Hall Ticket Number :										

R-17

Code: 7G141

II B.Tech. II Semester Supplementary Examinations March 2021

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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	State the differences between encoder and multiplexer. Mention the role of these components in the design of computers.	6M	CO1	L2
	b)	Given a 16 X 8 ROM chip with chip enable input, show the external connections necessary to construct a 128 X 8 ROM after determining the number of chips required and a decoder logic.	8M	CO1	L3
		OR			
2.	a)	Represent 67 in 1's and 2's complement 8-bit binary number system. Prove that the resultant of the arithmetic operation (67-67) is different in these two types of representation schemes.	8M	CO1	L5
	b)	Explain the format of floating-point numbers in computer organization with suitable examples.	6M	CO1	L1
		UNIT–II			
3.	a)	Illustrate the sequence of operations carried out in the transfer of contents from a register to another with the signals CLOCK and LOAD.	6M	CO2	L2
	b)	Design a 4 bit binary adder/subtractor with full adder as a basic building block. Describe its functionality..	8M	CO2	L3
		OR			
4.	a)	Enumerate the sequence of micro operations for the following memory-referencing instructions: LDA, BSA, BUN and ISZ.	8M	CO2	L2
	b)	Write down the sequences of operations effected by a processor whenever it is interrupted by an Input/Output device.	6M	CO2	L1
		UNIT–III			
5.	a)	Write brief notes on the control address register and micro program sequencer.	6M	CO3	L1
	b)	What is the significance of address sequencer in micro programmed control unit? With a neat sketch of block diagram, explain the process of determining the next micro address.	8M	CO3	L2
		OR			
6.	a)	Describe the format of microinstructions and the associated bit fields.	8M	CO3	L2
	b)	Compare and contrast between hardwired and micro programmed control units.	6M	CO3	L2
		UNIT–IV			
7.	a)	What is divide overflow? Explain any one method by which this can be handled in the hardware implementation of division algorithm.	8M	CO4	L2
	b)	With a schematic explain the use of 2-bit by 2-bit array multiplier in the implementation of Booth's multiplication algorithm.	6M	CO4	L3
		OR			

8.	a)	Depict the addition and subtraction of floating point numbers using an appropriate flow chart and explain the data flow.	8M	CO4	L2
	b)	Narrate the steps involved in the multiplication of floating point numbers with a suitable example.	6M	CO4	L1

UNIT–V

9.	a)	Compare and contrast between the source-initiated and destination initiated data transfer using handshake methods.	8M	CO5	L2
	b)	State the requirements in processor architecture to support Direct Memory Access.	6M	CO5	L2

OR

10.	a)	What are the impacts of branching instructions in the pipelined architecture? Discuss the strategies to mitigate these problems.	8M	CO5	L2
	b)	Write brief notes on memory interleaving technique used in vector processors.	6M	CO5	L1

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R-17

Code: 7G142

II B.Tech. II Semester Supplementary Examinations March 2021

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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		Explain briefly the Mathematical analysis of recursive and non-recursive algorithms.	14M	1	2
		OR			
2.		Explain briefly Big oh Notation, Omega Notation and Theta Notations. Give Examples.	14M	1	2
		UNIT–II			
3.	a)	What is divide and conquer strategy and explain the binary search with suitable example.	7M	2	1
	b)	Apply quick sort to sort the list E,X,A,M,P,L,E in alphabetical order. Generate the tree of the recursive calls made.	7M	2	4
		OR			
4.	a)	Solve the Knapsack Problem where m=10, n=4, P= (40,42,25,12), W= (4,7,5,3) using greedy algorithm.	7M	2	3
	b)	What is job sequencing with deadline problem? Let n=5, profits = (10,3,33, 11,40), deadlines=(3,1,1,2,2) respectively. Find the optimal solution using greedy algorithm.	7M	2	1
		UNIT–III			
5.		Explain optimal binary search tree problem with the help of an example using dynamic programming.	14M	3	2
		OR			
6.	a)	Solve the all pair shortest path problem using dynamic programming for the diagraph with the following weight matrix: $\begin{vmatrix} 0 & 2 & \infty & 1 & 8 \\ 6 & 0 & \infty & \infty & \infty \\ \infty & \infty & 0 & 4 & \infty \\ \infty & \infty & 2 & 0 & \infty \\ 3 & \infty & \infty & \infty & 0 \end{vmatrix}$	7M	3	3
	b)	Develop a pseudo code for all pair shortest path problem using dynamic programming.	7M	3	3
		UNIT–IV			
7.	a)	Explain the backtracking solution to solve 8-queens problem.	7M	4	5
	b)	Develop the pseudo code for 8-queens problem using backtracking algorithm.	7M	4	3
		OR			
8.		Solve Travelling Salesperson Problem using Branch and Bound algorithm for the given instance: $\begin{vmatrix} \infty & 2 & 5 & 7 \\ 2 & \infty & 8 & 3 \\ 5 & 8 & \infty & 1 \\ 7 & 3 & 1 & \infty \end{vmatrix}$	14M	4	6
		UNIT–V			
9.	a)	Using an example prove that satisfiability of boolean formula in 3- Conjuctive normal form is NP-Complete.	7M	5	5
	b)	What does Nondeterministic Algorithm mean? Distinguish between deterministic and nondeterministic algorithm in design and analysis of algorithm?	7M	5	4
		OR			
10.		Discuss the need of approximation algorithms and how they can be used for NP Hard Problems.	14M	5	6

