

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

**B.TECH (R18)
(II YEAR – I SEM)
(2020-21)**



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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Maisammaguda, Dhulapally (Post Via. Hakimpet), Secunderabad – 500100, Telangana State, India

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester Model Paper****Computer Organisation****SET-1**

Roll No									
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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) Explain the bus structure in detail with neat diagram.

b) Explain about Floating-point representation.

(OR)

2 a) Describe the connections between the processor and memory with a diagram.

b) What are the functions of ALU.

SECTION – II

3 a) Explain various types of computer registers with block diagrams

b) Explain address sequencing in micro programmed control.

(OR)

4a)What is Instruction Cycle ? Briefly explain with state diagram.

b) Explain various instruction formats and write various instruction formats for $X=(A+B)*(C+D)$.**SECTION – III**

5 a) Explain the different Addressing modes with numerical example.

b) Explain clearly the three types of CPU organizations.

(OR)

6a) Explain input-output processor in detail.

b) With a neat diagram, explain the instruction pipeline processing in detail

SECTION – IV

7.With the help of a block diagram. Explain DMA transfer in detail.

(OR)

8 a) Explain the mechanism of Asynchronous data transfer.

b) Give the details of handshaking signals for data transfer using source initiated data transfer.

SECTION – V

9a) How is the Associative memory suited to do parallel searches by data association.

Explain with the help of a block diagram.

b) What is Virtual Memory ? What is its advantage.

(OR)

10 Explain in detail various mapping techniques in cache memory.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester Model Paper****Computer Organisation****SET-2**

Roll No									
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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. With a neat sketch, explain in detail about the functional units of computers.

(OR)

2. Design one stage of an Arithmetic logic shift unit and then explain it with the help of function table.

SECTION – II

3. (a) What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register?

(b) Show and explain the input-out configuration.

(OR)

4. Explain the instruction cycle with the help of a flow chart.

SECTION – III

5. Explain all addressing modes with numerical examples and diagrams.

(OR)

6. (a) Draw and explain a flowchart of the hardware multiply algorithm.
- (b) Illustrate the binary division process through a numerical example.

SECTION – IV

7. (a) Draw a space-time diagram for a six-segment pipeline showing the time it takes to process eight tasks.

(5M)

(b) With the help of flow chart explain how the instruction cycle in the CPU can be processed with a four-segment Pipeline.

(OR)

8. Design Parallel priority interrupt hardware for a system with eight interrupt sources and then explain the same.

SECTION – V

9. (a) Explain the following Auxiliary memory devices:

- i. Magnetic disks
- ii. Magnetic tape

(b) Discuss the block diagram of an Associative memory.

(OR)

10. Explain briefly about memory hierarchy

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech I Semester Model Paper
Computer Organisation
SET-3

Roll No									
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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) What is bus? Draw the figure to show how functional units are interconnected using a bus and explain it
b) Differentiate between fixed point and floating point representation

(OR)

2. a) What is register transfer language? Explain the basic symbols used in register transfer.
b) Explain the design of accumulator logic

SECTION-II

3. a) Explain the basic computer instruction formats
b) Explain the different types of addressing modes

(OR)

4. a) List and explain the steps involved in the execution of a complete instruction
b) What is Micro operation? Briefly explain the arithmetic micro operations?

SECTION-III

5. a) An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register r1 contains the number 200. Evaluate the effective address if the addressing mode of the instruction is i) Direct ii) Immediate iii) Relative iv) Register Indirect (8M)
b) Explain the operation of a Micro programmed control unit using a diagram (8M)

(OR)

6. a) Multiple $(-7)_{10}$ with $(3)_{10}$ by using Booth's multiplication. Give the flow table of the multiplication b) Draw the circuit of a BCD adder / subtractor and explain its operations

SECTION-IV

7. Draw the block diagram of a DMA controller and explain its functioning?
b) Discuss any five key differences between subroutine and interrupt service routines

(OR)

8. Explain in detail about arithmetic and instruction pipeline.

SECTION-V

9. a) Compare and contrast between Asynchronous DRAM and Synchronous DRAM.

b) What is cache memory? Explain the different mapping functions

(OR)

10. a) Discuss about the virtual memory? Discuss about the mapping of virtual address to memory table. b) Discuss about set-associative mapping.

