Code No: R20A0503 **R20**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, July/August 2023

Data Structures Using Python

(CSE, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT, IT, AIDS & 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		Write the Major uses of Inheritance? Illustrate Multiple and Multilevel Inheritance with relevant examples	**[14M]**
		OR	
2		What is an Abstract Class and How to Implement It in Python? Correlate Polymorphism with inheritance and provide proper explanation on both of them?	**[14M]**

SECTION-II

3		What are sequence data types? Discuss about the various python sequence operations and functions in detail.	**[14M]**
		OR	
4	***A***	Classify different Comprehensions in Data Structures?	**[7M]**
	B	How to perform String Slicing in Python. Write the supporting code in Python?	**[7M]**

SECTION-III

5	***A***	"Selecting the pivot element plays vital role in Quick sort" support this statement with proper explanation. Explain various choices available for selecting the pivot.	**[7M]**
	B	Discuss how to search elements using Binary search with suitable example. Write the advantages using Binary search?	**[7M]**
		OR	
6	***A***	Define Array? Classify different Types of Arrays?	**[7M]**
	B	Discuss about the Major Operations that are performed on Arrays?	**[7M]**

SECTION-IV

7	***A***	Write an algorithm to insert and delete elements from stacks?	**[7M]**
	B	What is Circular Linked Lists? What are the Major operations that are performed on it?	**[7M]**
		OR	
8	***A***	Write an algorithm to insert new node at the beginning, at middle position and at the end of a Double linked list.	**[7M]**
	B	Discuss about the Major Applications of Stacks and Queues?	**[7M]**

SECTION-V

9	***A***	Define Graph? Classify different types of the graphs?	**[7M]**
	B	Differentiate Weighted vs Unweighted Graphs with relevant examples?	**[7M]**
		OR	
10	***A***	Explain the process of finding the minimum and maximum elements of the binary trees.	**[7M]**
	B	Define AVL Tree? Write the Major rotations that are performed on AVL Trees	**[7M]**

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Code No: R20A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, July/August 2023

Operating Systems

(CSE, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT & IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1	A	Explain real-time and desktop systems with example	**[8M]**
	B	Describe about OS services.	**[6M]**
		OR	
2	A	Discuss the simple operating system structure. Describe the layered approach.	**[7M]**
	B	Demonstrate importance of Multi Programmed Systems	**[7M]**

SECTION-II

3	A	Explain Cooperating Processes with example.	**[8M]**
	B	Explain Multilevel Queue scheduling algorithm	**[6M]**
		OR	
4	A	Explain the following schedulers. (i)Medium term scheduler (ii)Short-term Scheduler	**[6M]**
	B	Assume the following workload in a system: Process Arrival Time Burst Time P1 0 5 P2 1 6 P3 2 7 Draw a Gantt chart illustrating the execution of these jobs using Round Robin scheduling algorithm and also Calculate the average waiting time and average turnaround time.	**[8M]**

SECTION-III

5	A	Demonstrate the methods for handling deadlocks?	**[7M]**
	B	Explain Banker's algorithm to avoidance of dead lock .	**[7M]**
		OR	
6	A	Specify any two methods for deadlock Prevention.	**[6M]**
	B	What is semaphore? Explain Dining philosopher problem using semaphore	**[8M]**

SECTION-IV

7	A	ExplainIPC between processes on different systems using FIFO system	**[10M]**
	B	Define FIFO? Write the syntax for Creation of FIFO?	**[4M]**
		OR	
8	A	What is shared memory? Explain shared memory with example	**[7M]**
	B	Explain Demand paging with example.	**[7M]**

SECTION-V

9	A	What is File system? Explain file allocation methods with example?	**[7M]**
	B	Consider the following disk request sequence for a disk with 100 tracks 45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25 .Head pointer starting at 50 and moving in left direction. Find the number of head movements in cylinders using SCAN scheduling.	**[7M]**

OR

10	A	Explain importance of directory structure in a file system	**[7M]**
	B	What is system call? Explain the following system calls (i)open (ii)create (iii read	**[7M]**

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Code No: R20A0505

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, July/August 2023

Design and Analysis of Algorithms

(CSE, CSE-AI&ML, IT, 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*** Illustrate the properties of algorithm and write an algorithm to find third largest element in the given list. **[7M]**

B Calculate space and time complexity for the following algorithm. Algorithm Fib(n) { if((n=0) or (n=1)) then return n; else { F1:=0;F2:=3; i:=3; While(i<=n) { F:=F1 + F2; F1:=F2; F2:=F; i:=i+1; } Return F; } } **[7M]**

OR

2 ***A*** Implement Quick Sort for the given dataset **[7M]**

B Calculate space and time complexity for the following algorithm **[7M]**
Algorithm Sample(n) { a=0; for(i = 0; i < n; i++)
{for(j =n; j > i; j--) { a=a+i+j; } } }

