Hall Ticket Number :										

R-20

Code: 20DF14T

M.C.A. I Semester Regular Examinations July 2021

Computer Organization

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.		Simplify the Boolean function F together with the don't care condition d in product of sums form F (w,x,y,z) = (0,1,2,3,7,8,10) d (w,x,y,z) = (5,6,11,15)	12M	CO1	L1
		OR			
2.	a)	Explain the process of representing Signed and unsigned numbers in digital Computer.	6M	CO1	L1
	b)	What is excitation table? Explain about JK flip-flop with its excitation table.	6M	CO1	L1
		UNIT–II			
3.		With a block diagram of associative memory, explain in detail about hardware organization.	12M	CO2	L2
		OR			
4.		Explain briefly about memory hierarchy.	12M	CO2	L2
		UNIT–III			
5.		Explain different instruction formats in detail.	12M	CO3	L3
		OR			
6.		Draw and explain the Intel 8086 CPU Architecture.	12M	CO2	L2
		UNIT–IV			
7.	a)	Explain about data manipulation instructions with examples.	6M	CO3	L3
	b)	Explain about shift instructions in detail.	6M	CO3	L3
		OR			
8.		Write short notes on Interrupts and Assembler Directives	12M	CO2	L2
		UNIT–V			
9.		What is control memory? Explain micro programmed control organization.	12M	CO2	L2
		OR			
10.	a)	Explain DMA transfer in a computer system.	6M	CO2	L2
	b)	Discuss asynchronous data transfer in detail.	6M	CO2	L2

END

Hall Ticket Number :										

R-20

Code: 20DF12T

M.C.A. I Semester Regular Examinations July 2021

Data Structures and Algorithms

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.	a)	Write a pseudocode to represent an array as an abstract data type.	6M	CO1	L3
	b)	Which data structure is used to perform recursion? Why?	6M	CO1	L2
		OR			
2.	a)	What is algorithm? What are the components generally require for an algorithm? Explain.	6M	CO1	L2
	b)	Discuss briefly about different notations of time complexity.	6M	CO1	L4
		UNIT–II			
3.	a)	Discuss in detail about singly liked list and its operations.	6M	CO2	L4
	b)	Explain array implementation of stack.	6M	CO2	L4
		OR			
4.	a)	Define stacks and Queues with an example and their applications.	6M	CO2	L1
	b)	Explain linked list implementation of Queues.	6M	CO2	L4
		UNIT–III			
5.	a)	Write the algorithm for pre-order and post-order traversals of a binary tree.	6M	CO3	L3
	b)	Explain briefly about sequential and indexed file organizations.	6M	CO3	L4
		OR			
6.	a)	Explain briefly about representation of trees with suitable examples.	6M	CO3	L4
	b)	Discuss in detail about various collision resolution techniques.	6M	CO3	L2
		UNIT–IV			
7.	a)	What are the different representations of a graph? Explain	6M	CO4	L2
	b)	The keys 24, 39, 31, 46, 48, 34, 19, 5, and 29 are inserted (in the order given) into an initially empty AVL tree. Show the AVL tree after each insertion.	6M	CO4	L3
		OR			
8.	a)	What is Binary Search Tree (BST)? Construct a BST for the following numbers: 47, 55, 23, 17, 39, 11, 50, 9, 19, 74, 33, 28 Show all the steps. Write its preorder traversal.	6M	CO4	L3
	b)	What is MST? Explain with suitable example of the Kruskal's algorithm to find out MST.	6M	CO4	L4
		UNIT–V			
9.	a)	Write a program to implement quick sort. Give a trace of sorting the given array of elements using Quick sort 10, 24, 13, 9, 27, 14, 5, 9, 18, 7, 33, 46, 35	6M	CO5	L3
	b)	Write a program for binary search and calculate the time complexity.	6M	CO5	L3
		OR			
10.	a)	Write about different phases in heap sort for the following data set. 47, 78, 81, 52, 50, 82, 58, 42, 65, 80, 92, 53, 63, 87, 95, 59, 34, 37, 7, 20	6M	CO5	L3
	b)	Write the Fibonacci search algorithm. Calculate the time complexity of the algorithm.	6M	CO5	L3

****END****

Hall Ticket Number :										

R-20

Code: 20DC11T

M.C.A. I Semester Regular Examinations July 2021

Probability and Statistics

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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		Marks	CO	BL
	UNIT–I			
1.	There are 12 cards numbered 1 to 12 in a box, if two cards are selected, what is the probability that sum is odd (i) With replacement (ii) without replacement	12M	CO1	L2
	OR			
2.	A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items.	12M	CO1	L2
	UNIT–II			
3.	Fit a binomial distribution to the following data.			