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II B.Tech I Semester Model Paper
Computer Organisation
SET-4

Roll No									
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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) Define Data representation. Explain different data representations in detail.
b) Write about bus structure.

(OR)

2. Explain in detail about various arithmetic, logic and shift micro operations.

SECTION-II

3. Explain hardwired control unit and micro programmed control unit.

(OR)

4. Explain different types of computer instruction formats.

SECTION-III

5. Explain all Addressing modes with numerical example.

(OR)

6. Explain data transfer, data manipulation and program control instructions.

SECTION-IV

7. . Describe in detail about input-output-processor (IOP) organization

(OR)

8. Explain the DMA transfer technique with the block diagram.

SECTION-V

9. Write short notes on the following

- a) Virtual memory
- b) Hit ratio
- c) Cache coherency

(OR)

- 10.a) Discuss the different mapping techniques used in cache memories and their relative merits and demerits

- b) Explain briefly about memory hierarchy

Important Questions

UNIT I:

1. With a neat diagram, explain in detail the functional units of a computer.
2. a) Define Data representation. Explain different data representations in detail.
b) Write about bus structure.
3. Discuss the Booth's multiplication algorithm with an example.
4. Explain the differences between Multiprocessors and Multicomputer.
5. Discuss addition and multiplication algorithm with its hardware organization and flow chart.

UNIT II:

1. Explain about Bus transfers in detail.
2. Explain the instruction cycle with help of a flow chart.
3. a) Explain in detail about various arithmetic, logic and shift micro operations.
b) Explain in detail about Arithmetic logic shift unit with a neat diagram.
4. a) Explain in detail about Input-Output Interrupt.
b) Explain about Memory reference instructions.
5. Explain the various kinds of computer registers along with its representations.

UNIT III:

1. Explain all Addressing modes with numerical example.
2. Explain hardwired control unit and micro programmed control unit.
3. a) Explain data transfer, data manipulation and program control instructions.
b) Explain the various CPU Organizations in detail.
4. a) Explain the STACK Organization in detail.
b) Differentiate between CISC and RISC processors.
5. Explain different types of computer instruction formats w.r.t No. of addresses and derive the expression $X = (A+B)*(C+D)$ using them.

UNIT IV:

1. Explain briefly about memory hierarchy.
2. Discuss the different mapping techniques used in cache memories and their relative merits and demerits.
3. Explain the internal organizations of RAM and ROM chips with a neat sketch.
4. Write short notes on the following
a) Address Map b) Hit ratio c) Auxiliary memory d) Replacement algorithms
5. Explain briefly about Associative memory along with its hardware organization.

UNIT V:

1. Explain the various modes of transfers in detail.
2. Describe in detail about input-output-processor (IOP) organization.
3. Explain in detail about arithmetic and instruction pipeline.
4. Explain the DMA transfer technique with the block diagram.
5. Explain the I/O device interface in detail.

Data Structures Model paper -1

Roll No									
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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 What is a Data structures? Explain various types in detail with example [14M]

OR

- 2 What is a linked list? Explain operations on a singly linked list with a program. [14M]

SECTION-II

- 3 a)List various operations of Stack [5M]
b).Write a program for static implementation of Stack [9M]

OR

- 4 Define Stack .Write a program for dynamic implementation of Stack [7M]
[7M]

SECTION-III

- 5 Explain the technique of quick sort. Sort the following elements using quick sort. [14M]
98 ,56 ,12 ,23, 86, 29, 42, 34, 67. and write a C++ program to implement quick sort

OR

- 6 a)Explain different types of graph representation? [7M]
b)Explain BFS and DFS with examples [7M]

SECTION-IV

- 7 Explain the ways of implementing dictionaries and give applications of dictionaries [14M]

OR

- 8 What is a collision? What are various collision resolution techniques and Give the characteristics of Good hashing function [14M]

SECTION-V

- 9 a)What is a B-Tree? Construct a B-tree of order 3 for the following elements: [7M]
25,10,20,30,35,80,40,50,60,82,70,90,85,93.. [7M]
b)Explain insertion ,deletion in Binary search trees.