SECTION-II

3 ***A*** Given an array of jobs where every job has a deadline and associated profit if the job is finished before the deadline. It is also given that every job takes a single unit of time, so the minimum possible deadline for any job is 1. How to maximize total profit if only one job can be scheduled at a time. Input: Four Jobs with the following deadlines and profits **[7M]**

JobID	Deadline	Profit
A	4	20
B	1	10
C	1	40
D	1	30

B What is Minimum cost spanning tree? Explain an algorithm for generating minimum cost spanning tree and list some applications of it **[7M]**

OR

4 ***A*** Generate the shortest paths for the given graph from vertex 1 to all remaining vertices. 1->2=20, 2- >1=2, 1->3=15, 2- >5=10,2->6=30, 3- >6=10, 3->4=4, 5- >4=15,6->4=4, 6- >5=10 using Prims algorithm **[7M]**

B A motorist wishing to ride from city A to B. Formulate greedy-based algorithms to generate the shortest path and explain with an example graph apply Kruskal's algorithm. **[7M]**

SECTION-III

5 ***A*** Find an optimal solution to the knapsack instance n=7, m=15,(p1,p2,.....p7)=(10,5,15,7,6,18,3) and (w1,w2,.....w7)=(2,3,5,7,1,4,1) using dynamic programming. **[7M]**

B Define And Or Graph problem (AOG) with an example. Prove that AOG is NP-Hard for the following formula F= (x1Vx2Vx3) ∧ (~x1V~x2Vx3) ∧ (~x1Vx2). **[7M]**

OR

6 ***A*** What is dynamic programming? Design an algorithm to solve the 0/1 knapsack procedure for dynamic programming **[7M]**

B Write warshall's algorithm and apply it to compute transitive closure for the directed graph for the adjacency matrix shown below: **[7M]**

	A	*B*	*C*	*D*
A	0	1	0	0
B	0	0	0	1
C	0	0	0	0
D	1	0	1	0

SECTION-IV

7 ***A*** Discuss the sum of the subset problems with an example S={1,3,4,5} and M=8 **[7M]**

B Describe in detail graph coloring using back tracking? **[7M]**

OR

8 ***A*** Explain eight queen's problems with a pseudo-code **[7M]**

B Describe Hamiltonian cycle with an example. **[7M]**

SECTION-V

9 ***A*** List the types of problems on which Branch and Bound Technique can be applied? Give examples. **[7M]**

B Explain Cook's Theorem. **[7M]**

OR

10 ***A*** Solve the following instance of knapsack problem by least cost branch and bound algorithm., with knapsack capacity of 25 **[7M]**

object	1	2	3	4	5	6	7
weight	5	7	2	8	6	4	3
profit	30	20	15	45	90	22	38

B Briefly explain the FIFO branch and bound solution with 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, July/August 2023

Computer Organization

(CSE, CSE-CS, CSE-AIML, CSE-DS & 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***	What are the functional units of a computer system? Explain the way of handling information by each of them?	**[7M]**
	B	Discuss the generations of computers based on the development technologies used to fabricate the processors, memories and I/O units.	**[7M]**
		OR	
2	***A***	Write about various general purpose registers involved in the typical computer system.	**[7M]**
	B	"System software is responsible for coordination of all activities in a computing system"- Justify this statement with the functionalities of it.	**[7M]**

SECTION-II

3	***A***	Write about various means by which data are transferred between memory of a computer and outside world.	**[7M]**
	B	Write the subroutines for parameter passing through registers.	**[7M]**
		OR	
4		What is register transfer notation? Write and explain these notations to three-address, two-address, single address and zero-address instruction types. Explain the following example X=(A*B)+(C*D)	**[14M]**

SECTION-III

5	***A***	Define Micro-operation and Micro-program.	**[7M]**
	B	Define Micro-Instruction and Explain basic organization of micro programmed control unit.	**[7M]**
		OR	
6	***A***	Discuss load/store instructions for multiple operands.	**[7M]**
	B	Write short notes on branch instructions.	**[7M]**

SECTION-IV

7	***A***	Explain the static RAM and Dynamic RAM.	**[7M]**
	B	Discuss the possible methods for specifying the placement of memory blocks in cache.	**[7M]**
		OR	
8	***A***	Relate the access speed, size and cost of various memories in memory hierarchy system.	**[7M]**
	B	What are the possible configurations of ROM? Explain with advantages and disadvantages.	**[7M]**

SECTION-V

9	***A***	Give few examples of external interrupts and few examples of internal interrupts. What is the difference between a software interrupt and subroutine call?	**[7M]**
	B	What is the difference between isolated I/O and memory mapped I/O? What are the advantages and disadvantages of each?	**[7M]**
		OR	
10	***A***	Explain the concept of pipeline to speed up the instruction execution. Explain with five stage pipelining.	**[7M]**
	B	Explain RISC and CISC	**[7M]**

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R20

Code No: R20A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, July/August 2023

Probability and Statistics

(CSE, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT, IT, AIDS & 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 random variable X has the following probability function : **[14M]**

