MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024
DATA STRUCTURES AND ALGORITHMS
(CSE, CSE-DS, CSE-AIML, CSE-IOT, CSE-CS & IT)

[Time: 3 Hours]   **[Max. Marks: 60]**

PART – A

(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
           2. Answer **All Questions**. Each question carries 1Mark.

1	A	Write down the complexity of Linear and Binary Search?	1M	BTL2
	B	Define Data Structures?	1M	BTL1
	C	Evaluate the postfix expression 521*+	1M	BTL4
	D	Draw a Diagram for Double ended Queue?	1M	BTL1
	E	Write down the Application of Linked List.	1M	BTL2
	F	Differentiate a circular linked list from a normal Linked list?	1M	BTL3
	G	Discriminate between Binary Tree and Binary Search Tree.	1M	BTL2
	H	Why we need AVL Tree?	1M	BTL4
	I	Explain about DAG?	1M	BTL2
	J	Define Hashing?	1M	BTL1

PART – B

(5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
           2. Answer any 1 question from each Section.Each question carries 10 Marks.
           3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Write detail notes on time complexity and space complexity	5M	BTL3
2.B	Explain in detail about Asymptotic Notation	5M	BTL3

(OR)

3.	Write down C or Python code for implementing Linear Search and Binary Search Techniques	10M	BTL4

SECTION - II

4.A	Write an algorithm for insertion and deletion operation in Circular Queue	5M	BTL3
4.B	What is STACK? Write and explain algorithm for PUSH & POP	5M	BTL2

(OR)

5.A	Define Queue and explain its basic operations.	5M	BTL3
5.B	Evaluate the following postfix expression in tabular form showing stack after every step. 7 6 + 4 * 4 10 + - 5 +	5M	BTL5

SECTION - III

6.A	Write down C or python program for Singly Linked list	5M	BTL4
6.B	Differentiate between Singly Linked list and Circular Linked List	5M	BTL3

(OR)

7.	Write down all the operations involved in Doubly Linked List	10M	BTL3

SECTION – IV

8.A	What is Tree Traversal? What are different methods of tree traversal? Explain Any one with example	8M	BTL3
8.B	Differentiate B-Tree and B+ Tree	2M	BTL3

(OR)

9.	Construct AVL tree for the following data 21,26,30,9,4,14,28,18,15,10,2,3,7	10M	BTL5

SECTION – V

10.A	What is Hashing? Explain linear probing method with suitable example	5M	BTL4
10.B	Compare all Sorting Methods.	5M	BTL3

(OR)

11.	Define Sorting. Explain in detail about Quick Sort.	10M	BTL3

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER SUPPLY EXAMINATIONS, JAN/FEB-2024
DATA STRUCTURES AND ALGORITHMS
(CSE, CSE-DS, CSE-AIML, CSE-IOT, CSE-CS & IT)

[Time: 3 Hours]   **[Max. Marks: 70]**

PART – A

(5x2= 10M)

Note: 1. This Part consists of 8 QUESTIONS
2. Answer **ANY 5 Questions**. Each question carries 2Marks.

1	A	Write down the complexity of Linear and Binary Search?	2M	BTL2
	B	Define Data Structures?	2M	BTL1
	C	Evaluate the postfix expression 521*+	2M	BTL4
	D	Draw a Diagram for Double ended Queue?	2M	BTL1
	E	Write down the Application of Linked List.	2M	BTL2
	F	Differentiate a circular linked list from a normal Linked list?	2M	BTL3
	G	Discriminate between Binary Tree and Binary Search Tree.	2M	BTL2
	H	Why we need AVL Tree?	2M	BTL4

PART – B

(5 x 12= 50M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 12 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Write detail notes on time complexity and space complexity	6M	BTL3
2.B	Explain in detail about Asymptotic Notation	6M	BTL3

(OR)

3.	Write down C or Python code for implementing Linear Search and Binary Search Techniques	12M	BTL4

SECTION - II

4.A	Write an algorithm for insertion and deletion operation in Circular Queue	6M	BTL3
4.B	What is STACK? Write and explain algorithm for PUSH & POP	6M	BTL2

(OR)

5.A	Define Queue and explain its basic operations.	6M	BTL3

5.B	Evaluate the following postfix expression in tabular form showing stack after every step. 7 6 + 4 * 4 10 + - 5 +	6M	BTL5

SECTION - III

6.A	Write down C or python program for Singly Linked list	6M	BTL4
6.B	Differentiate between Singly Linked list and Circular Linked List	6M	BTL3

(OR)

