



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 R15 SUPPLEMENTARY PREVIOUS QUESTION PAPERS



LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R15A0510	Computer Organization
R15A0461	Digital Logic Design
R15A0504	Data Structures Using C++
R15A0401	Electronic Devices and Circuits
R15A0503	Mathematical Foundation of Computer Science
R15A0024	Probability and Statistics

Code No: **R15A0510****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, November 2018**Computer Organization****(IT)**

Roll No									
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Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a What is 1's compliment ? Give Examples. [2M]
- b What is Parity ? Give its significance. [3M]
- c What are the functionalities of PC, IR registers,. [2M]
- d Differentiate between Micro operation and Macro Operation. [3M]
- e What is Register Indirect addressing mode ? Give an Example. [2M]
- f Compare RISC and CISC. [3M]
- g What is an Instruction pipeline ? [2M]
- h What are the methods of data transfer between I/O peripheral devices and memory. [3M]
- i Distinguish between Isolated and memory mapped I/O. [2M]
- j How does match logic function in Associative Memory. [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 a) Describe about the Fixed point representation of numbers with example. [5M]
- b) Discuss the concept of complements used to represent signed numbers [5 M]

OR

- 3 By using the required parity generator/checker circuit, Explain how parity checking can be used for error detection. [10M]

SECTION-II

- 4 Explain in detail the working of a micro-programmed control unit. [10M]

OR

- 5 a) List out the computer instructions and group them into broad categories [5M]
- b) Explain all the arithmetic oriented instructions with suitable instructions. [5 M]

SECTION-III

- 6 a) What is an Array multiplier. [4M]
- b) With the help of block diagram, explain the process of addition/subtraction using 2's complement number. [6 M]

OR

- 7 With a neat flow-chart explain Booth's multiplication algorithm and show the various steps involved in multiplication of (-9) and (-13) using Booth's algorithm (Assume 5-bit register) [10M]

SECTION-IV

8 Explain the different modes of data transfer to and from the peripherals. [10M]

OR

9 Explain about Asynchronous communication interface with the block diagram. [10M]

SECTION-V

10 Explain the direct mapping process of a cache memory of size 512 x 12 bits with a main memory of 32k x 12 bits. Give the relevant details. [10M]

OR

11 a) How is the Associative memory suited to do parallel searches by data association. Explain with the help of block diagram. [6M]

b) What is virtual memory ? what is its advantage. [4 M]

Code No: R15A0461

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, November 2018**Digital Logic Design**

(CSE& IT)

Roll No									
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Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a Perform the binary subtraction $01110000 - 01011111$ [2M]
- b Find the complement of $F = x'yz' + x'y'z$ [3M]
- c List the advantages and disadvantages of K-map simplification [2M]
- d Implement $F = AB + CD$ using only NAND gates [3M]
- e What is a decoder? How many AND gates are needed for implementing 3-to-8-line decoder [2M]
- f List the Truth table of Full Adder [3M]
- g What are the differences between Combinational and Sequential Circuits [2M]
- h Draw the Excitation tables of JK and T Flip Flops [3M]
- i Write about ROM [2M]
- j What is PLA? How does it differ from PAL? [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 (a) What is Gray code? Construct 4 bit gray code . [6M]
- (b) Reduce the Boolean Expression $A'C' + ABC + AC'$ to three literals [4M]

OR

- 3 (a) Convert the following numbers with the given radix to decimal. [3M]
 - i) $(4433)_8$ ii) $(1199)_{16}$
- (b) Express the Boolean function $F = A + B'C$ as sum of minterms. [3M]
- (c) Realize Ex-OR gate operation with minimal number of NAND gates [4M]

SECTION-II

- 4 (a) Using K-map method obtain the minimal expression for the following function $F_1(A,B,C,D) = \sum m(8,12,13)$ and $F_2(A, B, C, D) = \sum m(1,2,4,6,7,11)$. [6M]
- (b) Draw the AND-OR-INVERT circuits for $F = (AB + CD + E)'$ [4M]