OR

- 10 a)Explain threaded binary trees [7M]
b)Prove that height of AVL tree with n elements is $O(\log(n))$. [7M]

Code No: R18A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II B.Tech I Semester Regular Examinations, April/May 2019

Data Structures Model paper -2

R18

Roll No									
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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 Define Abstract data types. Explain operations on doubly linked list [14M]

OR

- 2 Explain Circular Linked list and various operations on it [14M]

SECTION-II

- 3 a)List various operations of Queue [5M]

- b).Write a program for static implementation of Queue [9M]

OR

- 4 Define Queue .Write a program for dynamic implementation of Queue [14M]

SECTION-III

- 5 a)Write a C++ program to implement Linear Search [7M]

- b)Write a C++ program to implement Binary search [7M]

OR

- 6 Explain the technique of merge sort. Sort the following elements using merge sort. [14M]
98 ,56 ,12 ,23, 86, 29, 42, 34, 67. and write a C++ program to implement mergesort

SECTION-IV

- 7 What is double hashing? Compare: Quadratic probing and double hashing [14M]
What is rehashing? Explain in detail

OR

- 8 What is Dictionary? Write C++ code for implementation of Dictionary with Single [14M]
linked list.

SECTION-V

- 9 What is a balanced tree? Give various types of balance trees. Discuss in detail [14M]

OR

- 10 What is an AVL Tree? Construct an AVL tree for the following elements: [14M]
2,10,12,3,35,8,40,5,60,18,7,90,28,93 and then delete 5,18

Code No: R18A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, April/May 2019

R18

Data Structures Model paper -3

Roll No									
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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 What is a linked list? explain various types with a neat sketch [14M]

OR

- 2 What are the applications of linked list? Explain difference between different types of linked list [14M]

SECTION-II

- 3 Explain Circular Queue. Write a program for static implementation of Queue [14M]

OR

- 4 Write a program for dynamic implementation of Queue [14M]

SECTION-III

- 5 a)What is an external sort? Explain external sorting model [7M]

- b)Construct Max heap and Min heap for the following instance: [7M]

12,5,65,2,33,24,89,23,25,15,17,38,48,23

OR

- 6 Explain the technique of Heap sort. Sort the following elements using Heap.98 ,56 ,12 ,23, 86, 29, 42, 34, 67and Write a c++ program to implement Heap sort. [14M]

SECTION-IV

- 7 Explain the ways of implementing dictionaries and give applications of dictionaries [14M]

OR

- 8 a)What is a skip list? Give its representation and write various operations that can be performed on skip list in detail [7M]

- (b)Differentiate between skip list and linked list [7M]

SECTION-V

- 9 Explain insertion, deletion and searching in AVL tree. [14M]

OR

- 10 What is a B-Tree? Construct a B-tree of order 3 for the following elements: 25,10,20,30,35,80,40,50,60,82,70,90,85,93 [14M]

Code No: R18A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, April/May 2019

R18

Data Structures Model paper -4

Roll No									
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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 What is a linked list? explain various types with a neat sketch [14M]

OR

- 2 What are the applications of linked list? Explain difference between various types of linked list [14M]

SECTION-II

- 3 a) Explain Priority Queue [7M]
b) What is a heap? Explain various types in detail [7M]

OR

- 4 a) Convert following expressions from infix to prefix and postfix [6M]
i) $(A + B) * C - (D - E) * (F + G)$ [8M]
ii) $A + (B * C - (D / E ^ F) * G) * H$
b) Explain steps for Evaluation of post fix expression . evaluate following post fix expression $A B C D * + * E +$
 $A=2, B=3, C=4, D=5, E=6$