x	0	1	2	3	4	5
Frequency(f)	2	14	20	34	22	8

12M CO2 L3

	OR					
4.	10 cards are drawn from a deck of 52 cards. Find the probability of getting 2 to 5 diamonds using normal distribution.	12M	CO2	L3		
	UNIT–III					
5.	The mean height of students in a college is 155cms and standard deviation is 15. What is the probability that the mean weight of 36 students is less tha157 cms.	12M	CO3	L2		
	OR					
6.	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, and 14.	12M	CO3	L2		
	UNIT–IV					
7.	A random samples of 10 bags of pesticides are taken whose weights are 50, 49, 52, 44, 45, 48, 46, 45, 49 and 45 (in kgs). Test whether the average packing can be taken to be 50 kgs.	12M	CO4	L4		
	OR					
8.	Fit a Poisson distribution to the following data and for its goodness of fit at level of significance 0.05 level of significance					

x	0	1	2	3	4
f	419	352	154	56	19

12M CO4 L4

	UNIT–V			
9.	The mean rate of arrival of planes at an airport during the peak period is 20 per hour. The number of arrivals in any hour follows a Poisson distribution. When there is congestion the planes are forced to fly over the field the stack awaiting the landing of other planes that arrived earlier. 60 planes per hour can land in good weather and 30 planes per hour can land in bad weather. (a) How many planes would be flying over the field in the stack on an average in good weather and in bad weather? (b) How long a plane would be in the stack in the process of landing in good and bad weather?	12M	CO5	L3
	OR			
10.	Customers arrive at a one window drive-in bank according to a Poisson distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes. The car space in front of the window including that for the serviced can accommodate a maximum of 3 cars. Other cars can wait outside the space. (a) What is the probability that an arriving customer can drive directly to the space in front of the window? (b) What is the probability that an arriving customer will have to wait outside the indicated space? (c) How long is arriving customer expected to wait before starting service.	12M	CO5	L3

****END***

Hall Ticket Number :										

R-20

Code: 20DF11T

M.C.A. I Semester Regular Examinations July 2021

Mathematical Foundations of Computer Science

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.	a)	Explain Conjunction , Disjunction and Conditional Proposition with example	6M	1	L1
	b)	Obtain disjunctive normal form of P V (~ P→ (Q V (Q →~ R)))	6M	1	L5
		OR			
2.	a)	If p, q and r be the propositions P : you have the flee q : you miss the final examination r : you pass the course. Write the following propositions into statement form. (i) ~p→ r (ii) p ∨ q ∨ r (iii) (p→ ~r) ∨ (q→ ~r) (iv) (p ∧ q) ∨ (~q ∧ r).	6M	1	L3
	b)	Show that RVS is valid conclusion from the premises: C∨D, (C∨D)→ ~H , ~H→ (A∧~B), (A∧~B) → R∨S	6M	1	L3
		UNIT–II			
3.	a)	Define a Relation? Explain Reflexive, Symmetric and Transitive relations with an example	6M	2	L1,L2
	b)	Let A = { 1, 2, 3, 4, 6, 12 }. On A, define the relation R by a R b if and only if a divides b. Prove that R is a partial order on A. Draw the Hasse diagram for this relation.	6M	2	L1,L5
		OR			
4.	a)	Define Compatibility Relation. Let X = { ball, bed, dog, let, egg } and let the relation R be given by R = { <x, y> / x, y € X ∩ x R y if x and y contain some common letter} and also draw maximal compatibility block for the given relation.	6M	2	L1,L4
	b)	Explain the following by giving a suitable example i) Totally ordered set ii) Lattice	6M	2	L2
		UNIT–III			
5.	a)	Find the number of permutations of the letters of the word MASSASAUGA. In how many of these, all four A' s are together ? How many of them begin with S?	6M	3	L3,L5
	b)	Woman has 11 close relatives and he wishes to invite 5 of them to dinner. In how many ways can she invite them in the following situations i) There is no restrictions on the choice ii) Two particular persons will not attend separately iii) Two persons will not attend together.	6M	3	L5
		OR			
6.	a)	Determine the number of positive integers ≤ 100 which are divisible by 3 or 7?	6M	3	L3
	b)	Show that if any 30 dictionaries in a library contain a total of 61,327 pages, then one of the dictionaries must have at least 2045 pages.	6M	3	L3

UNIT–IV

7.	a)	Find the generating function for the sequence $0^2, 1^2, 2^2, 3^2, 4^2, \ldots\ldots\ldots$	6M	4	L4
	b)	The number of virus affected files in a system is 1000 (to start with) and this increases 250% every two hours. Use a recurrence relation to determine the number of virus affected files in the system after one day.	6M	4	L5

OR

8.		Find the generating function for the recurrence relation $a_{n+1} - a_n = n^2$, $n \geq 0$ and $a_0 = 1$. Hence solve it.	12M	4	L3