OR

- 5 (a) Minimize the following switching function using K-map Method [6M]

- (b) $F(A, B, C, D) = \sum m(0, 5, 7, 8, 9, 10, 11, 14, 15)$.
 (c) Draw a NAND logic diagram that implements the complement of the function $F(A,B,C,D) = \sum m(0, 1, 2, 3, 4, 8, 9, 12)$ [4M]

SECTION-III

- 6 (a) Draw the diagram of a 2-Bit Magnitude Comparator and explain its working. [5M]
 (b) Design a circuit to transform 8-4-2-1 BCD code into Excess-3-code [5M]

OR

- 7 (a) Draw and explain the logic diagram of a 2-to-4 line decoder . [5M]
 (b) Design the full adder combinational circuit [5M]

SECTION-IV

- 8 (a) Draw and explain the working of RS and D flip-flops. [5M]
 (b) Convert JK to SR flip flop [5M]

OR

- 9 (a) Draw the Block diagram of a sequential circuit and explain. [4M]
 (b) Draw and explain the working of a 4-bit universal shift register [6M]

SECTION-V

- 10 (a) What is a PLD? Compare the three combinational PLDs? [4M]
 (b) Design a Combinational circuit using ROM that accepts a 3-bit number and generates an output binary number equal to the square of the input number [6M]

OR

- 11 Implement the following Boolean functions using PLA [10M]
 $F_1(A,B,C) = \sum m(0,1,2,4)$ and $F_2(A,B,C) = \sum m(0,5,6,7)$

Code No: R15A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, November 2018

Data Structures Using C++

(CSE &IT)

Roll No									
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Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

<u>SECTION-I</u>		
1 a)	Define time complexity and space complexity	[2M]
b)	Write the time complexity for merge sort	[3M]
c)	Explain queue operations	[2M]
d)	What are the different types of tree traversal techniques	[3M]
e)	Defien max heap.	[2M]
f)	Write the applications of priority queue	[3M]
g)	Discuss different types of hash functions	[2M]
h)	Explain skip list	[3M]
i)	What are the diffeent rotations in AVL	[2M]
j)	Explain BFS	[3M]
<u>SECTION-I</u>		
2	a) Explain Quick Sort with an example and Write a C++ program to implement Quick sort? b) Write a C++ program to implement Linear Search technique.	[6M+4M]
OR		
3	a) Write a program for Selection Sort and mention the time and space complexity of selection sort. b) Explain the technique of insertion sort. Sort the following elements using insertion sort. 98 56 12 23 86 29 42 34 67	[6M+4M]
<u>SECTION-II</u>		
4	a) Explain about Stack and its operations. Write its Applications. b) Write a C++ program to implement Stack using Arrays.	[4M+6M]
OR		
5	Define Threaded Binary Tree .List out the types of Threaded Binary Tree. Explain in detail with an example.	[10M]
<u>SECTION-III</u>		
6	a) Explain polyphase merge with an example? b) Write a C++ program to Implementation of Priority Queue using Heap.	[6M+4M]

	OR	
7	a) Describe the model for external sorting using Merge Sort. b) Differentiate between Multiway merge and Polyphase merge.	[4M+6M]
	<u>SECTION-IV</u>	
8	a) Write the applications of Dictionary with duplicates and without duplicates? b) Compare Hashing and Skip List.	[6M+4M]
	OR	
9	Explain Collision Resolution Techniques. i) Chaining ii) Double Hashing iii) Quadratic Probing	[10M]
	<u>SECTION-V</u>	
10	Define AVL Tree. Write a C++ constructs to insert into and delete from AVL Tree?	[10M]
	OR	
11	a) List out different types of graph representation? Explain each with example? b) Write the applications of Graphs?	[6M+4M]

Code No: R15A0401**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester supplementary Examinations, November 2018****Electronic Devices and Circuits****(ECE, CSE& IT)**

