	**L1**
b)	Explain Critical Section problem.	**CO2**	**L2**
c)	Define mutual exclusion in deadlock prevention	**CO3**	**L1**
d)	List various Disk-Scheduling Algorithms.	**CO4**	**L1**
e)	Illustrate the structure of an operating system's I/O subsystem	**CO5**	**L2**

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Explain the purpose of all types of system calls and discuss the calls related to Process Control, device management and communications in detail.	6M	CO1	L2
b)	Discuss the following CPU scheduling algorithms with an example: (i) Round Robin (ii) Priority.	6M	CO1	L2
	OR			
3. a)	Explain about Operating System operations.	6M	CO1	L2
b)	List various computer systems Architectures and compare them.	6M	CO1	L2
	UNIT–II			
4. a)	Explain multithreaded server architecture and various multithreading models.	6M	CO2	L2
b)	State the dining philosopher's problem and show how to allocate the several resources among several processes in a deadlock and starvation free manner.	6M	CO2	L3
	OR			

5.	a)	Describe the Readers-Writers Problem. Find the solution for Readers-Writers Problem using Semaphores concept.	6M	CO2	L3
	b)	Explain the syntax and semantics of monitor.	6M	CO2	L2

UNIT–III

6.	a)	Use Banker's algorithm briefly explains the deadlock avoidance with a suitable example.	6M	CO3	L3
	b)	What is deadlock recovery? Explain various methods of deadlock recovery.	6M	CO3	L2

OR

7.	a)	Illustrate the importance of Demand paging in memory management? Take any example for illustration.	6M	CO3	L2
	b)	Explain external fragmentation. In which memory management technique it occurs? Explain the solution for it.	6M	CO3	L2

UNIT–IV

8.	a)	Write short notes on i. File Access Methods ii. File Operations	6M	CO4	L2
	b)	Briefly discuss about the various directory structures.	6M	CO4	L2

OR

9.	a)	A Work Queue is as: 23, 89, 132, 42, 187. There are 200 cylinders numbered from 0 – 199.The disk head starts at number 100 and moves forward. Calculate the total head movement for the following algorithms: i) FCFS ii)SSTF iii)SCAN iv)LOOK v)C-SCAN	8M	CO4	L3
	b)	Distinguish between sequential and direct file access methods	4M	CO4	L2

UNIT–V

10.	a)	Demonstrate Goals of Protection.	6M	CO5	L3
	b)	Explain the following system threats i) Worms ii) Viruses iii) Denial of service.	6M	CO5	L2

OR

11.	a)	Write about Computer Security classifications.	6M	CO5	L2
	b)	Explain the common approaches for authenticating a user identity.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC41T

II B.Tech. II Semester Supplementary Examinations December 2023

Probability and Statistics

(Common to CE, ME, CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1.Answer ALL the following short answer questions (5 X 2 = 10M) CO BL

a) Define Correlation between two variables. Also write the formula for Karl Pearson's coefficient of correlation. CO1 L1

b) Two dice are thrown. Let A be the event that the sum of the points on the faces is 9. Let B be the event that at least one number is 6.Find (i) $P(A \cap B)$ (ii)P(AUB) CO2 L3

c) What is Binomial distribution function? Write the formulae for mean and variance of Binomial distribution. CO3 L1

d) A random sample of size 100 has a standard deviation of 5.what can you say about the maximum error of estimate with 95% confidence? CO4 L3

e) For F -distribution , find $F_{0.05}$ with v_1 =7 and v_2 =15 CO5 L3

PART-B

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

Marks CO BL

UNIT–I

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

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	8	7	12	28	20	10	10

12M CO1 L3

OR

3. From the following data calculate the rank correlation coefficient

X	48	33	40	9	16	16	65	24	16	57
Y	13	13	24	6	15	4	20	9	6	19

12M CO1 L3

UNIT–II

4. Suppose a continuous random variable X has the probability density function $f(x)=K(1-x^2)$ for $0<x<1$, and $f(x)=0$ otherwise.
Find (i) K (ii) Mean (iii) Variance 12M CO2 L3

OR

5. A random variable X has the following probability function:

X	1	2	3	4	5	6	7	8
P(X)	K	2K	3K	4K	5K	6K	7K	8K

Find the value of (i) K (ii) Mean (iii) Variance 12M CO2 L3

UNIT–III

6. Seven coins are tossed and the number of heads are noted. The experiment is repeated 128 times and the following distribution is obtained.