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Hall Ticket Number :										

R-17

Code: 7G143

II B.Tech. II Semester Supplementary Examinations March 2021

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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Design FA to check whether given decimal number is divisible by three.	7M	1	L5
	b)	Differentiate between DFA and NFA with suitable illustration.	7M	1	L3
		OR			
2.	a)	Design a Moore machine to determine the residue mod 5 for each binary string treated as integer?	7M	1	L5
	b)	Give Moore machine for ∑={0,1,2}, print the residue modulo 5 of input treated as a ternary number.	7M	1	L1
		UNIT–II			
3.	a)	Discuss applications of regular expressions and finite automata	7M	2	L2
	b)	Prove L={a^p/ p is a prime} is not regular.	7M	2	L3
		OR			
4.	a)	Design a FA from given regular expression 10+(0+11)0*1	7M	2	L5
	b)	Construct Finite automata to accept the regular expression (0+1)*(00+11)(0+1)*	7M	2	L3
		UNIT–III			
5.	a)	Differentiate between right linear and left linear grammar with suitable examples.	7M	3	L2
	b)	Convert the following CFG to GNF. **A1→A2A3** **A2→A3A1/b** **A3→A1A2/a**	7M	3	L3
		OR			
6.	a)	Define Greibach Normal Form and Convert the given CFG to GNF **S→ABA** **A→aA/ε** **B→bB/ε**	7M	3	L4
	b)	Discuss about minimization of context Free Grammar.	7M	3	L3
		UNIT–IV			
7.	a)	Construct PDA for the language L={$a^n b^{2n}$/n≥1}	7M		
	b)	Construct PDA for the given CFG S→OBB B→OS/ 1S/ 0 Test whether 010^4 is acceptable by this PDA.	7M	3	L4
		OR			
8.	a)	Design PDA for the language that accepts strings with $n_a(w)<n_b(w)$ where w belongs to (a+b)*	7M	4	L5
	b)	Design a PDA for the following grammar. S→0A A→0AB/1 B→1	7M	4	L5
		UNIT–V			
9.	a)	Explain the types of Turing Machines	7M	5	L2
	b)	Design Turing Machine to recognize an arbitrary string divisible by 4 from ∑ = {0, 1, 2}.	7M	5	L5
		OR			
10.	a)	Explain the differences between PDA and TM.	7M	5	L2
	b)	Explain the properties of recursive and recursive enumerable languages.	7M	5	L2

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Hall Ticket Number :										

