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R-17

Code: 7G143

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Construct DFA and NFA accepting the set of all strings with three consecutive zeroes. 7M
b) Analyze the procedure to convert NFA into DFA with illustration? 7M

OR

2. a) Design a Moore machine to determine the residue mod 4 for each binary string treated as integer? 7M
b) Construct NFA for the following regular expression $(0 + 1)^*(01+110)$. 7M

UNIT-II

3. a) Prove $L = \{WW^R \mid W \in \{a, b\}^*\}$ is not regular? 7M
b) Obtain a regular grammar to obtain the set of all strings not containing three consecutive zeroes? 7M

OR

4. a) Discuss the closure properties of regular sets. 7M
b) Describe Pumping Lemma for regular sets. 7M

UNIT-III

5. a) What is minimization of context free grammar and explain each with one example. 7M
b) Convert the given CFG to CNF $S \rightarrow aSa \mid bSb \mid a \mid b$ 7M

OR

6. a) Interpret enumeration of properties of CFL. 7M
b) Convert the given CFG to GNF
 $S \rightarrow ABA$
 $A \rightarrow Aa \mid$
 $B \rightarrow Bb \mid$ 7M

UNIT-IV

7. a) Analyze DCFL and DPDA with illustration. 7M
b) Construct PDA for the given CFG
 $S \rightarrow 0BB$
 $B \rightarrow 0S \mid 1S \mid 0$
Test whether 010000 is acceptable by this PDA. 7M

OR

8. a) Describe equivalence of CFL and PDA with appropriate example. 7M
b) Construct a PDA for set of all strings of balanced parenthesis? 7M

UNIT-IV

9. a) What are the types of Turing Machines explain in brief? 7M
b) Briefly explain the properties of recursive enumerable languages? 7M

OR

10. a) Discuss about Church's hypothesis and counter machine. 7M
b) Interpret Turing reducibility and Universal Turing Machine. 7M

Code: 7G145

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Operating Systems

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) What Operating system does? Explain about the structure of operating system. 8M
b) List types of system calls and explain. 6M

OR

2. a) Explain the process states with state transition diagram. Also explain the PCB with neat diagram. 8M
b) What is IPC? Explain the direct and indirect communication with respect to message passing system? 6M

UNIT-II

3. a) Explain the kernel I/O subsystems? 8M
b) Differentiate between
a) Process and a Thread b) User Level and Kernel level thread c) waiting and turnaround time 6M

OR

4. a) How does concurrency control occur in operating system during execution? 7M
b) Explain the Dining philosopher's problem using monitors? 7M

UNIT-III

5. a) For the following snapshot Find the safe sequence using Bankers algorithms

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	0	2	0	0	4	1	0	2
P1	1	0	0	2	0	1			
P2	1	3	5	1	3	7			
P3	6	3	2	8	4	2			
P4	1	4	3	1	5	7			

- i) Is the system in Safe State?
ii) If request from process P2 arrives for (002), Can the request granted immediately? 9M
- b) What are different methods to handle dead lock? Also explain the dead prevention and avoidance 5M

OR

6. a) What are virtual machines? Explain VM-WARE architecture with neat diagram? 7M
b) Consider the following segmentation table

Segment	Base	Length
0	219	600
1	2300	14
2		
90	100	
3	1327	580
4	1952	96

- a) What are the physical address for the following logical address
i) 0, 430 ii) 1, 10 iii) 2,500 iv) 3,400 v) 4, 112 7M

UNIT-IV

7. a) Discuss about the different types of file access methods. 7M
b) Point out and Explain briefly problems with RAID 7M

OR

8. Let Disk drive 5000 Cylinders from 0 to 4999. Currently drive is at 143rd Cylinder and the previous request was at 125. Queue of pending request in FIFO order is 86,1470,913,1774,948,1509,1022,1750,130. What is total distance the disk arm moves to satisfy all pending request for each of the following scheduling algorithms from current positions i) FCFS ii) SCAN iii) LOOK 14M

UNIT-V

9. a) What is protection? Distinguish between mechanisms and polices? Explain briefly Access matrix with domains as objects? 8M
b) Explain the different Security Classifications? 6M

OR

10. a) Describe the goals of protection? 7M
b) Explain domain of protection and access matrix 7M

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R-17

Code: 7GC42

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Probability and Statistics
(Common to CE, ME and CSE)

Max. Marks: 70

Time: 3 Hours

PART-A

Answer the following units by choosing one question from each unit (3 x 14 = 42 Marks)

UNIT-I

1. Given $P(A)=1/4$, $P(B)=1/3$ and $P(A \cup B)=1/2$, then evaluate $P(A/B)$, $P(B/A)$, $P(A \cap B')$ and $P(A' \cap B')$ 14M

OR

2. A random variable X has the following probability function values of X .

x:	-2	-1	0	1	2	3
p(x):	0.1	K	0.2	2k	0.3	k

Find the value k, $P(X \geq -1)$, $P(X \leq 2)$, mean and variance 14M

UNIT-II

3. a) The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that (a) exactly two will defective, (b) at least two will be defective and (c) none will be defective. 7M

- b) Fit a Poisson distribution to the frequency distribution

x:	0	1	2	3	4
f:	46	38	22	9	1

7M

OR

4. a) The weekly wages of workers in a company are normally distributed with mean of Rs. 700 and standard deviation of Rs. 50. Find the probability that the weekly wage of a randomly chosen worker is (i) between Rs. 650 and Rs. 750, and (ii) more than Rs. 750. 7M

