MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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DEPARTMENT OF INFORMATION TECHNOLOGY

II B.TECH I SEMESTER R17 REGULAR PREVIOUS QUESTION PAPERS

LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R17A0510	Computer Organization
R17A0461	Digital Logic Design
R17A0504	Data Structures using C++
R17A0401	Electronic Devices and Circuits
R17A0503	Mathematical Foundation of Computer science
R17A0024	Probability and Statistics

R17

Code No: R17A0510

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, November 2018

Computer Organization

(CSE& IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1(a)	Describe in brief the different generations of computer.	**[7M]**
(b)	Represent (-23) in: (i) Sign-and-magnitude representation (ii) 1's complement representation (iii) 2's complement representation	**[7M]**
	OR	
2(a)	What are the main four components of any general purpose computer? Describe briefly.	**[7M]**
(b)	Explain the bus structure of computer system.	**[7M]**

SECTION-II

3(a)	What is an instruction? With examples explain three, two, one, zero address instructions	**[7M]**
(b)	Explain the working of a microprogram sequencer with its block diagram.	**[7M]**
	OR	
4(a)	Consider the following instructions: Add (R3), R1 What sequence of elementary operations are required to execute this instruction? Explain.	**[7M]**
(b)	Explain how DMA controller communicates and transfers data between the peripheral devices and RAM.	**[7M]**

SECTION-III

5(a)	Define stack. Explain types of instruction format.	**[7M]**
(b)	Discuss about Booth's multiplication algorithm with an example	**[7M]**
	OR	
6(a)	Explain with syntax and examples, any two addressing modes supported by CISC but not supported by RISC.	**[7M]**
(b)	A two word instruction is stored in memory at an address designated by symbol *W*. The address field of the instruction (stored at $W + 1$) is designated by the symbol *Y*. The operand used during the execution of the instruction is stored at an address symbolized by *Z*. An index register contains the value *X*. State how *Z* is calculated from the other addresses if the addressing mode of the instruction is: (i) Direct (ii) Indirect (iii) Relative (iv) Indexed	**[7M]**

SECTION-IV

7(a)	What are the major difficulties that cause the instruction pipeline to deviate from its normal operations? Explain.	**[7M]**

(b)	Explain the Strobe Control method of Asynchronous data transfer. What are the disadvantages of this method?	**[7M]**

OR

8(a)	What are the address sequencing capabilities required in the control memory? Explain.	**[7M]**
(b)	Construct an associative memory page table with number of words equal to the number of blocks in the main memory.	**[7M]**

SECTION-V

9(a)	Explain the following mapping procedure: (i) Direct mapping (ii) Associative mapping	**[7M]**
(b)	Explain about internal organization of RAM and ROM chips in detail	**[7M]**

OR

10(a)	Explain the following (i) Virtual memory (ii) Hit ratio (iii) Cache coherence	**[7M]**
(b)	Explain memory hierarchy in detail	**[7M]**

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R17

Code No: R17A0461

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, November 2018

Digital Logic Design

(IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1 a) Convert the decimal number 35 in to its binary and then to octal and hexadecimal equivalents. **[7M]**

b) Given that A = 1101001 and B = 10011 **[7M]**
Perform A-B and B-A using 2's complement method.

OR

2 a) Implement NAND and Ex-OR gates using only NOR gates. **[4M]**

b) State and Prove De-Morgan's theorems. **[4M]**

c) Realize $Y = \overline{A}B + \overline{B}C\overline{D}$ using (i) only NAND gates **[6M]**
(ii) only NOR gates

SECTION-II

3 a) Simplify the following Boolean function using four variable k-map and implement using only NAND gates **[8M]**

$$f(A,B,C,D) = \sum(1,3,5,6,13,15)$$

b) Reduce the following Boolean expression to the minimum number of literals **[6M]**

$$\overline{A\overline{B} + ABC} + A\left(B + A\overline{B}\right)$$

OR

4 a) Simplify the following Boolean Function using 5-variable map and implement the simplified function using only NAND gates. **[6M]**

$$F(A,B,C,D,E) = \sum(0,2,4,6,9,13,21,23,25,29,31)$$

b) Find the essential prime implicants for the following function using Quine McCluskey method **[2M]**

$$f(A,B,C,D) = \sum(0,1,2,3,6,7,8,12,13,15)$$

c) Simplify the following function using tabulation method **[6M]**

$$F(A,B,C,D,E) = \sum(0,1,3,4,7,13,15,19,21,22,23,27,29)$$

SECTION-III

5 a) Implement Full Adder using two half-adders and OR gate. **[7M]**

b) Implement 8x1 MUX using 2x1 MUX **[7M]**

OR

6 a) Design a code converter that converts a Binary code to its equivalent Gray code. **[6M]**

b) Design a 4-bit adder circuit with Carry Lookahead generator. **[8M]**

SECTION-IV

7 a) Write about SR flip-flop. **[6M]**

b) Draw the logic diagrams of D and JK flip-flops and explain. Also derive the characteristic equations of these flip-flops. **[8M]**

