

**V.S.B. ENGINEERING COLLEGE, KARUR**  
**Department of Computer Science and Engineering**  
**Academic Year: 2018-2019 (ODD Semester)**

**Class: II Year / III Semester B.E. Computer Science and Engineering**

**Assignment Questions**

**MA8351 - Discrete Mathematics**

Sl. No.	Assignment Questions
1.	Truth table for $(p \rightarrow q \rightarrow s) \wedge (\neg r \vee p) \wedge q$ .
2.	Prove that the following equivalence by proving the equivalence of the duals (i) $\neg((\neg p \wedge q) \vee (\neg p \vee \neg q)) \vee (p \wedge q) \equiv p$ (ii) $(p \wedge (p \leftrightarrow q)) \rightarrow q \equiv T$
3.	Find the sequence whose generating function is $\frac{6-29x}{30x^2-11x+1}$ using partial fraction.
4.	Prove that $(\exists x)(p(x) \wedge q(x)) \Rightarrow (\exists x)p(x) \wedge (\exists x)q(x)$
5.	Use mathematical induction to show that, $n! \geq 2^{n-1}$ for $n=1,2,3,\dots$
6.	Show that $a^n - b^n$ is divisible by $(a-b)$ all $n \in N$
7.	Identify the sequence having the expression having the expression $\frac{5+2x}{1-4x^2}$ as a generating function.
8.	Solve the recurrence relation $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$ given that $a_0 = 5, a_1 = 9$ & $a_2 = 15$ .
9. =	Using mathematical induction, prove that $1^2+3^2+5^2+\dots+(2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$
10.	If A,B & C are three subsets of sets S then, $ A \cup B \cup C  =  A  +  B  +  C  -  A \cap B  -  B \cap C  -  A \cap C  +  A \cap B \cap C $ .
11.	Find the value of n is if ${}_n p_{13} : (n+1)p_{12} = \frac{3}{4}$ .
12.	How many ways are there to select five card hand from a 52 cards such that the hand contains at least on card in each suit?
13.	Find the solution to $a_n = 2a_{n-1} + 5a_{n-2} - 6a_{n-3}$ with $a_0 = 7, a_1 = -4, a_2 = 8$ .
14.	How many positive integers n can be formed using the digits 3,4,4,5,5,6,7 if n has to exceed

	5000000?
15.	Use Mathematics induction to prove the inequality $2^n < n!$ for all positive integer $n$ with $n \geq 4$ .
16.	Find the number of integers between 1 and 250 that are not divisible by any of the integers 2,3,5&7.
17.	Use generating functions to find an explicit formulae for the Fibonacci numbers.
18.	How many positive integers $n$ can we form using the digits 3,4,4,5,5,6,7 if we want $n$ to exceed 5,00,000?
19.	What is the solution of recurrence relation? $a_n = 5a_{n-1} - 6a_{n-2}$ for $n \geq 2$ , $a_0 = 1, a_1 = 0$
20.	Determine the no.of positive integers $n$ , $1 \leq n \leq 2000$ that are divisible by 2,3 (or) 5 but are divisible by 7.
21.	Write down the following statements in symbolic form using quantifiers; (i) Every real numbers has a additive inverse (ii) the set of real numbers has a multiplicative identity.
22.	Show that $(x)(p(x) \vee q(x)) \Rightarrow p(x) \vee (\exists x)q(x)$
23.	How many words of four letters can be formed from the letters of the word "EXAMINATION"?
24.	Find the number of positive integers not exceeding 100 that are not divisible by 7 or by 11.
25.	Find the recurrence relation for the number of binary sequence of length $n$ that have no two consecutive 0's .
26.	Using generating function solve $a_n - 3a_{n-1} = n$ , $n \geq 1$ , $a_0 = 1$ .
27.	Use mathematical induction to prove that, $(3^n + 7^n - 2)$ is divisible by 8 for $n \geq 1$ .
28.	Identify the sequence having the expression having the expression $\frac{5+2X}{1-4x^2}$ as a generating function.
29.	Find the number of distinct permutations that can be formed from all the letters of each word (i) RADAR (ii) UNUSUAL
30.	Using indirect method of proof derive $p \rightarrow \neg s$ from the premises $p \rightarrow (q \vee r)$ , $q \rightarrow \neg p$ , $s \rightarrow \neg r$ and $p$ .