- b) For the normal distribution with mean 2 and standard deviation 4, evaluate (i) $P(-6 < x < 3)$, (ii) $P\{x \geq 5\}$ and (iii) $P(\{|x| < 4\})$. 7M

UNIT-III

5. A population consists of the four numbers 3, 7, 11, 15. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 14M

OR

6. a) The standard deviation of the life-times of television tubes manufactured by a company is estimated as 100 hours. Find how large a sample must be taken in order to be 99% confident that the error in the estimated mean life-time will not exceed 20 hours 7M
- b) Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. 7M

UNIT-IV

7. a) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population 7M
- b) Experience had shown that 20% of a manufactured product is of the top quality. In one day production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 level 7M

OR

8. The mean yield of wheat from a district A was 210 pounds with S.D 2.5 inches per acer from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D 12 pounds from a sample of 150 plots. Assuming that the S.D of yield in the entire state was 11 pounds. Test whether there is any significant difference between the mean yield of crops in the two districts 14M

UNIT-V

9. In an investigation on the machine performance, the following results are obtained

	No. of units inspected	No. of defectives
Machine I	375	17
Machine II	450	22

Test whether there is any significant performance of two machines at $\alpha = 0.05$ 14M

OR

10. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees

Employees

Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M

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Code: 7G141

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Computer Organization
(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Draw the functional diagram of a computer and explain each block? 7M
b) What is bus? Draw the figure to show how functional units are interconnected using a bus and explain it 7M

OR

2. a) Differentiate between fixed point and floating point representation? 7M
b) Explain about signed magnitude approach for representing the fixed point numbers 7M

UNIT-II

3. a) What is register transfer language? Explain the basic symbols used in register Transfer 7M
b) Discuss about the arithmetic logic shift unit with examples? 7M

OR

4. a) What do you mean by Addressing modes? Explain the following addressing modes:
i) Index Addressing mode ii) Immediate Addressing mode
iii) Relative Addressing mode iv) Direct Addressing mode 7M
b) Explain the basic computer instruction formats? 7M

UNIT-III

5. a) Explain Hardwired control unit for simple CPU with diagram 7M
b) Explain micro sequencer organization with a neat sketch. 7M

OR

6. a) What is meant by microprogramming? Explain the micro programmed control? 7M
b) Explain about control memory in a micro programmed control organization 7M

UNIT-IV

7. a) Multiply each of the following pairs of signed 2's complement numbers using booth algorithm and bit pairing of the multiplier (Assume A is the Multiplicand and B is the Multiplier).
A=010111 B=110110
A=110011 B=101100 7M
b) Draw and explain the division of floating point numbers 7M

OR

8. a) What is virtual memory? With a neat block diagram explain the virtual memory address translation 7M
b) What is cache memory? Explain the different mapping functions 7M

UNIT-V

9. a) Draw the block diagram of a DMA controller and explain its functioning? 7M
b) Distinguish between Isolated versus Memory Mapped I/O 7M

OR

10. a) State and explain the different types of hazards that can occur in a pipeline 4M
b) What is data hazard? Explain the methods for dealing with data hazard? 10M

Code: 7G142

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Design and Analysis of Algorithms
(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

- 1. a) Explain in brief about Asymptotic notations with examples. 7M
- b) Define Time and Space Complexity, and calculate the time space complexity for addition of two matrices. 7M

OR

- 2. a) Develop algorithms for UNION and FIND using weighting rule and collapsing rule respectively. 7M
- b) Derive the time complexity of Binary search. 7M

UNIT-II

- 3. a) Use Strassen's algorithm to compute the matrix product $\begin{bmatrix} 1 & 7 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} 3 & 4 \\ 6 & 2 \end{bmatrix}$. 7M
- b) Write greedy algorithm to the job sequencing with deadlines. 7M

OR

- 4. a) Write an algorithm for single source shortest path problem. Explain with example. 7M
- b) Explain 0/1 Knapsack greedy algorithm with an example. 7M

UNIT-III

- 5. a) Explain how to solve Travelling Salesman problem by the method of dynamic programming and analyze the complexity of algorithm. 7M
- b) Construct an OBST for identifiers(a1,a2, a3,a4)=(do, if, int , while) with P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1). 7M

OR

- 6. a) Explain the general method of Dynamic Programming. 7M
- b) Find the optimal solution for the Knapsack instance n=7,M=15(p1,p2,p3,p4,p5,p6,p7)=(10,5,15,7,6,18,3) and (w1,w2,w3,w4,w5,w6,w7)=(2,3,5,7,1,4,1) by using dynamic programming. 7M

UNIT-IV

- 7. a) Explain the principle of FIFO branch and bound. 7M
- b) Solve the following instance of 0/1 knapsack problem using FIFO branch and bound and LC branch and bound.
N=4, (p1,p2,p3,p4)=(10,10,12,18), (w1,w2,w3,w4)=(2,4,6,9); M=15. 7M

OR

- 8. a) Define n-queens problem. Draw the tree organization of the 4-queens problem. 7M
- b) Explain the Travelling sales person problem LCBB procedure with the following instance and draw the portion of the state space tree and find an optimal tour.

20	30	10	11
15	16	4	2
3	5	2	4
19	6	18	3
16	4	7	16

7M

UNIT-V

- 9. a) Define P, NP, and NP-Complete problem? Explain. 7M
- b) Discuss about non-deterministic algorithms. 7M

OR

- 10. a) Explain the classes of NP-Hard and NP-Complete. 7M
- b) State and prove Cook's theorem. 7M