R-17

Code: 7G144

II B.Tech. II Semester Supplementary Examinations March 2021

Object Oriented Programming Using Java

(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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain the importance of byte code in java programming	5M	1	2
	b)	Write a java program to print the sum of even and odd numbers present between 1 to 20	5M	1	3
	c)	Prove that java is pure object oriented programming language	4M	1	5
		OR			
2.	a)	List and explain the java buzz words.	8M	1	1,2
	b)	Write a java program to find any given number is palindrome or not	6M	1	1
		UNIT–II			
3.		How can we implement the multiple inheritance using java? In what way it is different from other type of inheritance? Illustrate with example program	14M	2	1,2
		OR			
4.	a)	Distinguish between packages and interfaces	4M	2	4
	b)	What is meant by inheritance? Explain single and multilevel inheritance with example program.	10M	2	1,2
		UNIT–III			
5.	a)	What is an exception? In what way it is differ from error? Explain.	5M	3	1,5
	b)	With the help of a neat sketch explain the life cycle of a thread.	5M	3	5
	c)	Write a java program to display the priority of a thread.	4M	3	3
		OR			
6.		In how many ways a thread in java can be implemented? Explain each with example program.	14M	3	1,2
		UNIT–IV			
7.	a)	Give brief description about the java's generic classes.	7M	4	1
	b)	Write about the different lambda parameter passing techniques.	7M	4	3
		OR			
8.	a)	Discuss about the instance variable and static variable capture using lambda.	7M	4	6
	b)	Write short notes on method overriding using generic class.	7M	4	3
		UNIT–V			
9.	a)	Write and explain the sorted set interface.	7M	5	3
	b)	Give brief description about the LinkedList class interface in java	7M	5	2
		OR			
10.	a)	Discuss about the Enumeration interface and vector.	7M	5	6
	b)	Explain the importance of Hash set interface in java	7M	5	5

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Hall Ticket Number :										

R-17

Code: 7G145

II B.Tech. II Semester Supplementary Examinations March 2021

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)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define Kernel of Operating System? Explain its contribution in functioning of an operating system.	8M	CO1	L1
	b)	Why Scheduling is important in Operating System. Differentiate between preemptive and non-preemptive scheduling with example.	6M	CO1	L1
		OR			
2.	a)	Define Operating System? Why it is known as Resource Manager. Explain layered architecture of an Operating System.	7M	CO1	L1
	b)	Give the queuing diagram representing process scheduling and interpret the action point for the different types of CPU schedulers.	7M	CO1	L5
		UNIT–II			
3.	a)	Discuss Peterson's solution for handling the process concurrency problems	7M	CO2	L6
	b)	What is the term busy waiting? What other kinds of waiting are there in an OS? Can busy waiting be avoided altogether? Explain.	7M	CO2	L1
		OR			
4.	a)	Differentiate between the following: i. Thread Vs process ii. Process switching Vs context switching	7M	CO2	L5
	b)	What is critical section problem and what are the requirements that need to be satisfied by any solution to critical section problem? Discuss a solution to a 2-process critical section problem.	7M	CO2	L6
		UNIT–III			
5.	a)	Given the memory partitions of 100K, 500K, 200K, 300K and 600K i(in order), how would each of the First-fit, Best-fit and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory?	6M	CO3	L3
	b)	Assume a maximum-claim reusable resource system with four processes and three resource types. The total units of each resource type are given by vector $\begin{bmatrix}5 & 8 & 16\end{bmatrix}$. The claim matrix C and the allocation matrix A are given below. $C=\begin{bmatrix}4 & 1 & 4\\ 3 & 1 & 4\\ 5 & 7 & 13\\ 1 & 1 & 6\end{bmatrix}$ $A=\begin{bmatrix}0 & 1 & 4\\ 2 & 0 & 1\\ 1 & 2 & 1\\ 1 & 0 & 3\end{bmatrix}$ i. Determine if the current state of the system is safe. ii. Determine if a request by process 1 for 1 unit of resource 1 can be safely granted. iii. Determine if a request by process 3 for 6 units of resource 3 can be safely granted.	8M	CO3	L5
		OR			

6.		Consider the following page reference string 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, or seven frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each. i. LRU replacement ii. FIFO replacement iii. Optimal replacement	14M	CO3	L1

UNIT–IV

7.	a)	Explain different file access technique with suitable diagrams.	6M	CO4	L2
	b)	What are points to be consider in file system design? Explain the following file allocation methods (i) Contiguous allocation (ii) i-node	8M	CO4	L1

OR

8.		Compare the performance of C-SCAN and SCAN scheduling, assuming a uniform distribution of requests. Consider the average response time (the time between the arrival of a request and the completion of that request's service), the variation in response time, and the effective bandwidth. How does performance depend on the relative sizes of seek time and rotational latency?	14M	CO4	L4

