R20

Code No: R20A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024

Operating Systems

(CSE, IT & CSE-AIML)

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 List four services provided by an operating system, and explain how each of these creates convenience for users. In which cases would it be impossible for user-level programs to provide these services? Explain your answer. **[10M]**

B With suitable example describe the following commands of UNIX: **[4M]**
i. ls ii. mv iii. cat iv. cp

OR

2 A Compare and contrast Multiprogramming, Multitasking and Multiprocessing. **[10M]**

B Briefly discuss the view of an OS as a Resource Manager. **[4M]**

SECTION-II

3 A Demonstrate and Compare various Multi-Threaded Models with neat diagram. **[4M]**

B Consider the following set of processes, with the arrival times and the length of the CPU-burst times given in milliseconds. **[10M]**

Process	Arrival Time	Burst Time
P1	0	7
P2	2	4
P3	4	1
P4	5	4

Calculate the average waiting time and average turnaround time using SJF scheduling algorithms.

OR

4 A What is a shell? Explain types of shells. **[7M]**

B Discuss scheduling criteria suggested for comparing CPU scheduling algorithms. **[7M]**

SECTION-III

5 A Explain the various strategies for dealing with the deadlocks prevention. **[7M]**

B What is semaphore? Write the algorithm for readers-writers problem with semaphore. **[7M]**

OR

6 A Considering a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following. snapshot of the system has been taken: **[10M]**

Processes	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer following questions using Bankers algorithm:

i. Is the system in a safe state

ii. Can request for (0, 2, 0) by P0 be granted immediately? Give reason

B What are the necessary conditions to occur deadlock. **[4M]**

SECTION-IV

7 A Explain the following IPC models used by operating systems. **[7M]**

i. Pipes ii. Shared Memory Model

B Explain about **[7M]**

i. First fit

ii. Best fit

iii. Worst fit

Which algorithm makes the most efficient use of the memory?

OR

8 A A small computer has 4 page frames. A process makes the following list of page references: **[10M]**

1, 2, 3, 4, 0, 3, 2, 1, 5, 2, 3, 1, 2, 5, 0

How many page faults occur, using LRU and Optimal page replacement algorithms?

B Describe the following system calls with prototypes: **[4M]**

i. msgget() ii. semop() iii. shmat()

SECTION-V

9 A Discuss various file allocation methods in detail. **[4M]**

B Discuss SSTF disk scheduling algorithm for the following sequence if the head is at 64 and moving to higher 78, 16, 24, 41, 80, 91, 72, 30 if disk contains 100 tracks. **[10M]**

OR

10 A Explain e various directory structures supported by operating systems. **[4M]**

B Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 50, The queue of pending requests, in FIFO order, is 95, 180, 34, 119, 11, 123, 62, 64 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms: **[10M]**

i. FCFS ii. SCAN

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024

Design and Analysis of Algorithms

(CSE, IT, CSE-AI&ML, B.Tech-AIDS & B.Tech-AIML)

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

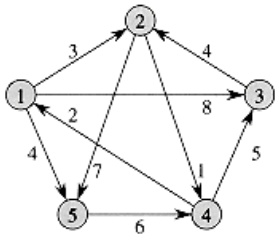
1	***A***	Explain Pseudo code conventions for designing an algorithm with help of example.	**[7M]**
	B	Discuss about binary search with an algorithm	**[7M]**
		OR	
2	***A***	Describe about merge sort with an example.	**[7M]**
	B	How quickly can you multiply a $kn \times n$ matrix by an $n \times kn$ matrix, using Strassen's multiplication algorithm.	**[7M]**