7.	Write down all the operations involved in Doubly Linked List	12M	BTL3

SECTION – IV

8.A	What is Tree Traversal? What are different methods of tree traversal? Explain Any one with example	8M	BTL3
8.B	Differentiate B-Tree and B+ Tree	4M	BTL3

(OR)

9.	Construct AVL tree for the following data 21,26,30,9,4,14,28,18,15,10,2,3,7	12M	BTL5

SECTION – V

10.A	What is Hashing? Explain linear probing method with suitable example	6M	BTL4
10.B	Compare all Sorting Methods.	6M	BTL3

(OR)

11.	Define Sorting. Explain in detail about Quick Sort.	12M	BTL3

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024
DISCRETE MATHEMATICS
(CSE, CSE-DS, CSE-AIML, CSE-IOT, CSE-CS & IT)

[Time: 3 Hours]   **[Max. Marks: 60]**

PART – A

(10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark.

1	A	Provide examples of well-formed formulas (WFFs) and identify any that are not.	1 M	BTL 3
	B	Define the implication and biconditional connectives. Give Example.	1 M	BTL 2
	C	Define finite and infinite sets. Give Examples.	1 M	BTL 2
	D	Distinguish between reflexive, symmetric, and transitive relations.	1 M	BTL 4
	E	Differentiate between a semi-group, a monoid, and a group. Provide examples.	1 M	BTL 3
	F	Define the terms conjunction, disjunction, and complement in Boolean algebra with examples.	1 M	BTL 2
	G	Calculate the number of ways to arrange the letters of the word "MATH."	1 M	BTL 4
	H	Give a real-life example where the Pigeonhole Principle is applicable.	1 M	BTL 2
	I	Define walk, path.	1 M	BTL 1
	J	Define articulation point with an example..	1 M	BTL 1

PART – B

(5 x 10 = 50M)

Note: 1. ThisPart consists of 10 QUESTIONS
2. Answer any 1 question from each Section.Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION – I

2.A	Investigate De Morgan's Laws in propositional logic and provide proofs for both ¬(p ∧ q) ≡ ¬p ∨ ¬q and ¬(p ∨ q) ≡ ¬p ∧ ¬q.	5 M	BTL 4
2.B	Determine the negation of the statement "For every integer n, if n is even, then 2n is even."	5 M	BTL 5

(OR)

3.A	Prove that p ∨¬p is always true, regardless of the truth value of p. Use a proof by contraposition to show that if p → q, then ¬q → ¬p	5 M	BTL 4
3.B	Discuss the applications of CNF in logical expressions. Convert the proposition (p ∨¬q) ∧ (r → s) into Conjunctive Normal Form (CNF).	5 M	BTL 5

SECTION - II

4.A	Define the concept of a set and discuss the fundamental operations on sets, including union, intersection, and complement. Provide illustrative examples to explain each operation.	5 M	BTL 4
4.B	Explain the concept of a recursive definition and its role in defining sequences. Define a sequence $\{a_n\}$ recursively as follows $a_1 = 2$ and $a_{n+1} = 2a_n - 1$ for Calculate the first five terms of the sequence and express the general term a_n in terms of n.	5 M	BTL 5

(OR)

5.A	Define a function and discuss the concepts of domain, codomain, and range. Given the sets A = {1,2,3} and B = {a, b, c} define two functions f: A→B and g: B→A. Provide the mappings for both functions and determine g ∘ f and f ∘ g	5 M	BTL 4
5.B	Define the Well-Ordering Principle and discuss its significance in proving mathematical statements. Provide an example to demonstrate the application of the Well-Ordering Principle in a proof.	5 M	BTL 5

SECTION - III

6.A	Define normal subgroups in the context of group theory. Prove the criterion for normality and provide examples of groups with normal and non-normal subgroups.	5 M	BTL 4
6.B	Define a Boolean ring and distinguish it from a general ring. Prove that the complement operation in a Boolean algebra satisfies the idempotent law:	5 M	BTL 5

(OR)

7.A	Define cyclic groups and discuss the properties of cyclic groups. Provide examples of finite and infinite cyclic groups and prove that every subgroup a cyclic group is also cyclic.	5 M	BTL 4
7.B	Discuss the representation of Boolean functions using truth tables and algebraic expressions. Consider a Boolean function $f(x, y, z) = x^- \cdot y + x$ $y^- \cdot z^-$ Apply the principles of duality to derive an equivalent expression for the complement of f	5 M	BTL 5

SECTION – IV

8.A	Define the Inclusion-Exclusion Principle in combinatorics. Explain its significance in solving problems involving overlapping sets. Apply the Inclusion-Exclusion Principle to find the number of integers from to 100 that are divisible by either 2, 3, or 5. Provide a step-by-step solution.	6 M	BTL 4
8.B	A box contains 5 red balls, 3 blue balls, and 2 green balls. In how many ways can a person select 4 balls from the box? Consider all possibilities.	4 M	BTL 5