31.	Express the following propositions in terms of only NAND and only NOR connectives. (i) $\neg p$ (ii) $p \wedge q$ (iii) $p \vee q$ (iv) $p \rightarrow q$
32.	Using generating function solve the recurrence relation corresponding to the Fibonacci sequence. $a_n = a_{n-1} + a_{n-2}$ , $n \geq 2$ with $a_0 = a_1 = 1$ .
33.	Consider the following arguments is valid or not. "I will get grade A in this course or I will not graduate. If I do not graduate, I will join the army. I got grade A. Therefore, I will not join the army. Is this a valid argument?"
34.	Find the disjunctive normal forms of the following (i) $p \wedge p \rightarrow q$ (ii) $\neg(p \vee q) \leftrightarrow (p \wedge q)$
35.	Show that the form (a) $(\exists x)(F(x) \wedge S(x) \rightarrow (y)(M(y) \rightarrow W(y)))$ (b) $(\exists y)(M(y) \wedge \neg W(y))$
36.	Show that if n is an integer and $n^3 + 5$ is odd, then n is even using a proof by contraposition.
37.	Show that the following argument is valid: "In a triangle XYZ, there is no pair of angles of equal measure". If a triangle has two sides of equal lengths, then it is isosceles. If a triangle is isosceles, then it has two angles, of equal measure.
38.	If n Pigeonholes are occupied by (kn+1) pigeons, where k is positive integer, prove that at least one pigeonhole is occupied by k+1 or more pigeons. Hence, find the minimum number of m integers to be selected from $S = \{1, 2, \dots, 9\}$ so that the sum of the m integers are even.
39.	Show that $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$ , $n \geq 1$ by mathematical induction.
40.	Use mathematical induction $\frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \dots + \frac{1}{\sqrt{n}} > \sqrt{n}$ for $n \geq 2$ .
41.	Prove by mathematical induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integers.
42.	Use mathematical induction to prove that $n^3 - n$ is divisible by 3 whether n is a positive integer.
43.	Prove that the premises $a \rightarrow (b \rightarrow c)$ , $d \rightarrow (b \wedge \neg c)$ and $(a \wedge d)$ .

44.	<p>How many permutations of the letters A B C D E F G contain</p> <p>(a) the string BCD</p> <p>(b) the string CFGA</p> <p>(c) the strings BA and GF</p> <p>(d) the strings ABC &amp; DE</p> <p>(e) the strings ABC &amp; CDE?</p>
45.	<p>Find the number of integers between and 1000 inclusive that are divisible by none of 5,6,8,10</p>
46.	<p>Use mathematical induction <math>n! &gt; 2^{n+1}</math>, <math>n = 5,6,\dots</math></p>
47.	<p>How many of these 2500 students have taken a course in any of these three courses C, Pascal and Networking? (ii) How many of these 2500 students have not taken a course in any of these three courses C, Pascal and Networking?</p>
48.	<p>Show that the given formula is an implication</p> $((p \vee \neg q) \rightarrow q) \rightarrow ((p \vee \neg p) \rightarrow r) \Rightarrow (q \rightarrow r)$
49.	<p>Prove the that if x is irrational then <math>\frac{1}{x}</math> is irrational.</p>
50.	<p>Show that the hypothesis “It is not sunny” this afternoon and if is colder then yesterday. We will go swimming only if it is sunny. If we do not go swimming then we will take a canoe trip.” If it take a canoe trip, then we will be home by sunshine. leave to the conclusion we will be home by sunset.</p>
51.	<p>Prove that the implication by using truth table <math>p \rightarrow ((p \rightarrow r) \Rightarrow (p \rightarrow q) \rightarrow (p \rightarrow r))</math> is tautology.</p>
52.	<p>Verify the validity of the following argument. Every living thing is a plant or an animal. John’s gold fish is alive and it is not a plant. All animals have hearts. Therefore John’s gold fish has a heart.</p>