OR

8 a) Design Mod-12 Asynchronous counter. **[6M]**

b) Design 4-bit Universal shift register and explain in detail. **[8M]**

SECTION-V

9 a) Draw the logic diagram of a Static RAM cell. What are the various advantages and disadvantages of Dynamic RAM over Static RAM? **[4M]**

b) Write about classification of memories **[10M]**

OR

10 a) Implement Full subtractor using ROM. **[6M]**

b) A Combinational circuit is defined by the functions **[8M]**

$F1(A,B,C) = \Sigma(0,1,2,4)$ $F2(A,B,C) = \Sigma(0,5,6,7)$

Implement the circuit with PLA having 3 inputs, four product terms and two outputs. Also give the PLA programming table.

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R17

Code No: R17A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, November 2018

Data Structures using C++

(CSE& IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1(a) How do you find the complexity of an algorithm? What is the relation between the time and space complexities of an algorithm? Justify your answer with an example. **[7M]**

(b) Write an algorithm for binary search. What are the conditions under which sequential search of a list is preferred over binary search? **[7M]**

OR

2(a) Write an algorithm for selection sort. Describe the behaviors of selection sort when the input is already sorted. **[7M]**

(b) Apply Quick sort algorithm for the following array and sort the elements (Take first element of the list to be sorted as the pivot element) 24, 56, 47, 35, 10, 90, 82, 31 Also discuss the complexity of the algorithm. **[7M]**

SECTION-II

3(a) Imagine we have two empty stacks of integers, *s*1 and *s*2. Draw a picture of each stack after the following operations. **[7M]**

```
pushStack(s1,3);
pushStack(s1,5);
pushStack(s1,7);
pushStack(s1,9);
while (! emptyStack(s1))
                        {
    popStack(s1,x);
   popStack(s1,x);
   pushStack(s2,x);
}
```

(b) Can a Queue be represented by circular linked list with only one pointer pointing to the tail of the queue? Give an example. **[7M]**

OR

4(a) Explain Queue data structure with neat diagram **[7M]**

(b) Write a program to implement Queue ADT. **[7M]**

SECTION-III

5(a)	What is Heap? Explain various types of Heaps.	**[7M]**
(b)	Distinguish between Multiway merge and Polyphase merge.	**[7M]**
	OR	
6(a)	Create a Heap when the values 100,200,-10,-30,-60, 80, 90,300 are entered.	**[7M]**
(b)	Assuming that priority queue is implemented using the linked lists where a master list contains a pointer to the corresponding priority list. Write a function to insert an element x of priority p into this queue.	**[7M]**

SECTION-IV

7(a)	How to define a good hash function? Explain the Hashing strategies	**[7M]**
(b)	Distinguish between hashing and skip lists.	**[7M]**
	OR	
8(a)	Describe how to use a map to implement the basic ops in a dictionary ADT, assuming that the user does not attempt to insert entries with the same key	**[7M]** **[7M]**
(b)	Describe any two Hash functions using suitable examples.	

SECTION-V

9 (a)	Define AVL tree and explain various operations on AVL tree	**[7M]**
(b)	Explain in detail about rotations of AVL tree.	**[7M]**
	OR	
10 (a)	Suppose the following list of numbers is inserted in order into an empty binary search tree: 45, 32, 90, 34, 68, 72, 15, 24, 30, 66, 11, 50, 10 (i) Construct the binary search tree. **(ii)** Find the in-order, pre-order and post-order traversal of BST created.	**[8M]**
(b)	What is the worst case of searching in a B-tree? List the possible situations that can occur while inserting a key in a B-tree?	**[6M]**

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R17

Code No: R17A0401

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, November 2018

Electronic Devices and Circuits

(EEE, ECE, CSE & IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 Draw and explain the tunnel diode with energy band diagram. **[14M]**

OR

2 a. Derive an expression for transition capacitance of a diode. **[7+7=14M]**

b. Explain Avalanche and Zener Breakdowns.