SECTION-III

- 5 Explain the technique of bubble sort. Sort the following elements using bubble sort. 98 ,56 ,12 ,23, 86, 29, 42, 34, 67. and write a C++ program to implement bubble sort [14M]

OR

- 6 Explain selection sort ? Sort the following elements using selection sort. 98 ,56 ,12 ,23, 86, 29, 42, 34, 67 and Write a C++ program to implement selection sort. [14M]

SECTION-IV

- 7 a) Explain the problem associated with linear probing [7M]
(b) Explain Quadratic Probing in detail. [7M]

OR

- 8 What is Hashing? What are various Hash table representations and explain various hashing Functions [14M]

SECTION-V

- 9 Explain insertion, deletion and searching in BST tree [14M]

OR

- 10 What is a balanced tree? Give various types of balance trees. Discuss in detail [14M]

Code No: **R17A0504****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester Supplementary Examinations, May 2019****Data Structures using C++****(CSE & IT)**

Roll No									
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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) Illustrate Binary search with an example. [7M]
 (b) Write a C++ program to implement Merge sort? [7M]

OR

- 2 Write a program to sort a list of following 10 integers using quick sort. 10, 23, 11, 55, 32, 5, 67, 53, 4, 98 and Trace the working of your program. [14M]

SECTION-II

- 3(a) Explain the singly linked list and write a program to insert an element in the beginning of a singly linked list. [7M]
 (b) Describe the various applications of stack and queues. [7M]

OR

- 4(a) Construct a binary tree for the given: [6M]
 In-order traversal = Q, A, Z, Y, P, C, X, B
 Pre-order traversal = Z, A, Q, P, Y, X, C, B
 Write the post order traversal for the created binary tree.
 (b) Explain about Threaded binary tree. [8M]

SECTION-III

- 5(a) Define Priority Queue? Explain types of Priority Queues. [7M]
 (b) Illustrate the heap- sort on the following input sequence: [7M]
 (22,15,36,44,10,3,9,13,29,8,25,35)

OR

- 6(a) Explain External sorting? What is model for external sorting. [7M]
 (b) Distinguish between Polyphase merge and Multiway merge [7M]

SECTION-IV

- 7(a) Define hash function? Explain the Hashing strategies. [7M]
 (b) Distinguish between open addressing-linear probing, quadratic probing [7M]

OR

- 8(a) Explain in detail about skip list. [7M]
 (b) Draw the 11-entry hash that results from using the hash function $h(i) = (2i+5) \bmod 11$ to hash keys 12, 44, 13, 88, 23, 94, 11, 39, 20, 16, 5. • (a) Assume collisions are handled by chaining. • (b) Assume collisions are handled by linear probing. • (c) Assume collisions are handled with double hashing, with the secondary hash function $h'(k) = 7 - (k \bmod 7)$. [7M]

SECTION-V

- 9 (a) What do you mean by AVL tree? Construct an AVL tree by inserting the following elements in the order of their occurrence H, I, J, B, A, E, C, F, D, [9M]

G, K, L,
(b) Distinguish between DFS and BFS. **[5M]**

OR

10 (a) Define binary search tree? What are the properties of binary search tree. **[8M]**

(b) Insert items with the following keys into an initially empty binary search tree:
30, 40, 24, 58, 48, 26, 11, 13. Draw the tree after each insertion. **[6M]**

Code No: **R15A0504****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****II B.Tech I Semester supplementary Examinations, May 2019****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.

PART-A (25 Marks)

1. a What is a stable sorting? [2M]
- b Explain various asymptotic notations used for denoting time complexity? [3M]
- c What is an Abstract Data type? [2M]
- d What are different types of Binary trees? [3M]
- e Write priority queue ADT. [2M]
- f Explain types of heaps. [3M]
- g What are applications of dictionaries? [2M]
- h Explain about Double hashing in detail. [3M]
- i What is spanning tree? [2M]
- j What are properties of Binary search tree: [3M]

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

- 2 a) What is Binary search? Write a C++ program to implement Binary Search Technique. [5M]
- b) Explain Bubble Sort with an example. Write a C++ program to implement Bubble sort? [5M]