## CS8351-Digital Principles and System Design

Sl. No.	Assignment Questions
1	Use Boolean Algebra to show that $A'BC' + AB'C' + AB'C + ABC' + ABC = A + BC'$
2	Using K'Map simplify the Boolean function $F(w, x, y, z) = \sum m(2, 3, 10, 11, 12, 13, 14, 15)$
3	Implement the Boolean function $F = xy + xy + yz$ (a) With AND, OR, and inverter gates (b) With OR and inverter gates (c) With AND and inverter gates (d) With NAND and inverter gates (e) With NOR and inverter gates
4	Simplify the following Boolean functions: (a) $F(A, B, C, D) = \sum m(11, 3, 5, 7, 13, 15)$ (b) $F(A, B, C, D) = \sum m(11, 3, 6, 9, 11, 12, 14)$
5	Explain 4-bit full adders with look ahead carry generator.
6	Discuss $3 \times 8$ Decoder and $8 \times 3$ Encoder circuits.
7	Design 8-bit BCD adder using four 4-bit binary parallel adders IC.
8	Design 16:1 multiplexer using two 8:1 multiplexer with enable input.
9	Prove the following (i) $A'BC + AB'C + ABC' + ABC = BC + AC + AB$ (ii) $AB + BC(B + C) = B(A + C)$ (iii) $((AB'C)' + (ACD)' + (BC'))' = AB'CD$
10	Give classification of Logic Families and compare CMOS and TTL families.
11	With sketch realize the expression $X = AB + CD$ using ( i ) NAND gates only and ( ii ) NOR gates only.
12	Simplify the following functions using karnaugh map, (i) $F(a,b,c,d) = \sum(3,5,6,7,11,13,14,15)$ (ii) $F(x,y,z) = \sum(2,3,4,5,7)$
13	Draw Karnaugh maps for following three variables A,B,C and simplify it: (i) $F = \sum m(0,3,4,5,7)$ (ii) $F = \sum m(0,1,2,6)$ (iii) $F = \sum m(0,12,5,6)$
14	Design 16:1 multiplexer using two 8:1 multiplexer with enable input.
15	Explain the Master-Slave operation of a flip flop
16	Draw the circuit of a BCD adder using 4-bit binary adders.
17	Obtain the excitation table of the JK' flip-flop, i.e. A JK flip-flop with an inverter between external input K' and internal input K.
18	Discuss 4-bit magnitude comparator in detail.
19	Write short note on EEPROM, EPROM and PROM.
20	Design combinational circuit that generates an even parity for 4 bit input.
21	Design a combinational circuit that generates the 9's complement of a BCD digit
22	Construct a BCD adder-subtractor circuit. Use block diagrams for the different components.
23	Given a two input MUX, write down its truth table. Use it to implement an AND gate.
24	Define Binary Code. Describe in detail about different types of Binary codes.
25	State and Prove properties of Boolean Algebra in detail.
26	Simplify the Boolean function using Quine-McCluskey method $F = \sum(1,2,3,7,8,9,10,11,14,15)$ .