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

Determine (i) K (ii) Evaluate P(X<6), P(0<X<5) (iii) mean (iv) variance

OR

2 ***A*** If X is a continous random variable and Y=aX+b, prove that E(Y)=a E(X)+b and V(Y)=a^2V(X), where V stands for variance and a,b are constants **[7M]**

B If a random variable has the probability density f(x) as **[7M]**

$f(x) = \begin{cases} 2e^{-2x}, for\ x > 0 \\ 0, \quad for\ x \leq 0 \end{cases}$ find the probabilities that it will take on a value (i) between 1 and 3 (ii) greater than 0.5

SECTION-II

3 ***A*** Derive mean and variance of the Binomial distribution. **[7M]**

B If a random variable has a poisson distribution such that P(1)=P(2), Find (i) mean (ii) P(4) (iii) P(1<X<4) (iv) variance **[7M]**

OR

4 ***A*** Fit a poisson distribution to the following data **[7M]**

x	0	1	2	3	4	5	Total
f	142	156	69	27	5	1	400

B In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution **[7M]**

SECTION-III

5 ***A*** Find if there is any significant correlation between the heights and weights given below **[7M]**

Height in inches	57	59	62	63	64	65	55	58	57
Weight in lbs	113	117	126	126	130	129	111	116	112

B From the following data calculate (i)Correlation coefficient (ii) Standard deviation of Y(σ_y) **[7M]**

$b_{xy} = 0.85; b_{yx} = 0.89; \sigma_x = 3$

OR

6 ***A*** Obtain the rank correlation coefficient for the following data **[7M]**

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

B Find the mean values of the variable X and Y and correlation coefficient from the following regression equations. 2Y-X-50=0, 3Y-2X-10=0 **[7M]**

SECTION-IV

7 ***A*** Write about (i) Critical region (ii) Left tailed test (iii) Right tailed test **[7M]**

B In a hospital 480 females and 520 male babies were born in a week. Do these figures confirm the hypothesis that males and females are born in equal number? **[7M]**

OR

8 ***A*** A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased. Use a 0.05 Level of significance **[7M]**

B A sample of 64 students have a mean weight of 72 kgs. Can this be regarded as a sample from a population with mean weight 58 kgs and S.D 27 kgs **[7M]**

SECTION-V

9 Explain Chi square distribution and F-distribution **[14M]**

OR

10 A random sample of 10 boys had the following **[14M]**
I.Q's:70,120.110,101,88,83,95,98,107 and 100

(a) Do these data support the assumption of a population mean I.Q of 100?

(b) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie

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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, July/August 2023

Managerial Economics and Financial Analysis

(CSE, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT, IT, AIDS & 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 how Managerial Economics provide solutions to business problems.	**[7M]**
	B	Differentiate between Durable and Perishable goods with examples.	**[7M]**
		OR	
2	***A***	State the Law of Demand with its assumptions and exceptions.	**[8M]**
	B	What are the factors governing Elasticity of Demand?	**[6M]**

SECTION-II

3	***A***	What is Economies of Scale? Explain the types of Economies of Scale.	**[8M]**
	B	What are the features of Isoquant?	**[6M]**
		OR	
4	***A***	Explain the Cobb-Douglas Production Function.	**[7M]**
	B	Differentiate between Fixed cost and Variable cost with examples.	**[7M]**

SECTION-III

5	***A***	Compare the features of Perfect competition and Monopoly.	**[8M]**
	B	Explain in detail the two important documents required for forming a company.	**[6M]**
		OR	
6	***A***	Explain the price output determination under Monopoly.	**[8M]**
	B	Explain the following pricing strategies 1. Skimming pricing 2. Penetration Pricing.	**[6M]**

SECTION-IV

7	***A***	Prepare the format of Trading and Profit and Loss Account with your imaginary figures.	**[8M]**
	B	Explain the content and purpose of Balance Sheet.	**[6M]**
		OR	
8	***A***	What do you understand by Double Entry Book Keeping of Accounting?	**[7M]**
	B	Explain the Accounting Rules for assigning debit and credit to the accounts.	**[7M]**

SECTION-V

9	***A***	The following are the extracts from the financial statements of Blue and Red Ltd as on March 2017 and 2018 respectively.	**[10M]**

Particulars	31.03.2017 (Rs)	31.03.2018 (Rs)
Stock	10,000	25,000
Debtors	20,000	20,000
Bills Receivables	10,000	5,000
Cash in Hand	18,000	15,000
Bills Payable	15,000	20,000
Bank Overdraft	--------	2,000
9% Debentures	5.00.000	5,00,000
Sales for the year	3.50,000	3,00,000
Gross profit	70,000	50,000

Compute the following Ratios for both the years

1. Current Ratio
2. Quick Ratio
3. Debtors Turnover Ratio

B How the profitability of organisation is assessed with Ratios? **[4M]**

OR

10 *A* What is Financial Analysis? Explain to whom Ratio Analysis is useful. **[8M]**

B Differentiate between Current Assets and Current Liabilities with examples. **[6M]**

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