UNIT–V

9.	a)	Explain different methods used to solve the problem of security at the operating system level	7M	CO5	L2
	b)	Differentiate between mechanism and policy.	7M	CO5	L4

OR

10.	a)	Describe the access matrix model used for protection purpose.	7M	CO5	L1
	b)	Write a short note on Revocation of access rights.	7M	CO5	L4

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Hall Ticket Number :										

R-17

Code: 7GC42

II B.Tech. II Semester Supplementary Examinations March 2021

Probability and Statistics

(Common to CE, ME & CSE)

Max. Marks: 70 Time: 3 Hours

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

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Marks

UNIT–I

1. a) In a bolt factory machine A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3%, and 2% are defective. A bolt is drawn at random and found to be defective. Find the probability that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C 7M

   b) A random variable X has the following probability distribution :

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

   Determine (i) K (ii) P(x<6) (iii) E[x^2] 7M

OR

2. a) The probability density *f(x)* of a continuous random variable is given by

   $f(x) = c\, e^{-|x|}$, $-\infty < x < \infty$

   Find the value of *c*, mean and variance of the distribution. 7M

   b) Bag I contains 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags and it is found to be black. Find the probability that it was drawn from Bag I. 7M

UNIT–II

3. a) The probability that the bulb of 100 days life is 0.05. Find the probability that one of 6 bulbs (i) At least one (ii) greater than four (iii) none, will be having a life of 100 days. 7M

   b) 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) 7M

OR

4. a) The mean weight of 500 college students is 70 kg and the standard deviation is 3 kg. Assuming that the weight is normally distributed, determine how many students weigh: (i) between 70 kg and 75 kg. (ii) more than 80 kg. (iii) less than 64 kg. 7M

   b) The following data was collected over a period of 10 years, showing the number of injuries from horse kicks in each of the 200 army corps. The distribution of injuries was as follows:

No. of injuries	0	1	2	3	4	Total
Frequency	109	65	22	3	1	200

   Fit a Poisson distribution to the data and calculate the theoretical frequencies: 7M

UNIT–III

5. a) Traveling between two campuses of a university in a city via shuttle bus takes, on average, 28 minutes with a standard deviation of 5 minutes. In a given week, a bus transported passengers 40 times. What is the probability that the average transport time, i.e., the average for 40 trips, was more than 30 minutes? Assume the mean time is measured to the nearest minute. 7M

   b) The contents of seven similar containers of sulfuric acid are 9.8, 10.2, 10.4, 9.8, 10.0, 10.2, and 9.6 liters. Find a 95% confidence interval for the mean contents of all such containers, assuming an approximately normal distribution. 7M

OR

6. a) 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. 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) Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After the increase in duty, 800 people were consumers of tea in a sample of 1200 persons. Find whether there is significant decrease in the consumption of tea after increase in duty? 7M

   b) Explain the following

   1) Null hypothesis 2) Critical region 3) Type I and Type II errors. 7M

OR

8. a) 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? 7M

   b) The following are the samples of skills. Test the significant difference between the means at 0.05 level

Sample I	71.4	77.7	74.4	74	73.8	-
Sample II	70.8	74.9	74.2	70.4	69.2	72.2

7M

UNIT–V

9. a) The theory predicts the proportion of beans, in the four groups: A, B, C and D should be 9:3:3:1. In an experiment with 1600 beans the number in the four groups were 882, 313, 287 and 113. Does the experiment result support the theory. 7M

   b) Two random samples drawn from two normal populations have the variable values as below:

Sample1	28	30	32	33	31	29	34
Sample2	29	30	30	24	27	28	

   Examine whether the samples have been drawn from a normal population having the same variance. 7M

OR

10. a) A sample of size 13 gave an estimated population variance of 3.0 while another sample of size 15 gave an estimate of 2.5. Could both samples be from population with same variance? 7M

    b) In a pre-poll survey out of 1000 urban voters 540 favoured B and the rest A. Out of 1000 rural voters, 620 favoured A and the rest B. Examine if the nature of the area is related to voting performance using the Chi-square test. 7M

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