MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

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DEPARTMENT OF INFORMATION TECHNOLOGY

II B.TECH I SEMESTER R17 SUPPLEMENTARY PREVIOUS QUESTION PAPERS

LIST OF SUBJECTS

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

R17

Code No: R17A0510

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

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.

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SECTION-I

1	Describe the functional blocks of a computer. Explain the RTL interpretation of instructions.	**[14M]**
	OR	
2	Illustrate the various addressing modes of the CPU. Brief on fixed and floating point representation of relevant data.	**[14M]**

SECTION-II

3	Describe the phases in Instruction cycle.	**[14M]**
	OR	
4	Illustrate with a neat architecture about design of control unit	**[14M]**

SECTION-III

5	Explain in detail about CISC and RISC machines	**[14M]**
	OR	
6	Demonstrate with example the working of shift & add and booths multiplier.	**[14M]**

SECTION-IV

7	Briefly describe the modes of data transfer in detail.	**[14M]**
	OR	
8	List various parallel processing challenges. Draw the block diagram of 5 stage pipeline system.	**[14M]**

SECTION-V

9	Explain briefly about Associate-mapped and set-associate mapped cache memory	**[14M]**
	OR	
10	Describe about the segmented page mapping and page replacement in detail	**[14M]**

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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 Supplementary Examinations, Dec-21/Jan-22

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) Explain the process how to analyze the time and space complexities for a recursive function with an example. **[7M]**

b) Write a C++ program to search for the given key element in array using Binary Search. **[7M]**

OR

2 Write a C++ program to sort an array with n elements in ascending order using Quick Sort. Explain the process with suitable example. **[14M]**

SECTION-II

3 Implement List ADT with insert and delete operations at various positions. **[14M]**

OR

4 a) Implement Queue ADT using arrays. **[7M]**

b) Construct the Binary Tree using the following tree traversals:
Inorder Traversal : { 4, 2, 1, 7, 5, 8, 3, 6 }
Preorder Traversal: { 1, 2, 4, 3, 5, 7, 8, 6 } **[7M]**

SECTION-III

5 Explain the process of Polyphase merge with suitable example. **[14M]**

OR

6 What is a priority Queue? Implement its operations. **[14M]**

SECTION-IV

7 What is a Dictionary Data Structure? Explain its representations with proper examples. **[14M]**

OR

8 What is collision in Hashing? Apply linear probing and quadratic probing for the following elements with the table size as 15. **[14M]**

12, 78, 98, 23, 45, 32, 60, 5, 89, 56, 31, 46

SECTION-V

9 What are the limitations of a Binary Search Tree? What is AVL Tree? Construct AVL tree for the following elements: **[14M]**

H, I, J, B, A, E, C, F, D, G, K, L

OR

10 a) What are the Graph traversals? Explain with an example. **[7M]**

b) What is a B-tree? Explain insert and delete operations with an example. **[7M]**

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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 Supplementary Examinations, Dec-21/Jan-22

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.	Simplify the following compound proposition using the laws of logic. $(p \vee q) \wedge [\sim((\sim p) \vee q)]$	**[7M]**
	b.	Obtain PCNF of the following. $p \rightarrow \{(p \rightarrow q) \wedge \neg(\neg q \vee \neg p)\}$	**[7M]**
		OR	
2	a.	Obtain the principal conjunctive and disjunctive normal forms of $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$	**[7M]**
	b.	Find the principal disjunctive normal form of $P \rightarrow \{(P \rightarrow Q) \wedge \neg (\neg Q \vee \neg P)\}$	**[7M]**

SECTION-II

3	a.	Let A={1,2,3,4,6,8,12,24}, show that the relation 'divides' is partial ordering on A and draw Hasse diagram.	**[7M]**
	b.	Determine whether the relation is reflexive, symmetric, anti-symmetric, and transitive. Let A={1,2,3,4} and R={(1,1),(1,2),(1,3),(2,3) ,(3,1),(2,4) (4,4)} and find whether R is equivalent? If yes find the partition of A induced by R.	**[7M]**
		OR	
4	a.	Draw the Hasse diagram representing the partial ordering {(a, b)| a divides b} on {2, 3, 6, 12, 24, 36}.	**[7M]**
	b.	Explain partial ordering relation with example.	**[7M]**