(OR)

9.A	State the Pigeonhole Principle and discuss its applications in combinatorics. In a group of 21 students, each of whom is assigned a unique integer from 1 to 20, prove that there are at least two students with consecutive integers.	6 M	BTL 4
9.B	Calculate the number of distinct arrangements of the word "COMBINATORICS" considering all the letters.	4 M	BTL 5

SECTION – V

10.A	Define graph coloring and explain the concept of chromatic numbers. Prove that every planar graph is 6-colorable.	5 M	BTL 4
10.B	Explain the concept of shortest paths in a graph and discuss Dijkstra's algorithm for finding the shortest path.	5 M	BTL 5

(OR)

11.A	Define Eulerian walks and Hamiltonian cycles in a graph. Discuss the conditions under which a graph can have an Eulerian walk or Hamiltonian cycle.	5 M	BTL 4
11.B	Define weighted trees and discuss their application in representing prefix codes. Provide an example.	5 M	BTL 5

---***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER SUPPLY EXAMINATIONS, JAN/FEB-2024
DISCRETE MATHEMATICS
(CSE, CSE-DS, CSE-AIML, CSE-IOT, CSE-CS & IT)

[Time: 3 Hours]   [Max. Marks: 70]

PART – A

(5x 2 = 10M)

Note: 1. This Part consists of 8 QUESTIONS
        2. Answer **ANY 5 Questions**. Each question carries 2 Marks.

1	A	Provide examples of well-formed formulas (WFFs) and identify any that are not.	2 M	BTL 3
	B	Define the implication and biconditional connectives. Give Example.	2 M	BTL 2
	C	Define finite and infinite sets. Give Examples.	2 M	BTL 2
	D	Distinguish between reflexive, symmetric, and transitive relations.	2 M	BTL 4
	E	Differentiate between a semi-group, a monoid, and a group. Provide examples.	2 M	BTL 3
	F	Define the terms conjunction, disjunction, and complement in Boolean algebra with examples.	2 M	BTL 2
	G	Calculate the number of ways to arrange the letters of the word "MATH."	2 M	BTL 4
	H	Give a real-life example where the Pigeonhole Principle is applicable.	2 M	BTL 2

PART – B

(5 x 12 = 60M)

Note: 1. This Part consists of 10 QUESTIONS
       2. Answer any 1 question from each Section. Each question carries 12 Marks.
       3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION – I

2.A	Investigate De Morgan's Laws in propositional logic and provide proofs for both $\neg(p \wedge q) \equiv \neg p \vee \neg q$ and $\neg(p \vee q) \equiv \neg p \wedge \neg q$.	6 M	BTL 4
2.B	Determine the negation of the statement "For every integer n, if n is even, then 2n is even."	6M	BTL 5

(OR)

3.A	Prove that $p \vee \neg p$ is always true, regardless of the truth value of p. Use a proof by contraposition to show that if $p \rightarrow q$, then $\neg q \rightarrow \neg p$	6M	BTL 4
3.B	Discuss the applications of CNF in logical expressions. Convert the proposition $(p \vee \neg q) \wedge (r \rightarrow s)$ into Conjunctive Normal Form (CNF).	6 M	BTL 5

SECTION - II

4.A	Define the concept of a set and discuss the fundamental operations on sets, including union, intersection, and complement. Provide illustrative examples to explain each operation.	6 M	BTL 4
4.B	Explain the concept of a recursive definition and its role in defining sequences. Define a sequence $\{a_n\}$ recursively as follows $a_1 = 2$ and $a_{n+1} = 2a_n - 1$ for Calculate the first five terms of the sequence and express the general term a_n in terms of n.	6 M	BTL 5

(OR)

5.A	Define a function and discuss the concepts of domain, codomain, and range. Given the sets A = {1,2,3} and B = {a, b, c} define two functions f: A→B and g: B→A. Provide the mappings for both functions and determine g ∘ f and f ∘ g	6 M	BTL 4
5.B	Define the Well-Ordering Principle and discuss its significance in proving mathematical statements. Provide an example to demonstrate the application of the Well-Ordering Principle in a proof.	6 M	BTL 5

SECTION - III

6.A	Define normal subgroups in the context of group theory. Prove the criterion for normality and provide examples of groups with normal and non-normal subgroups.	6 M	BTL 4
6.B	Define a Boolean ring and distinguish it from a general ring. Prove that the complement operation in a Boolean algebra satisfies the idempotent law:	6 M	BTL 5