27	Explain about Encoder with an implementation of Boolean Function.
28	Explain about different types of Flipflops with neat sketch
29	Explain about State Reduction Principle and State Assignment with an example.
30	Discuss in detail about working concept of write and read operation of Random Access Memory.
31	Explain about different error detection and correction techniques with an example.
32	Explain about Combinational PLDs in detail.
33	Implement the following two Boolean Functions with a PLA. $F1 = AB' + AC + A'BC'$ $F2 = (AC + BC)$
34	Briefly discuss the Sequential programmable devices.
35	Describe the process involved in converting 8421 BCD code to Excess 3 code with neat sketch.
36	Design 2-bit magnitude comparator and write a verilog HDL code.
37	Construct a Full adder, Full subtractor, Multiplexer and write a HDL program module for the same.
38	Write the HDL description of T flip-flop and JK flip-flop from D flip-flops and gates.
39	Discuss with suitable example state reduction and state assignment.
40	Implement the switching function $F = \sum m(1,3,5,7,8,9,14,15)$ by a static hazard free two level AND-OR gate network.
41	State with a neat example the method for minimization of primitive flow table
42	Explain the hazards in combinational circuit and sequential circuit and also demonstrate a hazards and its removal with example.
43	Draw the ASM chart for a 3-bit up/down counter.
44	Discuss the various types of RAM and ROM with architecture.
45	Describe ASIC with its types.
46	Design a 4-bit magnitude comparator using basic gates.
47	Implement the following functions using PLA, $F1 = \sum m(1,2,4,6)$ ; $F2 = \sum m(0,1,6,7)$ $F3 = \sum m(2,6)$ .
48	Analyze the following using tabulation methods. $F(A,B,C,D,E) = \sum m(0,1,3,7,13,14,21,26,28) + \sum d(2, 5,9,11,17,24)$ and implement the functions using only NAND gates.
49	Write and verify an HDL behavioral description of a positive-edge-sensitive D flip-flop with asynchronous preset and clear.
50	Write and verify a Verilog model of a D flip-flop having asynchronous reset.
51	Use Boolean Algebra to show that $A'BC' + AB'C' + AB'C + ABC' + ABC = A + BC'$
52	Discuss $3 \times 8$ Decoder and $8 \times 3$ Encoder circuits.

## CS8391 - Data Structures

Sl.No	Assignment Questions
1.	Distinguish between best, worst and average case complexities of an algorithm.
2.	What do you mean by Time and Space complexity and how to represent these complexities?
3.	Explain efficiency of algorithm with example

4.	Write a short note on asymptotic notations.
5.	Explain any one method to calculate memory location for different position in two-dimensional array.
6.	What are the applications of an array? Explain each with examples.
7.	Explain sparse matrix. What are the benefits of the sparse matrix?
8.	Explain order-list matrix. What are the benefits of the order-list matrix?
9.	Write an algorithm to implement sparse matrix.
10.	Write an algorithm to search, insert and delete element in array.
11.	Explain three-dimensional array. How three dimensional arrays can be represented in memory?
12.	Explain any one method to calculate memory location for different position in two-dimensional array.
13.	Write a program to find second highest value from array elements.
14.	Write a program to delete an element of array at position of user choice.
15.	Distinguish between the row major and column major ordering of an array.
16.	Suppose A is linear array with n numeric values. Write procedure which finds the average of the values in A
17.	Explain Evaluation of expressions on stack.
18.	Write pseudo-code for factorial computation.
19.	Write a pseudo code for implementing stack using linked list.
20.	Write a pseudo code for implementing queue using linked queue.
21.	Write algorithm for push/pop operation on a linked stack.
22.	What are merit of linked stack and queues over their sequential counterparts?
23.	Explain array representation of binary tree with example?
24.	Explain linked representation of binary tree with example?
25.	Explain traversal technique of binary tree.
26.	Explain application of binary tree.
27.	Convert following postfix expression to prefix expression: a) 4,2\$3*3-8,4/1,1+/ b) PQ+R+-S↑UV+*