SECTION-III

5	a.	How the fuzzy logic can be applicable to the application of room temperature control?	**[7M]**
	b.	If o is an operation on Z defined by x o y = x + y +1, prove that (z , o) is an abelian group?	**[7M]**
		OR	
6	a.	Prove that a group G in which every element is its own inverse is abelian.	**[7M]**
	b.	If (G, *) is an abelian group then prove that $(a * b)^n = a^n * b^n$ for all n belongs to N	**[7M]**

SECTION-IV

7	a.	State and prove binomial theorem.	**[7M]**
	b.	Solve the inhomogeneous recurrence relation $a_{n+2} - 6a_{n+1} + 9a_n = 7(3)^n$ where $a_0 = 1$ and $a_1 = 4$	**[7M]**
		OR	
8	a.	Define Pigeonhole Principle and its Applications.	**[7M]**
	b.	A sequence is defined by the recurrence relation $a_{n+1} = -3a_n + 7$ with $a_0 = 2$ What is the value of a_2?	**[7M]**

SECTION-V

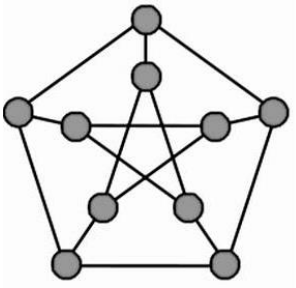
9 a. Explain planner graphs with example. **[7M]**

b. What is spanning tree? **[7M]**

OR

10 a. Sketch the following given graphs neatly. K_5, K_6, $K_{3,4}$, C_6, and W_6. **[7M]**

b. Define the chromatic number and find the chromatic number of the below graph. **[7M]**



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R17

Code No: R17A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

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.

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SECTION-I

1 A Continuous random variable X has the distribution function **[14M]**

$$F(x)=\begin{cases} 0, \text{ if } x\leq 1 \\ K(1-x)^4, \text{ if } 1< x \leq 3 \\ 1, \text{ if } x > 3 \end{cases}$$

Determine

i. f(x)

ii. K

iii. Mean

OR

2 If the weights of 300 students are normally distributed with mean 68kgs and Standard deviation 3 kgs. How many students have weight? **[14M]**

i. Greater than 72 kgs

ii. Less than or equal to 64 kgs

iii. Between 65 and 71 kgs inclusive

SECTION-II

3 Calculate the coefficient of Rank Correlation **[14M]**

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

OR

4 The equations of two regression lines are 7x-16y+9=0 and 5y-4x-3=0. Find the Coefficient of Correlation and the means of x and y. **[14M]**

SECTION-III

5 Population consists of five numbers 5,10,14,18,13 and 24 .Consider all possible samples of size two which can be drawn without replacement from the population. Find **[14M]**

a. The Mean of the population

b. The Variance of the population

c. The Standard deviation of the population

d. The mean of the Sampling distribution of Means

e. The Standard deviation of Sampling distribution of means.

OR

6 A sample of 900 members has a mean of 3.4cms and S.D 2.61cms. If this sample has been taken from a large population of mean 3.25cm and S.D of 2.61cms. Test at 5 % level of significance and also construct 95% confidence limits of true mean. **[14M]**

SECTION-IV

7 The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data **[14M]**

Item	1	2	3	4	5	6	7	8	9	10
Life in 1000 hrs	1.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life time of bulbs is 4000hrs.

OR

8 Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins, show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal. **[14M]**

SECTION-V

9 Consider a box office ticket window being manned by a single server. Customers arrive to purchase tickets according to Poisson input process with a mean late of 30 per hour .The time required to serve a customer has an exponential distribution with a mean of 910 seconds. Determine the following. **[14M]**

a. Fraction of the time the server busy

b. The average number of customers queuing for service.

OR

10 Describe the classification of the states of Markov process. What is homogenous Markov Chain . **[14M]**

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Code No: R17A0401 **R17**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

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.