(OR)

7.A	Define cyclic groups and discuss the properties of cyclic groups. Provide examples of finite and infinite cyclic groups and prove that every subgroup a cyclic group is also cyclic.	6 M	BTL 4
7.B	Discuss the representation of Boolean functions using truth tables and algebraic expressions. Consider a Boolean function $f(x, y, z) = x^- \cdot y + x$ $y^- \cdot z^-$ Apply the principles of duality to derive an equivalent expression for the complement of f	6 M	BTL 5

SECTION – IV

8.A	Define the Inclusion-Exclusion Principle in combinatorics. Explain its significance in solving problems involving overlapping sets. Apply the Inclusion-Exclusion Principle to find the number of integers from 1 to 100 that are divisible by either 2, 3, or 5. Provide a step-by-step solution.	8 M	BTL 4
8.B	A box contains 5 red balls, 3 blue balls, and 2 green balls. In how many ways can a person select 4 balls from the box? Consider all possibilities.	4 M	BTL 5

(OR)

9.A	State the Pigeonhole Principle and discuss its applications in combinatorics. In a group of 21 students, each of whom is assigned a unique integer from 1 to 20, prove that there are at least two students with consecutive integers.	8 M	BTL 4
9.B	Calculate the number of distinct arrangements of the word "COMBINATORICS" considering all the letters.	4 M	BTL 5

SECTION – V

10.A	Define graph coloring and explain the concept of chromatic numbers. Prove that every planar graph is 6-colorable.	6 M	BTL 4
10.B	Explain the concept of shortest paths in a graph and discuss Dijkstra's algorithm for finding the shortest path.	6 M	BTL 5

(OR)

11.A	Define Eulerian walks and Hamiltonian cycles in a graph. Discuss the conditions under which a graph can have an Eulerian walk or Hamiltonian cycle.	6 M	BTL 4
11.B	Define weighted trees and discuss their application in representing prefix codes. Provide an example.	6 M	BTL 5

---***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(CSE, CSE-CS, IT)

[Time: 3 Hours]　　　　　　　　　　　　　　　　　　　[Max. Marks: 60]
PART – A　　　　　　　　　　　　　**(10 x 1 = 10M)**

Note:　1. This Part consists of 10 QUESTIONS
　　　　　2. Answer All questions. Each question carries 1 Mark.

1	A	Concept of Demand	1M	BTL1
	B	Price Elasticity of Demand	1M	BTL1
	C	Break-Even Point	1M	BTL1
	D	Trade Mark	1M	BTL1
	E	Joint Stock Company	1M	BTL2
	F	Sleeping Partner	1M	BTL1
	G	ARR	1M	BTL1
	H	Fixed Capital	1M	BTL1
	I	Trial Balance	1M	BTL1
	J	Journal	1M	BTL2

PART – B　　　　　　　　　　　**(5 x 10 = 60M)**

Note:　1. This Part consists of 10 QUESTIONS
　　　　　2. Answer any 1 question from each Section. Each question carries 10Marks.
　　　　　3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Define 'Managerial Economics'. Discuss its Nature and Scope.	5M	BTL2
2.B	Define 'Demand'. What are the determinants of Demand?	5M	BTL2

(OR)

3.A	What are the methods available for Demand Forecasting?	5M	BTL2
3.B	Briefly explain about different types of Elasticity of Demand.	5M	BTL1

SECTION - II

4.A	Discuss about Laws of Returns to Scale with some examples.	5M	BTL2
4.B	Define 'Cost'. Give a classification of Costs.	5M	BTL1

(OR)

5.A	What are the objectives of Break-Even Analysis?	5M	BTL2
5.B	ABC Company manufactures and sells three products: Product A,B and C. The following data have been provided by the company.	5M	BTL4

	A	B	C
Selling Price	Rs. 100	120	50
Variable per unit	Rs. 60	90	40
Contribution margin per unit	Rs. 40	30	10
Contribution margin ratio	40%	25%	20%

The company sells 5 units of C for every unit of A and 2 units of B for every unit of A. Hence the sales mix is 1 : 2 : 5. The company incurred in Rs. 1,20,000 total fixed costs. Calculate Multiproduct breakeven point in units.

