



# 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

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

**Code No: R15A0510****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester Supplementary Examinations, October 2020****Computer Organization****(IT)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 75**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 Explain the functional units of a basic computer with neat diagram.
- 2
  - a) Explain the following shift micro-operations with example:  
i. Logical shift ii. Circular shift iii. Arithmetic shift.
  - b) An 8-bit register contains the binary value 10011100. What is the register value after arithmetic shift right? Starting from the initial number 10011100, determine the register value after an arithmetic shift left and state whether there is an overflow.
- 3
  - a) How do you check the instructions set completeness
  - b) Demonstrate the direct and indirect address in organising stored program.
- 4
  - a) Sketch out the organization of micro programmed control unit and explain about it.
  - b) How do you perform selection of address for control memory using conditional branching?
- 5 Evaluate the arithmetic statement  $X = (A + B) * (C + D)$  and illustrate the influence of the number of addresses using zero, one, two, or three address instructions .
- 6 Explain the Booths multiplication algorithm with multiplier as 10011 and multiplicand as 10111.
- 7 Explain the instruction pipeline with an example.
- 8 How do you initialize the cache memory and how do you perform write operation on it?

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Code No: **R15A0461****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**II B.Tech I Semester Supplementary Examinations, October 2020****Digital Logic Design**

(CSE &amp; IT)

Roll No									

**Time: 2 hours****Max. Marks: 75**

Answer Any **Four** Questions  
All Questions carries equal marks.

- 1 a) Explain Gray code and write 4 bit gray code.  
b) Convert the decimal number 431 to binary in two ways:
  - i) Convert directly to binary;
  - ii) Convert first to hexadecimal and then from hexadecimal to binary.Which method is faster?
- 2 a) Find the canonical sum of products and product of sums expression for the function:
$$F = X_1X_2X_3 + X_1 X_3X_4 + X_1 X_2 X_4.$$
b) Write the expression for a 4-input AND gate. Construct the complete truth table showing the output for all possible cases.
- 3 Using the Karnaugh map method, simplify the following function; obtain its sum of the products form, and product of the sums form. Realize it with NOR gates:
$$F(A, B, C, D) = \Sigma(4, 5, 7, 12, 14, 15) + \Sigma d(3, 8, 10).$$
- 4 Using the Quine-McCluskey method obtain all the prime implicants, essential prime implicants, and minimized Boolean expression for the function:
$$F(A, B, C, D, E) = \Sigma(4, 5, 6, 7, 9, 10, 14, 19, 26, 30, 31)$$
- 5 a) What is a full-adder? Draw its logic diagram with basic gates.  
b) Implement the Boolean function  $F(A, B, C, D) = \Sigma(1, 3, 4, 11, 12, 13, 15)$  using:
  - (i) decoder and external gates, and
  - (ii) 8-to-1 MUX and external gates.
- 6 a) Design an Excess-3-to-8421 code converter using a 4-to-16 decoder with enable input E' and associated gates.  
b) Construct a 4-to-16-line decoder with five 2-to-4-line decoders with enable.
- 7 Describe the operation of SR, T, D and JK Flip-Flops with the help of their truth tables and gate level diagrams.
- 8 Design an Excess-3-to-BCD code converter using:
  - (i) PROM
  - (ii) PLA
  - (iii) PAL.

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Code No: R15A0504

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**II B.Tech I Semester Supplementary Examinations, October 2020****Data Structures using C++****(CSE & IT)**

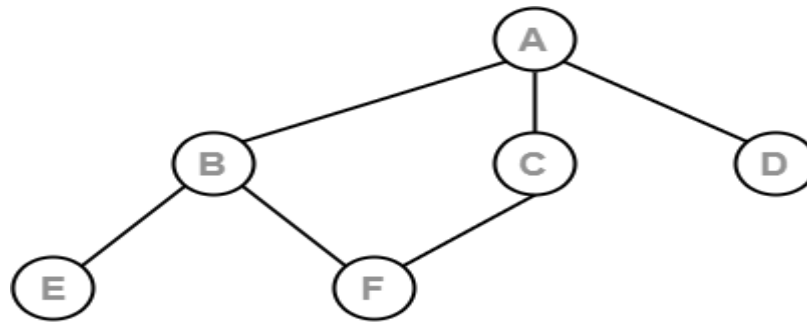
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**Time: 2 hours****Max. Marks: 75**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 a) How do you analyse the complexity of an algorithm?  
b) Write C++ program for heap sorting technique.
- 2 How does Merge Sort work? Write an algorithm and explain with an example.
- 3 (a) Convert the given infix expression into post fix expression and explain the representation of stacks used for conversion.  $A/B * C - D + E/(F + (G + H))$ .  
  