SECTION-II

3 a. Explain the operation of Full Wave Rectifier with capacitor filter with necessary diagrams. **[7+7=14M]**

b. A diode whose internal resistance is 20Ω is to supply power to a 100Ω load from
110V (R.M.S) source of supply. Calculate:
i) Peak Load Current
ii) DC Load Current
iii) AC Load Current
iv) % Regulation from No load to given load.

OR

4. a. Explain the operation of half wave rectifier with neat diagrams. **[8+6=14M]**

b. Derive the ripple factor, efficiency and percentage of regulation of half wave rectifier

SECTION-III

5. a. Draw and explain the Common Emitter (CE) transistor input and output charactesrtics. **[10+4=14M]**

b. Explain how transistor works as an amplifier?

OR

6.a. Draw the h-parameters equivalent circuit for a common emitter amplifier and derive the Expression for Ai ,R_i, Av.

b. Draw the hybrid parameter equivalent circuit for an NPN common emitter **[7+7=14M]**
transistor and explain.

SECTION-IV

7. a. What is Biasing? Explain the need of it. List out different types of biasing methods. **[7+7=14M]**

b. In a Silicon transistor circuit with a fixed bias, V_{CC}=9V, R_C=3KΩ, R_B=8KΩ, β=50, V_{BE}=0.7V. Find the operating point and Stability factor.

OR

8 a. Derive the expression for stability factor of self bias circuit. **[7+7=14M]**

b. Explain in detail about Thermal Runaway and derive the condition for thermal stability.

SECTION-V

9 a. Draw and explain the drain and transfer characteristics of JFET. **[7+7=14M]**

b. Why we call FET as a Voltage Variable resistor (VVR)

OR

10 a. Describe the construction and working principle of depletion mode MOSFET and draw its characteristics. **[10+4=14M]**

b. Derive the relation between JFET parameters

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R17

Code No: R17A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular Examinations, November 2018

Mathematical Foundation of Computer science

(CSE& IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1 (a) Use truth table to show that the formula $Q \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$ is a tautology **[4M]**

(b) Show that S v R is Tautologically implied by **[6M]**
(P v Q) ^ (P → R) ^ (Q → S) **[4M]**

(c) Prove that $(\exists x)(P(x) \wedge Q(x)) \Leftrightarrow (\exists x)P(x) \wedge (\exists x)Q(x)$

OR

2 (a) Express the value of P ↑ Q in terms of only {↓}. **[4M]**

(b) Show the following Equivalence $P \rightarrow (Q \vee R) \Leftrightarrow (P \rightarrow Q) \vee (P \rightarrow R)$ **[5M]**

(c) Show that R→S is logically derived from the premises **[5M]**
P→(Q→S), ¬R∨P and Q

SECTION-II

3 (a) Prove that A-(A-B)=A∩B for any two sets A and B. **[4M]**

(b)Draw a Hasse diagram for X= {2, 3, 6, 24, 36, 48} and the relation ≤ be such that x≤y, if x divides y **[10M]**

OR

4 (a) Let X={1,2,3,4} and R={(1,1),(1,4),(4,1),(4,4),(2,2), (2,3), (3,2),(3,3)}. Write the matrix of R and sketch its graph. **[4M]**

(b) Prove that the mapping f:N→N defined by $f(n)=n^2+n+1$ is a one-one but not onto. **[5M]**

(c) Show that the direct product of any two distributive lattices is a distributive lattice **[5M]**

SECTION-III

5 (a) A Survey of 500 television viewers of a sports channel produced the following information. 285 watch cricket, 195 watch hockey, 115 watch football, 45 watch cricket and foot ball, 70 watch cricket and hockey, 50 watch hockey and foot ball and 50 do not watch any of the three kinds of games?Find the Number of viewers who watch all the three kinds of games. **8M]**

[6M]

(b) Define Binomial theorem. Find the coefficient of x^5y^7 in the expansion of $(x+3y)^{12}$

OR

6 (a) Find the number of arrangements of the letters in TALLAHASSEE which have no two adjacent A's **[4M]**

(b) Find the number of integral solutions to $x_1 + x_2 + x_3 + x_4 = 50$, where $x_1 \geq -4$, $x_2 \geq 7$, $x_3 \geq -14$, $x_4 \geq 10$ **[5M]**