SECTION - III

6.A	Outline the various features of Perfect Competition.	5M	BTL3
6.B	What are the different objectives of Pricing?	5M	BTL2

(OR)

7.A	Describe the advantages and disadvantages of Sole Proprietorship.	5M	BTL2
7.B	What are the different forms of Business Organization?	5M	BTL2

SECTION – IV

8.A	How do you estimate the Working Capital requirements of a Large Scale Organization? Explain.	5M	BTL3
8.B	What are the various sources of Raising Capital?	5M	BTL1

(OR)

9.A	Examine the advantages and drawbacks of NPV.		5M	BTL2
9.B	A firm what cost of capital is 10% is considering two mutually exclusive projects X and Y. The details are as follows :		5M	BTL3

	Year	Profit of X (Rs.)	Profit of Y (Rs.)
Cost	0	70,000	70,000
Cash Inflows	1	10,000	50,000
	2	20,000	40,000
	3	30,000	20,000
	4	45,000	10,000
	5	60,000	10,000

State which project is to be accepted according to NPV Method?

SECTION – V

10.A	What are the advantages of Double Entry System?	5M	BTL2
10.B	Define 'Accounting'. What are the concepts of Accounting?	5M	BTL2

(OR)

11.A	What are the objectives of Financial Statement Analysis?	5M	BTL2
11.B	The following trial balance have been taken out from the books of ABC as on 31st December, 2017. Prepare the trading and profit and loss account for the year ended 31-12-2017 and a balance sheet as on that date :	5M	BTL4

Particulars	Dr.(Rs.)	Cr. (Rs.)
Plant and Machinery	2,00000	
Opening Stock	62,000	
Purchases	1,60,000	
Building	1,80,000	
Carriage Inward	3,400	
Carriage Outward	5,000	
Wages	32,000	
Sundry Debtors	1,00,000	
Salaries	24,000	
Furniture	36,000	
Trade Expenses	12,000	
Discount on Sales	1,900	
Advertisement	5,000	

Bad Debts	1,800	
Drawings	10,000	
Bills Receivables	50,000	
Insurance	4,400	
Bank Balances	20,000	
Sales		5,80,000
Interest Received		4,000
Sundry Creditors		50,000
Bank Loan		1,00,000
Discount on Purchases		2,000
Capital		1,71,500
Total Account Balance	9,07,500	9,07,500

Closing Stock is Valued at Rs. 90,000

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JAN/FEB-2024
OPERATING SYSTEMS
(CSE, IT)

[Time: 3 Hours]   **[Max. Marks: 60]**

PART – A   (10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
           2. Answer **All Questions**. Each question carries 1Mark.

1	A	List the objectives of an operating system.	1M	BTL1
	B	What are the advantages and disadvantages of using layered approach?	1M	BTL2
	C	What do you mean by PCB?	1M	BTL2
	D	Compare and contrast thread and process.	1M	BTL4
	E	Explain the usage and implementation of semaphores.	1M	BTL2
	F	Define deadlock.	1M	BTL1
	G	What is paging and swapping?	1M	BTL1
	H	What is page fault and how it is handled?	1M	BTL3
	I	Write about free – space management.	1M	BTL2
	J	What are the various kinds of performance overhead associated with servicing an interrupt?	1M	BTL2

PART – B   (5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
           2. Answer any 1 question from each Section. Each question carries 10 Marks.
           3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Discuss the services provided by the operating system for efficient system operation.	5M	BTL2
2.B	With a neat diagram, explain the layered structure of UNIX operating system.	5M	BTL2

(OR)

3.A	Write about the taxonomy of operating systems.	5M	BTL2
3.B	What is meant by system call? Discuss about types of system calls.	5M	BTL2

SECTION - II

4.A	Distinguish between
	  i) Process and Program
	  ii) Multiprogramming and multiprocessing
	  iii) Job scheduling and CPU scheduling
		5M	BTL4

4.B	Explain briefly about various multi-threading models with a neat diagram.	5M	BTL2

(OR)

5.A	Consider the following processes, with the CPU burst time given in milliseconds:	5M	BTL3

Process	Burst Time	Priority
P1	10	3
P2	1	1

	P3	2	3	
	P4	1	4	
	P5	5	2	

Processes are arrived in P1, P2, P3, P4, P5 order at time 0.

   i) Draw Gantt charts to show execution using FCFS, SJF, nonpreemptive priority and Round Robin (Quantum = 1) scheduling.

   ii) Also calculate waiting time and turnaround time for each scheduling algorithm.