Roll No									

Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a What is the function of SCR. [2M]
- b Compare Static and Dynamic resistances. [3M]
- c Draw and explain the function of L – Section filter. [3M]
- d List out the advantages of full wave rectifier over half wave rectifier. [2M]
- e Draw the h – parameter representation of transistor and explain. [3M]
- f Which is the most commonly used transistor configuration and why. [2M]
- g What is the need of ‘Transistor biasing’. [2M]
- h What are Stabilization factors and give its significance. [3M]
- i Bring out the advantages of MOSFET over JFET. [3M]
- j What do you mean by ‘Normally ON MOSFET’. [2M]

PART-B (50 MARKS)**SECTION-I**

- 2 (a) With a neat diagram, explain about the Voltage regulation using Zener diode. [10M]
- (b) What do you mean by load line and explain in detail about the VI characteristics of PN junction diode.

OR

- 3 (a) Draw the construction diagram of a Tunnel diode and explain its operation and characteristics. [10M]
- (b) Explain in detail about Transition and Diffusion Capacitance.

SECTION-II

- 4 (a) Discuss in detail about the capacitor filter and give its input and output wave forms. [10M]
- (b) List out the applications of Rectifiers.

OR

- 5 (a) Discuss in detail about Harmonic components in a rectifier circuit. [10M]
- (b) Compare Full wave and Half wave rectifiers with respect to any five parameters.

SECTION-III

- 6 Derive the expressions for the Voltage gain and Current gain for a single stage transistor amplifier using h – parameters in CE configuration. [10M]

OR

- 7 Derive the relation between α and β with respect to BJT. Also, give its significance and list out the applications of BJT. [10M]

SECTION-IV

- 8 Derive the expression for the Stabilization factor for Self-bias circuit [10M]

OR

- 9 Explain about the AC load line and discuss about the collector to base bias circuit. [10M]

SECTION-V

- 10 With a neat diagram, explain the construction and operation of N channel depletion MOSFET. [10M]

OR

- 11 Draw and discuss about the V-I characteristics of JFET. [10M]

Code No: R15A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, November 2018**Mathematical Foundation of Computer Science****(CSE &IT)**

Roll No									
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Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a What is a well formed Formula write an example? [2M]
- b Write Rule-P, Rule-T. [3M]
- c State the Generalized Pigeonhole Principle. [2M]
- d Draw the Hasse Diagram for Power Set of A. $A=\{a, b,c\}$. [3M]
- e Find the coefficient of x^4y^5 in the expansion of $(3x-5y)^9$. [2M]
- f How many 4 letter words can be formed with the letters of MASSUSAUGA? [3M]
- g What is Generating Function write an example? [2M]
- h Solve the recurrence relation $U_n-7U_{n-1}=0$ if $U_0=2$. [3M]
- i Define Bipartite Graph with and write an example. [2M]
- j What is Chromatic Number? Find the Chromatic Number for K_5 Graph. [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 a. Show that R is a valid inference from the premises $P \rightarrow Q$, $Q \rightarrow R$ and P. [10M]
- b. Explain Duality Law with suitable examples.

OR

- 3 a. Construct truth table for the formula $(P \rightarrow Q) \vee (Q \leftrightarrow R) \vee (P \rightarrow R)$ [10M]
- b. State and explain the rules that can generate a well-formed formula.

SECTION-II

- 4 a. Write about the properties of Binary Relations in a set with suitable examples. [10M]
- b. If $A=\emptyset$ and $B=\{1,2,3\}$, What are $A \times B$ and $B \times A$?

OR

- 5 a. Explain about the following: [10M]
- i) Semi Group ii) Group iii) Homomorphism
- b. Explain Pigeonhole principle application.

SECTION-III

- 6 a. How many numbers can be formed using the digits 1,3,4,5,6,8,9 if no repetitions are allowed? [10M]

b. Find the number of 5 digit integers that contain the digit 6 exactly one's.