No .of heads	0	1	2	3	4	5	6	7
Frequency	7	6	19	35	30	23	7	1

Fit a binomial distribution assuming that coin is unbiased 12M CO3 L3

OR

7. The marks obtained in mathematics by 1000 students is normally distributed with mean 78% and standard deviation 11%. Determine
   (i) How many students got marks above 90%
   (ii) What was the highest mark obtained by lowest 10 % of the students
   (iii) Within what limits did the middle of 90% of the students lie 12M CO3 L3

UNIT–IV

8. a) A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students having mean IQ of 75 with Standard deviation of 15. In the second group there are 250 students having mean IQ of 70 with Standard deviation of 20.test whether there is any significant difference in the two groups by considering 1% level of significance. 8M CO4 L4

   b) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that majority of men in this city are smokers? level of significance 5% 4M CO4 L4

OR

9. Before an increase on excise duty on tea 500 people out of a sample of 900 found to have the habit of having tea. After an increase on excise duty 250 are found to have tea habit among 1100. Is there any decrease in the consumption of tea? Test at 5% level of significance. 12M CO4 L4

UNIT–V

10. Scores obtained in a shooting competition by 10 soldiers before and after intensive training are given below:

Before	67	24	57	55	63	54	56	68	33	43
After	70	38	58	58	56	67	68	75	42	38

Test whether the intensive training is useful at 0.05 level of significance 12M CO5 L4

OR

11. Two researchers adopted different sampling techniques while investigating some group of students to find the number of students falling into different intelligence level. The results are as follows:

Researcher	Below Average	Average	Above Average	Genius
X	86	60	44	10
Y	40	33	25	2

Would you say that the sampling techniques adopted by two researchers are significantly different? Level of significance 5% 12M CO5 L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A541T

II B.Tech. II Semester Supplementary Examinations December 2023

Design and Analysis of Algorithms

(Common to CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	BL
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)			
a)	What are the characteristics of an algorithm?		CO1	L1
b)	What is the worst case time complexity of Quick sort?		CO1	L1
c)	Define minimum cost spanning tree.		CO2	L1
d)	Define principle of optimality.		CO2	L1
e)	What is Backtracking? What are the constraints used in it?		CO4	L1

PART-B

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

			Marks	CO	BL
	UNIT–I				
2.	Define an Algorithm. Explain various Asymptotic notations for the analysis of an algorithm with the help of examples.		12M	CO1	L1
	OR				
3.	a)	Explain Tower of Hanoi problem and develop a recursive algorithm.	6M	CO1	L2
	b)	Write a recursive algorithm to find maximum and minimum in an array.	6M	CO1	L1
	UNIT–II				
4.	a)	Develop an algorithm to find the k^{th} smallest element in a given array of elements using Divide and Conquer Technique and explain with an example. Discuss its time complexity.	6M	CO2	L3
	b)	Explain the Merge Sort algorithm with an example. Give the Time complexity of Merge sort algorithm	6M	CO2	L2
	OR				
5.	a)	Explain Knapsack Problem using greedy method with the help of an example. Give an algorithm for the Knapsack problem.	6M	CO2	L2

	b)	Define Minimum cost spanning tree. Explain with the help of example kruskal's algorithm for finding the minimum cost spanning tree.	6M	CO2	L1

UNIT–III

6.		Explain Multi Stage Graph Problem using Forward approach with the help of an example using Dynamic Programming.	12M	CO3	L2

OR

7.		Discuss Optimal Binary Search tree problem with the help of an example.	12M	CO3	L6

UNIT–IV

8.	a)	Define backtracking. Give the general algorithm for backtracking problems.	6M	CO4	L1
	b)	Explain the 4-Queen's problem with the help of example.	6M	CO4	L5

OR

9.		Explain knapsack problem with the help of example using branch and bound.	12M	CO4	L5

UNIT–V

10.		Discuss the basic concepts of NP-Hard and NP-Complete problems.	12M	CO5	L6

OR

11.	a)	Explain Cooks theorem.	3M	CO5	L2
	b)	Distinguish between non deterministic and deterministic algorithms.	9M	CO5	L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A542T

II B.Tech. II Semester Supplementary Examinations December 2023

Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		CO	BL
a)	Give the DFA accepting the language over the alphabet 0, 1 that have the set of all strings that either begins or end (or both) with 01.		CO1	L3
b)	State pumping lemma for regular languages.		CO2	L1
c)	Why some languages are not decidable or even Turing – recognizable?		CO5	L2
d)	Is it possible to reduce the unit production in context free grammar? Justify through example.		CO3	L2
e)	Differentiate 2-way FA and TM?		CO5	L1