SECTION-II

3	***A***	Suppose we start with n sets, each containing a distinct element. Show that at most $n - 1$ unions can be performed before the number of sets becomes1.	**[7M]**
	B	For the following expression obtain an expression tree. Label the nodes with their MR value and obtain the optimal code generated by CODE2 for the two cases N = 1 and N = 2. Assume that no operator is either commutative or associative. a * b* c/(e - f + g*(h - k)*(l + m)).	**[7M]**
		OR	
4	***A***	Solve job sequence problem for given n=7, (p1, p2, p3, p4, p5, p6, p7) = (100,10,15,27,120,55,40) and deadlines (d1, d2, d3, d4, d5,d6, d7) = (2,1,2,1,4,3,1).	**[7M]**
	B	Solve the following knapsack problem where M=40 and N=4 using greedy technique. Weights [W1, W2, W3, W4] = [20, 25, 10, 15] Profits [P1, P2, P3, P4] = [20, 40, 35, 45]	**[7M]**

SECTION-III

5	***A***	Describe about minimum spanning tree using Prim's algorithm.	**[7M]**
	B	Write an algorithm to construct the optimal binary search tree T given the roots $R(i, j), \leq i < j \leq n$. Show that this can be done in time O(n).	**[7M]**
		OR	
6	***A***	Explain briefly about dynamic programming. List out the differences between dynamic programming and greedy method.	**[7M]**
	B	Find all pairs shortest paths for the following graph.	**[7M]**



SECTION-IV

7 ***A*** Determine the order of magnitude of the worst-case computing time for the backtracking procedure that finds all Hamiltonian cycles. **[7M]**

B Construct portion of state space tree for the following integers n=5, W = {5, 6, 11, 13, 22} and m = 22 using sum of subsets problem. **[7M]**

OR

8 ***A*** Generate all possible 3 colouring for the graph with 3 nodes using state space tree. **[7M]**

B The N-queens problem is to place n-queens on an n x n chess board. What are the constraints in placing n-queens? Explain how backtracking can be used to solve the problem. **[7M]**

SECTION-V

9 ***A*** Write the algorithm for 0/1 knapsack problem using LC branch and bound technique. Trace the algorithm to find optimal solution to the knapsack instance of n = 4, m=10, profit (p1, p2, p3, p4) = (10, 10, 12, 18), weights (w1, w2, w3, w4) = (4, 7, 5, 3). **[7M]**

B Consider the following matrix and find optimal tour by using travelling salesperson problem by using branch and bound. **[7M]**

∞	10	8	9	6
8	∞	5	3	4
8	4	∞	4	8
8	7	5	∞	5
6	9	4	5	∞

OR

10 ***A*** Prove or disprove: If there exists a polynomial time algorithm to convert a Boolean formula in CNF into an equivalent formula in DNF, then P = NP. **[7M]**

B What is the relationship between NP-Hard and NP-complete problems? Discuss with an example. **[7M]**

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R20

Code No: R20A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024

Computer Organization

(CSE, CSE-CS, CSE-AIML, CSE-DS & B.Tech-AIML)

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***	Differentiate multiprocessor and multicomputer.	**[7M]**
	B	Discuss multiplication algorithm with an example.	**[7M]**
		OR	
2		Describe the components of a computer arithmetic circuit and how a binary adder subtractor operates.	**[14M]**

SECTION-II

3		List and explain the basic micro-operations performed in computer architecture.	**[14M]**
		OR	
4		Define computer instruction. Discuss the instruction cycle and instruction codes.	**[14M]**

SECTION-III

5	***A***	Explain general register organization.	**[7M]**
	B	Explain RISC processor.	**[7M]**
		OR	
6		Discuss the components and characteristics of Micro Programmed Control Unit.	**[14M]**

SECTION-IV

7		Discuss memory hierarchy and explain RAM and ROM chips in detail.	**[14M]**
		OR	
8	***A***	Discuss the considerations and challenges involved in writing into a cache memory with an emphasis on the different mapping techniques.	**[7M]**
	B	Discuss auxiliary memory.	**[7M]**