5.B	Discuss the issues in multiprocessor and real-time scheduling	5M	BTL2

SECTION - III

6.A	What is a critical section? Give examples. What are the minimum requirements that should be satisfied by a solution to critical section problem? Discuss briefly.	5M	BTL3
6.B	What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.	5M	BTL3

(OR)

7.A	What is readers – writers problem? How it can be considered as synchronization problem? Explain its solution with semaphore.	5M	BTL3
7.B	What is a Safe state and what is its use in deadlock avoidance? Explain with suitable example.	5M	BTL2

SECTION – IV

8.A	Explain the difference between External fragmentation and Internal fragmentation. How to solve the fragmentation problem using paging?	5M	BTL4
8.B	Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Find out the number of page faults if there are 4 page frames, using the following page replacement algorithm **i)** LRU ii) FIFO iii) Optimal	5M	BTL3

(OR)

9.A	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	5M	BTL2
9.B	What is demand paging? Why it is called as lazy swappers? Explain in detail.	5M	BTL2

SECTION – V

10.A	Suppose that the head of moving head disk with 200 tracks numbered 0 to 199 is currently serving the request at track 143 and has just finished a request at track 125. If the queue request is kept in FIFO order is: 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following disk scheduling algorithms? **i)** FCFS ii)SSTF	5M	BTL3
10.B	Discuss in detail about different file access methods.	5M	BTL2

(OR)

11.A	What are the advantages and disadvantages of supporting memory mapped I/O to device control registers? Explain.	5M	BTL2
11.B	Explain different allocation methods for allocating disk space in detail.	5M	BTL2

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER SUPPLY EXAMINATIONS, JAN/FEB-2024
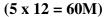### OPERATING SYSTEMS
(CSE, IT)

[Time: 3 Hours] [Max. Marks: 70]

PART – A (5x 2 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer **ANY 5 Questions**. Each question carries 2Marks.

1	A	List the objectives of an operating system.	2M	BTL1
	B	What are the advantages and disadvantages of using layered approach?	2M	BTL2
	C	What do you mean by PCB?	2M	BTL2
	D	Compare and contrast thread and process.	2M	BTL4
	E	What are the various kinds of performance overhead associated with servicing an interrupt?.	2M	BTL2
	F	Define deadlock.	2M	BTL1
	G	What is paging and swapping?	2M	BTL1
	H	What is page fault and how it is handled?	2M	BTL3

PART – B (5 x 12 = 60M)

Note: 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 12 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Discuss the services provided by the operating system for efficient system operation.	6M	BTL2
2.B	With a neat diagram, explain the layered structure of UNIX operating system.	6M	BTL2

(OR)

3.A	Write about the taxonomy of operating systems.	6M	BTL2
3.B	What is meant by system call? Discuss about types of system calls.	6M	BTL2

SECTION - II

4.A	Distinguish between **i)** Process and Program **ii)** Multiprogramming and multiprocessing **iii)** Job scheduling and CPU scheduling	6M	BTL4
4.B	Explain briefly about various multi-threading models with a neat diagram.	6M	BTL2

(OR)

5.A	Consider the following processes, with the CPU burst time given in milliseconds:	6M	BTL3

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4

	P5	5	2		

Processes are arrived in P1, P2, P3, P4, P5 order at time 0.
  i) Draw Gantt charts to show execution using FCFS, SJF, nonpreemptive priority and Round Robin (Quantum = 1) scheduling.
  ii) Also calculate waiting time and turnaround time for each scheduling algorithm.

5.B	Discuss the issues in multiprocessor and real-time scheduling	6M	BTL2

SECTION - III

6.A	What is a critical section? Give examples. What are the minimum requirements that should be satisfied by a solution to critical section problem? Discuss briefly.	6M	BTL3
6.B	What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.	6M	BTL3

(OR)

7.A	What is readers – writers problem? How it can be considered as synchronization problem? Explain its solution with semaphore.	6M	BTL3
7.B	What is a Safe state and what is its use in deadlock avoidance? Explain with suitable example.	6M	BTL2

SECTION – IV

8.A	Explain the difference between External fragmentation and Internal fragmentation. How to solve the fragmentation problem using paging?	6M	BTL4
8.B	Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Find out the number of page faults if there are 4 page frames, using the following page replacement algorithm **i)** LRU ii) FIFO iii) Optimal	6M	BTL3

(OR)

9.A	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	6M	BTL2
9.B	What is demand paging? Why it is called as lazy swappers? Explain in detail.	6M	BTL2

SECTION – V

10.A	Suppose that the head of moving head disk with 200 tracks numbered 0 to 199 is currently serving the request at track 143 and has just finished a request at track 125. If the queue request is kept in FIFO order is: 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following disk scheduling algorithms? **i)** FCFS ii)SSTF	6M	BTL3
10.B	Discuss in detail about different file access methods.	6M	BTL2

(OR)

11.A	What are the advantages and disadvantages of supporting memory mapped I/O to device control registers? Explain.	6M	BTL2
11.B	Explain different allocation methods for allocating disk space in detail.	6M	BTL2

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024
PROBABILITY AND STATISTICS
(COMMON TO CSE, CSE-CS, IT)

[Time: 3 Hours]   **[Max. Marks: 60]**

PART – A   (10x 1 = 10M)

Note: 1. This Part consists of 10 QUESTIONS
        2. Answer **All Questions**. Each question carries 1Mark.