OR

- 3 a) Briefly explain about Time and Space Complexity. [4M]
- b) Explain Merge Sort with an example and Write a C++ program to implement Merge sort? [6M]

SECTION-II

- 4 Explain about Queue and its operations and Write a C++ program to implement Queue using Arrays? [10M]

OR

- 5 a) Convert an infix expression to postfix expression using stack. [5M]
- b) Describe briefly about the representation of Binary Trees. [5M]

SECTION-III

- 6 What is Priority Queue? Discuss two of their applications and mention how they are represented in memory [10M]

OR

- 7 a) Write about External sorting mechanism and its types. [5M]
- b) Explain Multiway merge concept in detail with an example? [5M]

SECTION-IV

- 8 What is the structure to represent node in a Skip List? Write the Construct for [10M]

Skip List.

OR

- 9 What is Collision? Explain different Collision Resolution Techniques **[10M]**

SECTION-V

- 10 What is Binary Search Tree? Write a C++ program to implement Binary Search Tree operations? **[10M]**

OR

- 11 Explain in detail about BFS and DFS with examples? **[10M]**

Code No: R18A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester**Model Paper-1****Discrete Mathematics (CSE & IT)****Time: 3 hours Roll No****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) Use truth table to show that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$ [5M]
 (b) Obtain the Principal Conjunctive Normal Form of the formula S given [5M]
 by $(\neg P \rightarrow R) \wedge (Q \Rightarrow P)$ [4M]
 (c) Show that $(x)(P(x) \rightarrow Q(x)) \wedge (x)(Q(x) \rightarrow R(x)) \Rightarrow (x)(P(x) \rightarrow R(x))$
 OR
- 2 (a) Construct truth table for $(P \vee Q) \wedge ((\neg P) \vee (\neg R))$ [4M]
 (b) Check whether the truth values of the following formula is independent of [5M]
 their components $((P \rightarrow Q) \wedge (Q \wedge R)) \rightarrow (P \rightarrow R)$ [5M]
 (c) Prove that $\exists x(P(x) \wedge S(x)), \forall x(P(x) \rightarrow R(x)) \Rightarrow \exists x(R(x) \wedge S(x))$

SECTION-II

- 3 (a) For any two sets A and B Prove the following Identity $A - (A \cap B) = A - B$ [4M]
 (b) Prove that if R is a symmetric relation, then $R \cap R^{-1} = R$ [5M]
 (c) Prove that intersection of two subgroups of a group $(G, *)$ is a subgroup of [5M]
 a group $(G, *)$
 OR
- 4 (a) If $A = \{\alpha, \beta\}$, $B = \{1, 2, 3\}$. Find out $(A \times B) \cup (B \times A)$ and $(A \times B) \cap (B \times A)$ [4M]
 (b) If $A = \{1, 2, 3, 4\}$ and $P = \{\{1, 2\}, \{3\}, \{4\}\}$ is a partition of A. Find the [5M]
 equivalence relation determined by P.
 (c) Let $A = (6, 12, 18, 24, 36, 72)$, $a \leq b$ if and only if a divides b. Draw Hasse [5M]
 diagram for it and prove that it is a lattice, but not a distributive lattice.

SECTION-III

- 5 (a) A group of 8 scientists is composed of 5-psychologists and 3-sociologists, [4M]
 In how many ways can a committee of 5 be formed that has 3-
 psychologists and 2-sociologists.
 (b) How many ways can we distribute 14 indistinguishable balls in [5M]
 4 numbered boxes so that each box is non empty
 (c) Define multinomial theorem. Find number of integers < 250 and divisible [5M]
 by 3 or 5 or 11

OR

- 6 (a) Find the number of arrangements of the letters of MISSISSIPPI [4M]
 (b) How many integral solutions are there of $x_1 + x_2 + x_3 + x_4 + x_5 = 30$ [5M]
 where for each i, $x_i \geq 1$

7 (c) Find the coefficient of x^3y^7 in $(2x-9y)^{10}$ [5M]