(b) Construct a Binary Search Tree for the given elements {1, 7, 5, 50, 40, 10} and find its in-order and pre-order traversals.
- 4 a) Explain the array representation of a threaded binary tree.  
b) Discuss about the ADT Binary Tree
- 5 What is a priority queue? How will you implement stack using priority queue.
- 6 Explain about multiway merging and polyphase merging.
- 7 a) Write short notes on Extendible hashing  
b) Define dictionaries. Explain the different ways to represent dictionaries.
- 8 a) Explain about Adjacency matrix  
b) Trace out the DFS traversals for the following graph.



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**Code No: R15A0401****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester Supplementary Examinations, October 2020****Electronic Devices and Circuits****(ECE, CSE & IT)**

<b>Roll No</b>										
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**Time: 2 hours****Max. Marks: 75**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 Derive the expression for the transition capacitance of a PN junction diode.  
Explain Zener voltage regulator and give its limitations.
- 2 Discuss the formation and Volt-amp characteristics of a PN Junction.
- 3 Draw the full wave rectifier circuit diagram and derive the expression for  $I_{DC}$ ,  $I_{RMS}$ , ripple factor, PIV TUF and efficiency.
- 4 Explain why  $\pi$  filters are not suitable for varying loads. Why series inductor and C-section filter cannot be used with HWR. Derive the maximum efficiency of a half wave rectifier.
- 5 Explain the PNP transistor components. Discuss the early effect. What are the effects produced by base width modulation?
- 6 Draw the circuit for a common base BJT and explain the input and output characteristics for the same.
- 7 .Draw the self-biasing circuit for CE amplifier and derive the expression for the stability factor.
- 8 With help of suitable diagrams explain the working of 2 different types of MOSFET.

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Code No: **R15A0503****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

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**II B.Tech I Semester Supplementary Examinations, October 2020****Mathematical Foundation of Computer Science****(CSE & IT)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 75**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 Explain the proof of contradiction
- 2 What is Automatic Theorem Proving. Explain with example.
- 3 Describe the Semi groups and monads.
- 4 Discuss about the
  - a) groups
  - b)sub groups
  - c)homomorphism
  - d)Isomorphism
- 5 Understand the Pigeon hole principles.
- 6 Illustrate the applications of Pigeon hole principle
- 7 Solve the recurrence relation of Fibonacci series.
- 8 Write short notes on
  - a)Euler Circuits
  - b)Chromatic Numbers

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Code No: R15A0024

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

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**II B.Tech I Semester Supplementary Examinations, October 2020****Probability and Statistics****(CSE & IT)**

<b>Roll No</b>										
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**Time: 2 hours****Max. Marks: 75**Answer Any **Four** Questions

All Questions carries equal marks.

- In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C.
- In a Normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution.
- Calculate Karl Person's correlation co-efficient for the following data.
 

X	38	45	46	38	35	38	46	32	36	38
Y	28	34	38	34	36	26	28	29	36	25
- State the various properties of regression coefficients.
- What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence.
- Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14. (Table value=2.26)
- Random samples of 400 men and 200 women in a locality were asked whether they would like to have a bus stop near their residence. 200 men and 40 women are in favour of the proposal. Test the significance between the differences of two proportions at 5% level.
- A car park contains 5 cars .The arrival of cars is poisson with a mean rate of 10 per hour. The length of the time the car spends in the system has negative exponential distribution with mean 2 hours .How many cars are there in the car park on average and what is the probability that a newly arriving customer finds the car park full and having to park his car elsewhere.

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