28.	Convert following infix expression to prefix expression: a) $((a+b)/d-((e-f)+g)$ b) $12/3*6+6-6+8/2$
29.	Evaluate following expression. a) $10+3-2-8/2*6-7$ b) $(12-(2-3)+10/2+4*2)$
30.	Create a binary tree using inorder and preorder traversal In order: D B H E A I F J C G, Preorder: A B D E H C F I J G
31.	Create a binary tree using inorder and postorder traversal In order: D B H E A I F J C G, Post order: D H E B I J F G C A
32.	Create a binary tree from the following sequence: 14, 34, 22, 44, 11, 24, 33
33.	Identify the types of expression whether it is infix, prefix or postfix. a. $4,2\$3*3-8,4/1,1+/\+$ b. $PQ+R+-S\uparrow UV+*$
34.	Trace quick sort on the list $L = \{11, 34, 67, 78, 78, 78, 99\}$ . What are your observations?
35.	Which sorting techniques are an example of divide and conquer?
36.	Which sorting techniques is an application of recursion?
37.	If the starting address of array $a[-2,23]$ is 100 then what will be the address of 16th element?
38.	If the starting address of array $a[1:5,1:6]$ is 100 then what will be the address of $a[3,4]$ element?
39.	Describe Tail recursion.
40.	Draw red black tree in the given list $L = \{11, 34, 67, 78, 78, 78, 99\}$ . What are your observations?
41.	If the starting address of array $a[1:5,1:6,1:4]$ is 100 then what will be the address of $a[3,4,5]$ element?
42.	Write a pseudo code for implementing queue using linked queue.
43.	Write algorithm for push/pop operation on a linked stack.
44.	What are merit of linked stack and queues over their sequential counterparts?
45.	Explain array representation of binary tree with example?



46.	Explain linked representation of binary tree with example?
47.	Explain traversal technique of binary tree.
48.	Explain application of binary tree.
49.	Convert following postfix expression to prefix expression: a) 4,2\$3*3-8,4/1,1+/ b) PQ+R+-S↑UV+*
50.	Convert following infix expression to prefix expression: a) ((a+b)/d-((e-f)+g) b) 12/3*6+6-6+8/2
51.	Explain sparse matrix. What are the benefits of the sparse matrix?
52.	Explain order-list matrix. What are the benefits of the order-list matrix?

### CS8392 - Object Oriented Programming

Sl. No.	Assignment Questions
1	(i) How to reverse Singly Linked List? (ii) Find out duplicate number between 1 to N numbers.
2	Find out middle index where sum of both ends are equal
3	Write a program to create deadlock between two threads
4	(i) Write a program to reverse a string using recursive algorithm. (ii) Write a singleton class.
5	Write a program to convert decimal number to binary format
6	Write a program to find top two maximum numbers in a array
7	(i) Write a program to sort a map by value. (ii) Write a program to reverse a number
8	Write a program to find sum of each digit in the given number using recursion
9	Write a program to implement hashCode and equals
10	Write a program to convert string to number without using Integer.parseInt() method
11	(i) Write a program to remove duplicates from sorted array. (ii) Write a program to find

	perfect number or not.
12	Implement Binary Search Tree (BST) Level order traversal (breadth first)
13	How to check the given Binary Tree is Binary Search Tree (BST) or not?
14	Write a program to find the sum of the first 1000 prime numbers
15	Find longest substring without repeating characters.
16	Write a program for Bubble Sort and Insertion Sort in java.
17	Find min and max value from Binary Search Tree (BST)
18	How to swap two numbers without using temporary variable?
19	How to get distinct elements from an array by avoiding duplicate elements?
20	Write a program to print all permutations of a given string.
21	(i) Write a program to find top two maximum numbers in a array.(ii) Write a program to sort a map by value.
22	(i) Write a program to print fibonacci series. (ii)How to swap two numbers without using temporary variable?
23	(i) Write a program to find sum of each digit in the given number using recursion.(ii) Write a program to check the given number is a prime number or not?
24	(i) Write a program to find the given number is Armstrong number or not?(ii) Write a program to convert binary to decimal number.
25	(i) Write a program to check the given number is binary number or not?(ii) Write a program for Bubble Sort in java.
26	(i) Write a program for Insertion Sort in java.(ii) Write a program to implement hashCode and equals.
27	(i) Write a program to implement ArrayList. (ii)How to get distinct elements from an array by avoiding duplicate elements?
28	(i) How to reverse Singly Linked List?(ii) Find out duplicate number between 1 to N numbers.
29	Find out middle index where sum of both ends are equal
30	Write a program to create deadlock between two threads
31	(i) Write a program to reverse a string using recursive algorithm. (ii) Write a singleton class.
32	Write a program to convert decimal number to binary format