SECTION-IV

7 (a) Find the coefficient of X^{10} in $(X^3 + X^4 + \dots)^2$ [4M]

(b) Solve the following recurrence relation using characteristic roots [4M]
 $a_n + 6a_{n-1} + 8a_{n-2} = 0$ and $a_0 = 2, a_1 = -7$

(c) Solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$ with $a_0 = -3, a_1 = -10$ [6M]
 using generating functions

OR

8 (a) Solve the following recurrence relation using generating functions [6M]
 $a_n - 7a_{n-1} + 10a_{n-2} = 0, n \geq 2, a_0 = 10, a_1 = 41$

[8M]

SECTION-V

9 (a) Draw the graphs K_5, C_5, W_5 , and P_5 [4M]

(b) State and prove Grinberg theorem for a simple graph with n vertices. [5M]

(c) Draw binary search tree for the list : 2,1,5,6,8,9,7,3,4 [5M]

OR

10 (a) Explain Breadth First Search Algorithm with an example [6M]

(b) Find the chromatic number of the following i) C_n ii) K_n iii) $K_{m,n}$ [4M]

(c) State and prove Euler's formula for a plane connected graph [4M]

Code No: R18A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II B. Tech I Semester

Model Paper-2

Discrete Mathematics (CSE& IT)

Roll No										
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Time: 3 hours

Max. Marks: 70

Note:

Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

- 1) Show that $\sim p$ follows from the set of premises $(r \rightarrow \sim q), r \vee s, s \rightarrow \sim q, p \rightarrow q$ using indirect method of proof

OR

- 2). Obtain POS of the following formulas

(i) $(P \wedge Q \wedge R) \vee (\sim P \wedge R \wedge Q) \vee (\sim P \wedge \sim Q \wedge \sim R)$

(ii) $P \vee (\sim P \rightarrow (Q \vee (\sim Q \rightarrow R)))$

SECTION – II

3)

(ii) Abelian Group

Define the following terms (i) Group

(iii) Semi Group (iv) Sub Group

OR

- 4.) Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'.
(a) Odd integer (b) All positive integers

SECTION – III

- 5) a) Find the number of non negative integral solutions to $X_1 + X_2 + X_3 + X_4 + X_5 = 10$

b) Find the number of arrangements of letters "MISSISSIPPI".

OR

- 6). a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have books each and other 3 will have 5 books each.

b) Using multinomial theorem, expand $(2X - 3Y + 4Z)^3$

- 7). Solve the recurrence relation $a_n - 7a_{n-1} + 12a_{n-2} = 0$ for $n \geq 2$ where $a_0 = 1, a_1 = 2$

OR

- 8). Find the general expression for a solution to the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = n(n-1)$ for $n \geq 2$

- 9) Find the Chromatic number of the following graphs

(a) Complete Graph (K_3)

(b) Complete Bipartite Graph ($K_{2,3}$)

(c) Regular Graphs (K_3)

OR

10). Explain and illustrate BFS and DFS with examples?

Code No: R18A0506

R18

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester

Model Paper-3

Discrete Mathematics (CSE& IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: .

Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1) Using automatic theorem $(PVQ) \wedge (Q \rightarrow R) \wedge (P \rightarrow M) \Rightarrow (R \vee M)$ (14M)

OR

2). Show that the following implication without constructing truth table (14M)

(i) $(p \rightarrow q) \rightarrow q \Rightarrow (p \vee q)$

(ii) $p \rightarrow q \Rightarrow p \rightarrow p \wedge q$

SECTION – II

**3) Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'.
(a) Odd integer (b) All positive integers) (14M)**

OR

4). Draw the Hasse diagram for $X = \{2, 3, 6, 24, 36, 48\}$ and relation $\leq$ be such that $x \leq y$, if x divides y . (14M)

SECTION – III

5) What is the coefficient of x^3y^7 in (a) $(x+10)^{10}$ (b) $(2x-9y)^{10}$ (14M)