SECTION-V

9	***A***	Explain the modes of transfer in Input-Output Organization, citing an example of Programmed I/O.	**[7M]**
	B	Discuss input – output sub systems.	**[7M]**
		OR	
10		Explain the basic concepts of pipelining and vector processing.	**[14M]**

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R20

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024

Probability and Statistics

(CSE, IT, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT, B.Tech-AIDS & B.Tech-AIML)

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*** A random variable X has the following probability function: **[7M]**

X	1	2	3	4	5	6
P(X)	K	3K	5K	7K	9K	11K

Then find (i) K (ii) Expectation (iii) The Variance

B Suppose a continuous random variable X has the probability density function **[7M]**

f (x) = k (1-x^2) for 0 < x < 1, and
= 0 otherwise.

Then Find (i) k (ii). Mean (iii). Variance

OR

2 The joint distribution of X and Y is given by **[14M]**
$f(x,y) = 4xye^{-(x^2+y^2)}, x \geq 0, y \geq 0$ Find the Marginal density function of X and Y. Also test whether X and Y are Independent.

SECTION-II

3 ***A*** If a Poisson distribution is such that P(x=1).$\frac{3}{2}$ = P(x=3). then find **[7M]**
I) P ($x \geq 1$) ii) P($x \leq 3$) iii) P($2 \leq x \leq 5$)

B Write the Characteristics of Normal distributions **[7M]**

OR

4 In a normal distribution 31% of the items are under 45 and 8% are over 64. Determine the mean and the variance of the distribution. **[14M]**

SECTION-III

5 ***A*** If $\sigma_x = \sigma_y = \sigma$ and the angle between two regression lines is $tan^{-1}\left(\frac{4}{3}\right)$,Compute r **[7M]**

B A random Sample of 5 college Students is selected and their grades in Mathematics and Statistics are found to be **[7M]**

Mathematics	85	60	73	40	90
Mechanics	93	75	65	50	80

Calculate Spearman's rank correlation coefficient.

OR

6 Find the coefficient of correlation from the following data **[14M]**

X	28	41	40	38	35	33	40	32	36	33
Y	23	34	33	34	30	26	28	31	36	38

SECTION-IV

7 ***A*** A random sample of size 100 is taken from a population with $\sigma = 5.1$, given that the sample mean is 21.6. Construct a 95% confidence interval for the population mean μ. **[7M]**

B A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S. D of 15 in the second group there are 250 students having mean IQ of 70 with S. D of 20. Is there a significant difference between the means of two groups? (Use α=0.01). **[7M]**

OR

8 A population consists of the five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find (i) The mean of the population. (ii) The standard deviation of the population. (iii) The mean of the sampling distribution of means (iv) The standard deviation of the sampling distribution of means. **[14M]**

SECTION-V

9 ***A*** A random sample of 10 boys had the following **[7M]**
I. Q's.70,120,110,101,88,83,95,98,107, 100. Does this data support the assumption of a population mean I.Q of 100.

B Write the properties of F- distribution. **[7M]**

OR

10 In an investigation on the machine performance. the following results are obtained. **[14M]**

	No. of units inspected	No.of defectives
Machine 1	375	17
Machine 2	450	22

Test whether there is any significant performance of two machines at α =0.05 level of significance.

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R20

Code No: R20A0061

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024

Managerial Economics and Financial Analysis

(CSE, IT, CSE-CS, CSE-AIML, CSE-IOT, B.Tech-AIDS & B.Tech-AIML)