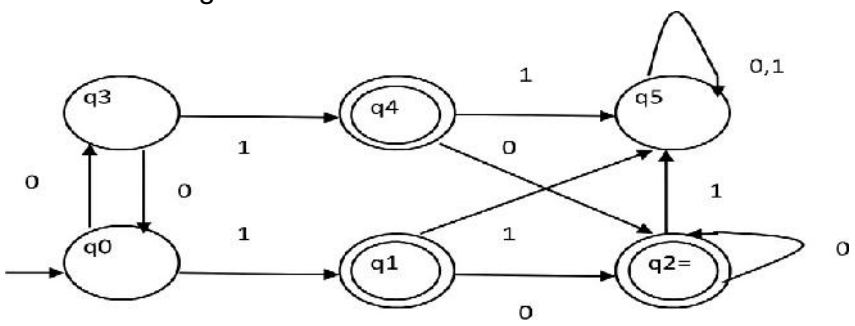
PART-B

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

		Marks	CO	BL

UNIT–I

2. a) Minimize the following DFA

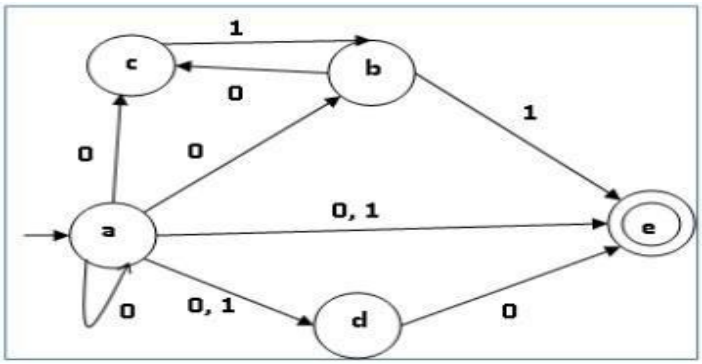


7M CO1 L3

b) Draw a deterministic and non-deterministic finite automate which accept 00 and 11 at the end of a string containing 0, 1 in it, e.g., 01010100 but not 000111010. 5M CO1 L3

OR

3. Convert NDFA to DFA and then do minimization of that DFA. 12M CO1 L3



UNIT–II

4.	a)	Construct a finite automata for the regular expression (0+1)*(00+11)(0+1)*.	6M	CO2	L2
	b)	State pumping lemma for regular languages. What are the conditions involved in it? Explain with an example.	6M	CO2	L1

OR

5.		Define regular language and regular expressions. Find regular expression for the following: Language of all string that do not end with 01. Describe the language corresponding to following: (1+01)*(0+01)*	12M	CO2	L2

UNIT–III

6.	a)	Convert the following grammar into CNF. S→aAD A→aB B →bAB D→d	6M	CO3	L3
	b)	Discuss Normal forms-Chomsky and Greibach Normal forms with example.	6M	CO3	L1

OR

7.	a)	Give proof for the statement: if L is a context free language, then can we construct PDA accepting L by empty state, i.e. L=N(A).	5M	CO4	L1
	b)	Let G be a grammar S→0B | 1A, A→0 | 0S |1AA, B→1 |1S | 0BB. For the string 00110101 find its leftmost derivation and derivation tree.	7M	CO3	L2

UNIT–IV

8.	a)	Explain the definition of a non-deterministic push down automata (ndpa). Construct PDA accepting L={wcw^r | w ∈ {a,b}*} by final state.	6M	CO4	L2
	b)	Construct a PDA equivalent to the following grammar S→aAA A→aS / bS / a	6M	CO4	L3

OR

9.	a)	Design a PDA for the language L={ WW^R / W is in (0+1)* }	6M	CO4	L3
	b)	Obtain PDA to accept all strings generated by the language {a^n b^m a^n | m, n > 1}	6M	CO4	L3

UNIT–V

10.	a)	Design Turing Machine to increment the value of any binary number by one. The output should also be a binary number with value one more the number given.	6M	CO5	L2
	b)	Find whether the post correspondence problem P = {(10, 101), (011, 11), (101, 011)} has a match. Give the solution.	6M	CO5	L3

OR

11.	a)	Design a Turing Machine to accept the strings having equal number of 0's and 1's	8M	CO5	L2
	b)	Explain universal Turing machine.	4M	CO5	L1

*** End ***