OR

6). a) Illustrate pigeon hole principle and its applications (7M)

b) a). How many ways can the letters of the word ALGORITHM be arranged in a row if A and L must remain together as a unit? (7M)

SECTION – IV

- 7).** Solve the recurrence relation using generating function $a_n - 6a_{n-1} = 0$ for $n \geq 1$ where $a_0 = 1$ **(14M)**

OR

- 8).** Solve the recurrence relation of Fibonacci series **(14)**

SECTION – V

- 9)(a)** Define Cycle? **(3M)**

- (b)** Apply DFS algorithm to form the spanning tree by taking own graph. **(11M)**

OR

- 10)** Explain the following **(14M)**

- (a) Isomorphism and sub graphs
- (b) Hamilton Paths
- (c) Planar Graph
- (d) Dual of a planar graph

Code No: R18A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester

Model Paper-4

Discrete Mathematics (CSE& IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: .

Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I1) Using automatic theorem $(P \vee Q) \wedge (Q \rightarrow R) \wedge (P \rightarrow M) \Rightarrow (R \vee M)$ (14M)**OR**

2). Show that the following implication without constructing truth table (14M)

(i) $(p \rightarrow q) \rightarrow q \Rightarrow (p \vee q)$

(ii) $p \rightarrow q \Rightarrow p \rightarrow p \wedge q$

SECTION – II3) Find all the properties that satisfies for the following algebraic systems under the binary operations 'X' and '+'.
(a) Odd integer (b) All positive integers (14M)**OR**4). Draw the Hasse diagram for $X = \{2, 3, 6, 24, 36, 48\}$ and relation $\leq$ be such that $x \leq y$, if x divides y. (14M)**SECTION – III**5) What is the coefficient of $x^3 y^7$ in (a) $(x+10)^{10}$ (b) $(2x-9y)^{10}$ (14M)**OR**

6). a) Illustrate pigeon hole principle and its applications (7M)

b) a). How many ways can the letters of the word ALGORITHM be arranged in a row if A and L must remain together as a unit? (7M)

SECTION – IV7). Solve the recurrence relation using generating function $a_n - 6a_{n-1} = 0$ for $n \geq 1$ where $a_0 = 1$ (14M)**OR**

8). Solve the recurrence relation of Fibonacci series (14M)

9). (a) Define Cycle?(**3M**)

(b) (**11M**) Apply DFS algorithm to form the spanning tree by taking own graph.

OR

10) Explain the following (**14M**)

- (a) Isomorphism and sub graphs
- (b) Hamilton Paths
- (c) Planar Graph
- (d) Dual of a planar graph

Code No: R18A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester

Model Paper-5

Discrete Mathematics (CSE& IT)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: .

Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1 a). Show that $\sim p$ follows from the set of premises $(r \rightarrow \sim q), r \vee s, s \rightarrow \sim q, p \rightarrow q$ using indirect method of proof (7M)

b). State and explain the rules that that can generate a well formed formula (7M)

(OR)

2 a). Define PDNF and find PDNF for $(\sim P \cdot R) \cdot (Q \cdot P)$. (7M)

b). Explain any five rules of inference with examples . (7M)

SECTION – II

3 a) Define a semi group and Monoid. Give an example of a Monoid which is not group. Justify your answer (7M)

b) Let $A = \{2, 4, 6, 8, 10, 12\}$, show that the relation 'divides' is a partial ordering on A and draw Hasse diagram (7M)

(OR)

4 a). Let $G = \{-1, 0, 1\}$, verify whether G forms a group under usual addition. (7M)

b). Define the following terms (i) Group (ii) Abelian Group (iii) Ring (7M)

SECTION – III

5 a). Use multinomial theorem to expand $(x_1 + x_2 + x_3 + x_4)^4$. (7M)

b). a) Find the number of non negative integral solutions to $x_1 + x_2 + x_3 + x_4 + x_5 = 10$. (7M)

(OR)

6 a). How many ways can the letters of the word MISSISSIPPI be arranged (7M)

b). a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each. (7M)