1	A	When is a set of events said to be exhaustive?	1M	BTL-1
	B	What is a conditional probability?	1M	BTL-1
	C	Why is normal distribution highly used in statistical theory of Communications?	1M	BTL-1
	D	Define standard normal random variable.	1M	BTL-1
	E	What is purposive sampling? Give an example.	1M	BTL-1
	F	Define standard error.	1M	BTL-1
	G	Define critical region.	1M	BTL-1
	H	Explain type-I and type-II errors in testing of hypothesis.	1M	BTL-5
	I	Discuss degrees of freedom with respect to Chi-square test for good ness of fit.	1M	BTL-6
	J	How is contingency table (r x c table) useful in Chi-square test for independence of attributes?	1M	BTL-1

PART – B   (5 x 10 = 50M)

Note: 1. This Part consists of 10 QUESTIONS
        2. Answer any 1 question from each Section. Each question carries 10 Marks.
        3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Six dice are thrown 729 times. How many times do you expect at least three dice to show a five or six?	5M	BTL3
2.B	A bag contains 5 balls and it is known how many of them are white. Two balls are drawn at random from the bag and they are noted to be white. What is the chance that all the balls in the bag are white?	5M	BTL1

(OR)

3.A	A random variable X has the following probability distribution Find (i) the value of 'k' (ii) $P(1.5 < X < 4.5)$	5M	BTL1

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

3.B	Explain the mean and variance of the Binomial distribution	5M	BTL5

SECTION - II

4.A	A Continuous random variable X has a probability density function $f(x) = 3x^2$, $0\leq x\leq1$. Find 'a' and 'b' such that (i) $P(X \leq a) = P(X > a)$; and (ii) $P(X > b) = 0.05$.	5M	BTL1
4.B	Explain the main features of normal probability distribution? Can a normal probability distribution be fully determined if we know its mean and standard deviation.	5M	BTL5

(OR)

5.A	Explain the method of least squares.	5M	BTL5
5.B	Develop (Fit) a straight line to the following data	5M	BTL3

X	1	2	3	4	6	8
Y	2.4	3	3.6	4	5	6

SECTION - III

6.A	A random sample is taken from N (30, 12). How large a sample should be taken if the sample mean is to lie between 25 and 35 with probability 0.95.	5M	BTL1
6.B	Let S = {1, 5, 6, 8}. Find the probability distribution of the sample mean For random samples of size 2 drawn without replacement.	5M	BTL1

(OR)

7.A	What are parameters and statistic? Write the formulae for calculating the variance of sampling distribution Of means for the sampling cases of (i) with replacement (ii) without replacement.	5M	BTL1
7.B	Discuss about sampling distribution?	5M	BTL6

SECTION – IV

8.A	A bag contains defective article, the exact number of which is not known. A sample of 100 from the bag gives 10 defective articles. Find the limits for the proportion of defective articles in the bag.	5M	BTL1
8.B	Discuss:-Null Hypothesis, Type-I error and Type-II error.	5M	BTL6

(OR)

9.A	Interpret the working procedure for testing of hypothesis.	5M	BTL5
9.B	According to the norms established for a mechanical aptitude test, persons who are 18 years old have an average height of 73.2 with a standard deviation of 8.6. If 45 randomly selected persons of that age averaged 76.7.Test the null hypothesis m = 73.2 against the alternative hypothesis m > 73.2, at the 0.01 level of significance.	5M	BTL6

SECTION – V

10.A	List the assumptions of t-test and F-test.	5M	BTL4
10.B	Test runs with 6 models of an experimental engine that they operated for 24, 28, 21, 23, 32, and 22 minutes with a gallon of a certain kind of fuel. If the probability of a type-1 error is to be at most 0.01. Interpret, is this evidence against a hypothesis that on the average this kind of engine will operate for at least 29 minutes per gallon with this kind of fuel? Assume normality.	5M	BTL5

(OR)

11.A	A sample of 6 persons in an office showed an average of 10, 12, 8, 9, 16 and 5 days of taking non-vegetarian food in a month. Estimate the average level of taking non-vegetarian food in a month in the whole office at 90% level of confidence.	5M	BTL5
11.B	Find the 99% confidence interval for the mean of the samples 15, 15, 16.4, 17.2, 16.8 and 18.4.	5M	BTL1

----***----

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution – UGC, Govt. of India)
(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)
Accredited by NBA & NAAC – 'A' Grade
NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH II YEAR I SEMESTER SUPPLY EXAMINATIONS, JANUARY-2024
PROBABILITY AND STATISTICS
(COMMON TO CSE, CSE-CS, IT)

[Time: 3 Hours]   [Max. Marks: 70]

PART – A   **(5x 2= 10M)**

Note: 1. This Part consists of 8 QUESTIONS
            2. Answer **ANY 5 Questions**. Each question carries 21Mark.