UNIT–V

9.		Explain the following i) Complete Graph ii) Complete Bipartite Graph iii) Planar Graph. iv) Euler's graph	12M	5	L2

OR

10.	a)	What is graph coloring? What is chromatic number? Explain them with suitable examples.	6M	5	L1,L2
	b)	Explain kruskal's algorithm with an example	6M	5	L2

****END****

Hall Ticket Number :										

R-20

Code: 20DF13T

M.C.A. I Semester Regular Examinations July 2021

Relational Database Management Systems

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.	a)	With a neat diagram, explain the architecture of a DBMS?	6M	1	L2
	b)	What is a view? How can it be created? Explain with an example?	6M	1	L2
		OR			
2.	a)	Define an entity and attribute. Explain the different types of attributes that occur in an ER - diagram model with an example?	6M	1	L2
	b)	Draw an ER-diagram for a Bank database schema with at least five entity types. Also specify primary key and structural constraints?	6M	1	L3
		UNIT–II			
3.	a)	Discuss about tuple relational calculus?	6M	2	L6
	b)	Discuss in detail the operators SELECT, PROJECT with suitable examples?	6M	2	L6
		OR			
4.		Explain in detail about Query by example (QBE)?	12M	2	L2
		UNIT–III			
5.	a)	Differentiate between independent and correlated nested queries?	6M	3	L4
	b)	Discuss about integrity constraints in detail?	6M	3	L6
		OR			
6.	a)	What is a normal form? Explain about various normal forms with examples?	6M	3	L2
	b)	Explain the role of functional dependencies in normalization with suitable examples?	6M	3	L2
		UNIT–IV			
7.	a)	What is transaction? Mention the desirable properties of a transaction?	6M	4	L1
	b)	Explain in detail about timestamp based concurrency control techniques?	6M	4	L2
		OR			
8.		Discuss in detail about log-based recovery system?	12M	4	L6
		UNIT–V			
9.	a)	Distinguish between Primary and Secondary indexing?	6M	5	L4
	b)	Write about indexed sequential files with advantages and disadvantages?	6M	5	L2
		OR			
10.	a)	By considering relevant example, show insertion and deletion operations on a B+ Tree?	6M	5	L2
	b)	Discuss about Hash-Based Indexing in detail?	6M	5	L6

****END****

Hall Ticket Number :										

R-20

Code: 20DC12T

M.C.A. I Semester Regular Examinations July 2021

Technical Communication

Max. Marks: 60 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.		Define Communication and explain the process of Communication.	12M	CO1	L3
		OR			
2.	a)	Elucidate the concept of communication with principles and strategies.	6M	CO1	L3
	b)	"Response of the receiver is feedback" - Explain the feedback mechanism with examples.	6M	CO1	L3
		UNIT–II			
3.		"Effective Non-Verbal communication is the base of personal & professional development" – Elucidate with examples.	12M	CO2	L2
		OR			
4.	a)	Give a detailed account of Kinesics in Non-Verbal Elements, with suitable examples.	6M	CO2	L2
	b)	What are the tips for effective Oral Presentations?	6M	CO2	L3
		UNIT–III			
5.	a)	Describe the strategies of Effective Presentation.	6M	CO4	L2
	b)	Write a complaint letter to P&G Company on a received product which ordered one item but received another, failed to have a warranty honored. You want to write letter of complaint to solve these problems.	6M	CO4	L2
		OR			
6.	a)	Imagine you are a manager of a company; one of your team members had done improper communication with fellow teammates. You have to suspend him/her based on his/her under company disciplinary action. Write a suspension memo with proper reasons.	6M	CO4	L2
	b)	Write the structure & styles of Memos.	6M	CO4	L2
		UNIT–IV			
7.	a)	List out the types of Reports and mention its significance.	6M	CO5	L3
	b)	A fire accident took place in a unit of your company which damaged the machinery costing Rs. 2 lakh. You are asked to submit a detailed Report on the accident by analyzing the incident and suggest recommendations.	6M	CO5	L3
		OR			
8.	a)	Imagine you are a coordinator of the blood donation camp which was recently held in your campus regarding that you have to prepare a report by using needy credentials and submit your district collector the same.	6M	CO5	L3
	b)	Elucidate the objectives and characteristics of Report.	6M	CO5	L3
		UNIT–V			
9.	a)	Dress code and body language play a vital role in successful Interview – Explain.	6M	CO3	L3
	b)	Write a note on the following: I. HR interview II. Telephone interview	6M	CO3	L3
		OR			
10.	a)	Group Discussion is a very important process for campus recruitment – Elucidate.	6M	CO3	L3
	b)	Draft a sample Resume of your profile as per the standard Resume Format.	6M	CO3	L3

END