(c) Evaluate the sum $1^2 + 2^2 + 3^2 + \ldots + n^2$ **[5M]**

SECTION-IV

7 (a) Find a generating function to count the number of integral solutions to $e_1 + e_2 + e_3 = 10$ if for each i, $0 \leq e_i$ **[4M]**

(b) Solve the following recurrence relation by Substitution $a_n = a_{n-1} + n^2$ where $a_0 = 2$ **[4M]**

(c) Solve the recurrence relation $a_n - 6a_{n-1} = 0$ for $n \geq 1$ where $a_0 = 1$ **[6M]**

OR

8 (a) Find the coefficient of X^{16} in $(1 + X^4 + X^8)^{10}$ **[6M]**

(b) Solve $a_{n+2} - 4a_{n+1} + 3a_n = -200$, $n \geq 0$ and $a_0 = 3000$, $a_1 = 3300$ **[8M]**

SECTION-V

9 (a) Give an example of graph of order 6 and size 6 with degree sequence (2,2,2,2,2,2) **[4M]**

(b) Explain Depth First Search Algorithm with an example **[5M]**

(c) Draw the bipartite graph $K_{3,3}$ and find its chromatic number **[5M]**

OR

10 (a) Prove that number of odd degree vertices in any graph is even **[4M]**

(b) Draw binary search tree for the list : 18,44,2,5,73,45,14,6,8,10,20,11 **[5M]**

(c) Prove whether K_4 and K_5 are planar or non-planar. **[5M]**

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Code No: R17A0024 **R17**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B. Tech I Semester Regular Examinations, November 2018
Probability and Statistics
(CSE& IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 a) Average number of accidents on any day on a national highway is 1.8. Determine the probability that number of accidents are **[7M]**
(I) At least one
(II) Atthe most one

b) Four coins are tossed 160 times. The number of times X heads occurs is given below **[7M]**

X	0	1	2	3	4
No of times	8	34	69	43	6

Fit the binomial distribution for the above data

OR

2 a) A random variable X has the following probability distribution **[7M]**

X	-3	6	9
P(X=x)	1/6	1/2	1/3

Find (1) Mean and variance (2) Find E[Y], Var[Y], given that Y=2X+1. **[7M]**

b) A r.v X is a normally distributed with mean 30 and SD 5.Find the probabilities that (i)$26 \leq X \leq 40$ (ii) $X \geq 45$

SECTION-II

3 a) Fit a linear regression equation of Y on X to the following data: **[7M]**

X:	5	8	7	6	4
Y:	3	4	5	[illegible]	1

b) Find the spearman rank correlation coefficient to the following data: **[7M]**

X:	11	12	43	84	15
Y:	8	15	30	60	12

OR

4 a)In a record of an analysis of correlation data, the following results are readable: Variance of X = 9 **[7M]**
Regression equations: 8X-10Y+66 = 0 and
40X-18Y = 214. Find (i) the mean values of X and Y (ii) The correlation coefficient between X and Y and (iii) The standard deviation of Y

b) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y): **[7M]**

X :	65	66	67	67	68	69	70	72
Y :	67	68	65	68	72	72	69	71

SECTION-III

5 a) Explain in brief one tailed and two tailed tests **[4M]**

b) A random sample of 400 students is found to have a mean height of 171.38 cms. Can it be reasonably regarded as a sample from a large population with mean height 171.17 cms. and standard deviation 3.30 cms. (Test at 5% level of significance **[5M]**

c) A random sample of 500 apples was taken from a large consignment and 60 were found bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment (given $z = 2.33$) **[5M]**

OR

6 Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level. **[14M]**

SECTION-IV

7 A sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. **[14M]**

OR

8 Fit a Poisson distribution to the following data and test the goodness of fit: **[14M]**

No. of accidents:	0	1	2	3	4	5	6
No. of days :	150	65	45	34	10	6	2

SECTION-V

9 What are the measures of queuing model $M/M/1:N/FCFS$. **[14M]**

b A self service canteen employs one cashier at its counter. 8 customers arrive per every 10 minutes on an average. The cashier can serve on average one per minute. Assuming that arrivals are Poisson and the service time distribution is exponential. Determine

i) The average number of customers in the system
ii) The average queue length
iii) The average time a customer spends in the system
iv) Average waiting time of each customer.

OR

10 a)Define Markov chain.Give examples. **[14M]**

b) Explai about limiting distribution of a Markov chain

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