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***	Define managerial economics. How managerial economics linked with other disciplines.	**[7M]**
	B	Differentiate between micro and macro economics.	**[7M]**
		OR	
2	***A***	What is elasticity of demand? Explain types and measure of elasticity of demand	**[7M]**
	B	Explain the nature of Managerial Economics	**[7M]**
		SECTION-II	
3		Define Break even analysis. What is the importance of BEP?	**[14M]**
		OR	
4	***A***	Explain Isoquants, Isocost and MRTS concepts with an example.	**[7M]**
	B	Describe the law of returns to scale.	**[7M]**
		SECTION-III	
5	***A***	Mention the features of partnership firm.	**[7M]**
	B	Discuss the advantages and disadvantages of sole trader firm.	**[7M]**
		OR	
6	***A***	Describe the various method of pricing.	**[7M]**
	B	Explain the features of monopolistic competition and monopoly competition.	**[7M]**
		SECTION-IV	
7		Give the formats for trading account, profit and loss account and balance sheet	**[14M]**
		OR	
8		Explain methods and sources of raising financing for an organization.	**[14M]**
		SECTION-V	
9		A five-year project has a projected net cash flow of Rs.15,000, Rs.25,000, Rs.30,000, Rs.20,000, and Rs.15,000 in the next five years. It will cost Rs.50,000 to implement the project. Determine whether the project can be accepted or not using payback period method.	**[14M]**

OR

10 [14M]

Liabilities	**Rs.**	**Assets**	**Rs.**
Equity Share Capital 12%	2,00,000	Machinery	5,92,000
Preference share capital	3,60,000	Investment	2,24,000
General Reserve	1,40,000	Stock	2,02,000
16% debentures	2,40,000	Bills Receivable	40,000
Trade payable	2,44,000	Debtors	98,000
Bank overdraft	40,000	Cash and Bank	76,000
Provision for Income Tax	36,000	Profit & Loss A/c	28,000
	12,60,000		**12,60,000**

Calculate Following Ratios from the above balance sheet:

1. Current Ratio 2. Liquid Ratio
3. Proprietary Ratio
4. Capital Gearing Ratio
5. Debt Equity Ratio

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R20

Code No: R20A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June 2024

Data Structures Using Python

(CSE, IT, CSE-CS, CSE-AIML & B.Tech-AIDS)

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 about class and object in python with an example.	**[6M]**
	B	Explain polymorphism with class methods in python with an example?	**[8M]**
		OR	
2	***A***	Explain different types of methods in python with an example.	**[6M]**
	B	Describe various forms of inheritance in python with example.	**[8M]**
		SECTION-II	
3	***A***	Define Non-Linear Data Structure. Explain any two Non-Linear Data Structures with an example.	**[7M]**
	B	Write in brief about Dictionaries in python. Write operations with suitable examples.	**[7M]**
		OR	
4	***A***	Explain about comprehensions and its types in python with an example.	**[7M]**
	B	Differentiate between Lists and Tuples in Python with an example.	**[7M]**
		SECTION-III	
5	***A***	What is an array? What are the operations performed on arrays.	**[5M]**
	B	Write a Python program for Insertion Sort.	**[9M]**
		OR	
6	***A***	Write a Python program to implement the binary search.	**[7M]**
	B	Sort the following list of elements by using Selection sort 30, 56, 78, 99, 12, 43, 10, 24, 85	**[7M]**
		SECTION-IV	
7	***A***	Explain insert and delete operations in doubly linked list.	**[5M]**
	B	Write a python program to implement Queue using Singly linked list.	**[9M]**
		OR	
8	***A***	Given a doubly linked list for the following elements in order: 2, 3, 4, 5, 6, 7, 8, 9. Explain the steps to delete element 8.	**[5M]**
	B	Write a python program to implement stack using Singly linked list.	**[9M]**
		SECTION-V	
9	***A***	Explain BFS Graph Traversal with an example. List two applications of graphs.	**[5M]**
	B	Construct the binary tree whose following traversals are given: inorder : DFEIHBAJCNOMK postorder: FIHEDBJONMKCA	**[9M]**

OR

10	***A***	Give any two representations of graph. Demonstrate DFS using suitable example.	**[5M]**
	B	Show each step of the AVL Tree built from a sequence of insertions corresponding to the following keys 44,17,32,78,50,54,62,48,88? Delete the elements 62, 17 and 48 from the AVL tree.	**[9M]**

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