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SECTION-I

1 a. Describe the working principle of an SCR with V-I Characteristics. **[10M]**

b. Determine the forward resistance of a Silicon PN junction diode when the forward current is 6 m A at room temperature **[4M]**

OR

2 a. Describe with the help of a relevant diagram, The construction of photo diode and explain its working? **[10M]**

b. Determine the forward bias voltage applied to a silicon diode to cause a forward current of 10mA and reverse saturation current $I_O=25x10^{-7}A$ at room temperature **[4M]**

SECTION-II

3 Explain the working of a half wave rectifier and derive expression for Rectification Efficiency, Ripple Factor and Transformer Utilization Factor of a half wave rectifier with resistive load **[14M]**

OR

4 Explain the operation of Full wave rectifier with center tap transformer and also derive ac and dc voltage and current, ripple factor and efficiency **[14M]**

SECTION-III

5 Derive the expression for current gain, voltage gain, input and output impedances of a CC amplifier using h- parameter exact and approximate analysis. **[14M]**

OR

6 Explain the input and output characteristics of CE configuration and from the output characteristics explain different regions of operation of transistor. **[14M]**

SECTION-IV

7 a. Draw the circuit of voltage divider biasing and derive the expression for stability factor. **[8 M]**

b. A silicon transistor having $\beta=52$ and $V_{BE}=0.7V$is used in voltage divider biasing circuit. $V_{CC}=25V$ and $R_L=5K\Omega$. The operating point is required to be established at $V_{CE}=10V$ and $I_C=2mA$ and stability factor S not exceeding 4. Draw the circuit and find the value of R_1, R_2 and R_E. **[6M]**

OR

8 a. Define stability factor and derive an expression for stability factor of fixed bias **[7M]**

[7M]

b. A transistor uses potential divider biasing with R_1=50KΩ, R_2=10KΩ and R_E=1KΩ. If V_{CC}=12V, find

i) I_C; given V_{BE}=0.1V

ii) I_C; given V_{BE}=0.4V

SECTION-V

9 a. What are the different biasing schemes used for FET. Explain Voltage divider biasing. **[8M]**

b. Differentiate FET and BJT **[6M]**

OR

10 a. Explain basic construction enhancement type N-Channel MOSFET and the characteristics. **[8M]**

b. The common drain JFET amplifier has the following parameters: r_d=100KΩ,g_m=300μmhos and Rs=10KΩ. Calculate Voltage gain and output impedance. **[6M]**

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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 Supplementary Examinations, Dec-21/Jan-22

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 **Marks**

1 a) Show that AB'C+B+BD'+ABD+ABD'+A'C = B+C **[7M]**

b) Realize logical XOR gate using NAND and NOR Gates **[7M]**

OR

2 a) Convert the following to Decimal and then to octal **[9M]**

(i) $(125F)_{16}$ (ii) $(10111111)_2$ (iii) $(392)_{16}$ **[5M]**

b) Apply 2's Complement Binary Subtraction for the following numbers

$25_{(10)} - 36_{(10)}$

SECTION-II

3 a) Implement the following Boolean function with NAND gates only. **[7M]**

$F(X, Y, Z) = \Sigma m (1, 2, 3, 4, 5, 7)$

b) Explain Prime Implicants and Essential Prime Implicants with an example **[7M]**

OR

4 a) Explain the advantage of Quine-McCluskey method with K-Map **[4M]**

b)Minimize the following logic function using k-map and realize using NOR gates. **[10M]**

$F(A,B,C,D) = \Sigma\, m(1,3,5,8,9,11,15) + \Sigma\, d(2,13)$

SECTION-III

5 a)Design a BCD to Excess-3 code converter and realize with minimum no. of gates **[7M]**

b)Implement the 8X1 Multiplexer using the function **[7M]**

$F(A,B,C,D) = \Sigma\, (1,3,4,11,12,13,14,15).$

OR

6 a)Design a combinational circuit to realize full-adder using NAND-gates only **[7M]**

b) Brief about Priority encoder with two inputs. **[7M]**

SECTION-IV

7 List out the following for all flip flops (SR, D, JK) **[14M]**

a. Logic symbol

b. Characteristic table

c. Logic diagram

d. Excitation table

OR

8 (a) Realize SR flip-flop using T flip-flop. **[7M]**

(b) Compare level triggering and edge triggering with neat timing diagram. **[7M]**

SECTION-V

9 a) What are the advantages and disadvantages of using a PROM as a PLD **[7M]**

b) What is ROM? List the different types of ROMs. **[7M]**

OR

10 a) Explain about RAM in detail. **[5M]**

b) Implement the following Boolean functions with a PLA. **[9M]**

$F1(A,B,C)=\Sigma m(0,1,2,4)$

$F2(A,B,C)=\Sigma m(0,5,6,7)$

$F3(A,B,C)=\Sigma m(0,3,5,7)$

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