33	Write a program to find top two maximum numbers in a array
34	(i)Write a program to sort a map by value. (ii) Write a program to reverse a number
35	Write a program to find sum of each digit in the given number using recursion
36	Write a program to implement hashCode and equals
37	Write a program to convert string to number without using Integer.parseInt() method
38	(i)Write a program to remove duplicates from sorted array.(ii) Write a program to find perfect number or not.
39	Implement Binary Search Tree (BST) Level order traversal (breadth first)
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43	Write a program for Bubble Sort and Insertion Sort in java.
44	Find min and max value from Binary Search Tree (BST)
45	How to swap two numbers without using temporary variable?
46	How to get distinct elements from an array by avoiding duplicate elements?
47	Write a program to print all permutations of a given string.
48	(i) Write a program to find top two maximum numbers in a array.(ii) Write a program to sort a map by value.
49	(i) Write a program to print fibonacci series. (ii)How to swap two numbers without using temporary variable?
50	(i) Write a program to find sum of each digit in the given number using recursion.(ii) Write a program to check the given number is a prime number or not?
51	(i) Write a program to find the given number is Armstrong number or not?(ii) Write a program to convert binary to decimal number.
52	(i) Write a program to check the given number is binary number or not?(ii) Write a program for Bubble Sort in java.

## EC8395 - COMMUNICATION ENGINEERING

Sl. No.	Assignment Topics
1	Discuss in detail about any one application of DM.
2	Explain in detail about applications of DSBSC.
3	List out the applications of SSBSC.
4	Discuss in detail about any one application of FM.
5	Discuss in detail about any one application of PM.
6	Why we cannot ignore the importance of telecommunication technology with the coming of wireless communication
7	Elobrate any one application of Amplitude Modulation.
8	Elobrate any one application of PAM.
9	Problem No-1
10	List out the applications of DPCM.
11	Discuss in detail about any one application of DM.
12	Elobrate any one application of ADPCM.
13	What type of wires are used for telecommunication system?
14	Which gadgets are used by communication engineers as receiver of signals?
15	Improvement that could be made in telecommunication systems.
16	Efforts that are being made by the engineers to find new technology in Communication Engineering.
17	Problem No-2
18	Scope of Communication Engineering with the advancement of technology in different fields.
19	Problem No-3

20	How the computer technology brings changes in electrical engineering.
21	Changes that have occurred in electrical communication engineering with the coming of different gadgets for communication.
22	Problem No-4
23	How the digital technology is different that of analog regarding electrical communication engineering.
24	Problem No-5
25	Explain in detail about applications of PCM.
26	Role of communication Engineering in Space science.
27	Explain in detail about applications of ADM.
28	Elobrate any one application of TDMA.
29	Discuss in detail about any one application of FDMA.
30	Elobrate any one application of CDMA.
31	Write detaily about the applications of BPSK.
32	List out the applications of DPSK.
33	Discuss in detail about any one application of QPSK.
34	Elobrate any one application of QAM.
35	Discuss in detail about any one application of FDMA.
36	Elobrate any one application of CDMA.
37	Write detaily about the applications of BPSK.
38	Problem No-6
39	List out the applications of DPCM.
40	Discuss in detail about any one application of DM.

41	Efforts that are being made by the engineers to find new technology in Communication Engineering.
42	Problem No-7
43	Problem No-8
44	Explain in detail about applications of PCM.
45	List out the applications of SSBSC.
46	Discuss in detail about any one application of FM.
47	Discuss in detail about any one application of PM.
48	Problem No-9
49	Problem No-10
50	Scope of Communication Engineering with the advancement of technology in different fields.
51	Discuss in detail about any one application of DM.
52	Explain in detail about applications of DSBSC.

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