OR

- 7 a. In how many ways can seven people be seated at a round table if two particular persons must sit next to each other? [10M]
b. Find the number of permutations of all letters of the word BASEBALL if the word are to begin and end with a vowel.

SECTION-IV

- 8 a. Solve the recurrence relation $a_n + a_{n-1} - 6a_{n-2} = 0$ for $n \geq 2$. Given that $a_0 = -1, a_1 = 8$. [10M]
b. Find the generating function of the sequence $0, 1, 2^2, 3^2, 4^2, \dots$.

OR

- 9 a. Solve the Fibonacci relation $a_n = a_{n-1} + a_{n-2}$ with $a_0 = 0$ and $a_1 = 1$ as initial conditions. [10M]
b. Solve the recurrence relation $a_n = a_{n-1} + n^3$ where $a_0 = 5$ by Method of Substitution.

SECTION-V

- 10 a. Give the basic rules for constructing Hamiltonian Paths and Cycles. [10M]
b. State the Kruskal's Algorithm for finding Minimal Spanning Tree.

OR

- 11 Write BFS algorithm and its applications; also explain the differences between BFS and DFS. [10M]

Code No: R15A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, November 2018

Probability and Statistics

(CSE &IT)

Roll No									
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Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a If X denote the number of heads in a single toss of 4 fair coins. [2M]
Determine $P(1 < X \leq 3)$.
- b The mean of a poisson distribution is 3 find $P(X < 2)$. [3M]
- c Write the equations of lines of regression. [2M]
- d Show that correlation coefficient is the geometric mean between the two regression coefficients. [3M]
- e Define Null hypothesis and Alternative hypothesis. [2M]
- f Write the test of statistic for difference of proportions. [3M]
- g Write properties of F-distribution. [2M]
- h Write a short note on degrees of freedom. [3M]
- i Write a short note on queue behavior. [2M]
- j Test whether matrix is stochastic or not $\begin{bmatrix} 15/6 & 1/16 \\ 2/3 & 4/3 \end{bmatrix}$ [3M]

PART-B (50 MARKS)

SECTION-I

- 2 Suppose 5 men out of 100 and 25 women out of 10,000 are colour blind. A colour blind person is chosen at random. What is the probability of the person being a male? [10M]

OR

- 3 Fit a Poisson distribution for the following data and calculate the expected frequencies [10M]

x	0	1	2	3	4
F(x)	109	65	22	3	1

SECTION-II

- 4 Find the correlation coefficient between x and y [10M]

x	1	2	3	4	5	6	7	8	9
y	12	11	13	15	14	17	16	19	18

OR

- 5 Test whether the equations $2x + 3y = 4$ and $x - y = 5$ represent valid regression lines. [10M]

SECTION-III

- 6 The average mark scored by 32 boys is 72 with a standard deviation of 8. While that for 36 girls is 70 with a standard deviation of 6. Does this indicate that the boys perform better than girls at a level of significance? [10M]

OR

- 7 In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? [10M]

SECTION-IV

- 8 200 digits were chosen at random from a set of tables. The frequencies of the digits were [10M]

Digits	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use χ^2 test to assess the correctness of the hypothesis that the digits were distributed in equal numbers in the table at 0.05 level of significance.

OR

- 9 Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results. [10M]

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Test whether the two horses have the same running capacity.

SECTION-V

- 10 Assume the goods trains are coming in a yard at the rate of 30 trains per day and suppose that inter-arrival time follows an exponential distribution. The service time for each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time, calculate the probability that the yard is empty and find the average queue length. [10M]

OR

- 11 A training process is considered as two state Markov chain. If it rains, it is considered to be in state 0 and it does not rain, the chain is in state of 1. The transition probability of the Markov chain is defined by $P = \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$. Find the probability that it will rain for three days from today assuming that it is raining today. Assume the mutual probabilities of state 0 or state 1 as 0.4 and 0.6 respectively. [10M]