1	A	When is a set of events said to be exhaustive?	2M	BTL-1
	B	What is a conditional probability?	2M	BTL-1
	C	Why is normal distribution highly used in statistical theory of Communications?	2M	BTL-1
	D	Define standard normal random variable.	2M	BTL-1
	E	What is purposive sampling? Give an example.	2M	BTL-1
	F	Define standard error.	2M	BTL-1
	G	Define critical region.	2M	BTL-1
	H	Explain type-I and type-II errors in testing of hypothesis.	2M	BTL-5

PART – B   **(5 x 12 = 60M)**

Note: 1. This Part consists of 10 QUESTIONS
            2. Answer any 1 question from each Section. Each question carries 12 Marks.
            3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Six dice are thrown 729 times. How many times do you expect at least three dice to show a five or six?	6M	BTL3
2.B	A bag contains 5 balls and it is known how many of them are white. Two balls are drawn at random from the bag and they are noted to be white. What is the chance that all the balls in the bag are white?	6M	BTL1

(OR)

3.A	A random variable X has the following probability distribution Find (i) the value of 'k' (ii) $P(1.5 < X < 4.5)$	6M	BTL1

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

3.B	Explain the mean and variance of the Binomial distribution	6M	BTL5

SECTION - II

4.A	A Continuous random variable X has a probability density function $f(x) = 3x^2$, $0 \le x \le 1$. Find 'a' and 'b' such that (i) $P(X \le a) = P(X > a)$; and (ii) $P(X > b) = 0.05$.	6M	BTL1
4.B	Explain the main features of normal probability distribution? Can a normal probability distribution be fully determined if we know its mean and standard deviation.	6M	BTL5

(OR)

5.A	Explain the method of least squares.	6M	BTL5
5.B	Develop (Fit) a straight line to the following data	6M	BTL3

X	1	2	3	4	6	8

| Y | 2.4 | 3 | 3.6 | 4 | 5 | 6 | | |

SECTION - III

6.A	A random sample is taken from N (30, 12). How large a sample should be taken if the sample mean is to lie between 25 and 35 with probability 0.95.	6M	BTL1
6.B	Let S = {1, 5, 6, 8}. Find the probability distribution of the sample mean For random samples of size 2 drawn without replacement.	6M	BTL1

(OR)

7.A	What are parameters and statistic? Write the formulae for calculating the variance of sampling distribution Of means for the sampling cases of (i) with replacement (ii) without replacement.	6M	BTL1
7.B	Discuss about sampling distribution?	6M	BTL6

SECTION – IV

8.A	A bag contains defective article, the exact number of which is not known. A sample of 100 from the bag gives 10 defective articles. Find the limits For the proportion of defective articles in the bag.	6M	BTL1
8.B	Discuss:-Null Hypothesis, Type-I error and Type-II error.	6M	BTL6

(OR)

9.A	Interpret the working procedure for testing of hypothesis.	6M	BTL5
9.B	According to the norms established for a mechanical aptitude test, persons who are 18 years old have an average height of 73.2 with a standard deviation of 8.6. If 45 randomly selected persons of that age averaged 76.7.Test the null hypothesis m = 73.2 against the alternative hypothesis m > 73.2, at the 0.01 level of significance.	6M	BTL6

SECTION – V

10.A	List the assumptions of t-test and F-test.	6M	BTL4
10.B	Test runs with 6 models of an experimental engine that they operated for 24, 28, 21, 23, 32, and 22 minutes with a gallon of a certain kind of fuel. If the probability of a type-1 error is to be at most 0.01. Interpret, is this evidence against a hypothesis that on the average this kind of engine will operate for at least 29 minutes per gallon with this kind of fuel? Assume normality.	6M	BTL5

(OR)

11.A	A sample of 6 persons in an office showed an average of 10, 12, 8, 9, 16 and 5 days of taking non-vegetarian food in a month. Estimate the average level of taking non-vegetarian food in a month in the whole office at 90% level of confidence.	6M	BTL5
11.B	Find the 99% confidence interval for the mean of the samples 15, 15, 16.4, 17.2, 16.8 and 18.4.	6M	BTL1

----***----