SECTION – IV

- 7 a). Solve the recurrence relation $a_n - 7a_{n-1} + 12a_{n-2} = 0$ for $n \geq 2$ where $a_0 = 1$, $a_1 = 2$. (7M)
b). Explain Fibonacci relation with suitable examples and also solve it. (7M)

(OR)

- 8 . Find the general expression for a solution to the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = n(n-1)$ for $n \geq 2$

SECTION – V

- 9 a). Write Kruskal's Algorithm and explain it with an example. (7M)
b). Prove that complete graph of 5 vertices is non planar. (7M)

(OR)

- 10).i) Find the Chromatic number of the following graphs (7M)

(a) Complete Graph (K_3)

(b) Complete Bipartite

Graph ($K_{2,3}$) (c) Regular

Graphs (K_3)

- ii) Explain DFS with examples?(7M)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech CSE - I Sem

(R18A0504) OPERATING SYSTEMS

QUESTION BANK

UNIT I

1. Explain different structures of operating system with a neat diagram
2. a. What are the services provided by operating systems?
b. What is system calls? Explain about the types of system calls
3. a. Write a note on virtual machine
b. Give the difference between processes and thread
4. Explain about various types of threads
5. Explain about the various process states with neat diagram

UNIT II

1. Following is the snapshot of a CPU

Process	CPU Burst	Arrival Time
P1	5	0
P2	6	1
P3	2	2
P4	8	3
P5	4	4

Draw the Gantt chart and calculate the turnaround time and waiting time of the jobs for FCFS (First Come First Served), SJF (Shortest Job First), SRTF (Shortest Remaining Time First) and RR (Round Robin with time quantum 3 ms) scheduling algorithms.

2. Compare long term, short term and medium term scheduler
3. Write a note on various types of queues in process scheduling
4. What is race condition? Explain about critical section problem with Peterson's solutions
5. Explain about the semaphore and the solutions provided for dining philosopher problem

UNIT III

1. Explain about Paging with a neat block diagram and give an example
2. a. Write a note on (i) Fixed & variable partitioning (ii) Internal & External fragmentation
b. Consider a swapping system in which memory consists of the following hole sizes in memory order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB, 9 KB, 12 KB, and 15 KB. Which hole is taken for successive segment requests of: (i) 12 KB (ii) 10 KB (iii) 9 KB for first fit, best fit, worst fit approaches?

- 3 . Consider the page reference string 1,3,4,0,5,3,2,1,0,4,5,2.How many page faults occur for the LRU and Optimal replacement algorithms with 4 frames each
4. Discuss about the virtual memory and demand paging concept with a neat diagram

UNIT-IV

1. a) Explain about the various file allocation methods
b) Write a note on free space management
2. Explain in detail about the various structure of directory
3. a) Describe about I/O devices with a neat diagram
b) Write a note on device controller
4. Explain in detail about Direct Memory Access
5. Write a note on goals of interrupt handler

UNIT-V

1. a) Describe how deadlock can be avoided using banker's algorithm
b) Explain Bankers algorithm and find that the given snapshot is a safe state or not?
5 Processes and 3 Resource A with 10, B with 5 and C with 7 instances

Available				Allocation				Max		
A	B	C		A	B	C		A	B	C
3	3	2	P ₀	0	1	0		7	5	3
			P ₁	2	0	0		3	2	2
			P ₂	3	0	2		9	0	2
			P ₃	2	1	1		2	2	2
			P ₄	0	0	2		4	3	3

2. a) Explain about Deadlock detection and recovery mechanism
b) Define deadlock. What are the necessary conditions of deadlock? Explain
3. Write a note on disk structure with a neat diagram
4. Write about Boot block and Bad block
5. Given the following track requests in the disk queue, compute for the Total Head Movement (THM) of the read/write head: 95, 180, 34, 119, 11, 123, 62, 64 Consider that the read/write head is positioned at location 50. Prior to this track location 199 was serviced. Show the total head movement for a 200 track disk (0-199) using FCFS, SRTF, SCAN, C-SCAN disk scheduling algorithms