R17

Code No: R17A0504

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, April 2023

Data Structures using C++

(CSE & 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***	Design a program to implement Linear search?	**[7M]**
	B	Discuss briefly about merge sort with an Example?	**[7M]**
		OR	
2	***A***	Explain in detail about Heap sort with an example?	**[7M]**
	B	Write a Program to implement insertion sort?	**[7M]**
		SECTION-II	
3	***A***	Briefly explain various operations of stack with suitable examples.	**[7M]**
	B	Design a program to implement Queue using linked list?	**[7M]**
		OR	
4	***A***	Explain in detail about Binary search tree traversals with an example?	**[7M]**
	B	How can you implement the insertion operation using linked list? Explain.	**[7M]**
		SECTION-III	
5	***A***	Explain about Priority queue using heap insertion and deletion concepts?	**[7M]**
	B	Discuss briefly about Multiway merge sort with an example?	**[7M]**
		OR	
6	***A***	Explain in detail about External sorting with suitable example?	**[7M]**
	B	List and explain in detail about the Polyphase merge with suitable examples	**[7M]**
		SECTION-IV	
7	***A***	Discuss about the Linear representation of Dictionaries?	**[7M]**
	B	List and explain in detail about the various operations of skip list with suitable examples?	**[7M]**
		OR	
8	***A***	Define collision? Explain in detail collision resolution technique?	**[7M]**
	B	Explain hashing and skip list with an example.	**[7M]**
		SECTION-V	
9	***A***	Explain BFS and DFS with an example.	**[7M]**
	B	Write an algorithm to implement BFS?	**[7M]**
		OR	
10		Define AVL tree. Explain AVL tree rotations with an example.	**[14M]**

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R17

Code No: R17A0510

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, April 2023

Computer Organization

(CSE)

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***	Describe about the Fixed point representation of numbers with an example	**[7M]**
	B	Discuss about arithmetic micro operations with examples.	**[7M]**
		OR	
2	***A***	Draw the flowchart for adding or subtracting two floating –point binary numbers	**[7M]**
	B	Explain various functional units of a computer.	**[7M]**
		SECTION-II	
3	***A***	What is Interrupt? Explain Input output interrupts?	**[7M]**
	B	Explain micro programmed control unit in detail.	**[7M]**
		OR	
4	***A***	What is RTL? Explain with suitable examples? What is its significance Instructions?	**[7M]**
	B	Design and explain micro program sequencer with a neat diagram.	**[7M]**
		SECTION-III	
5	***A***	Differentiate between CISC and RISC instructions.	**[7M]**
	B	Explain about Booth's multiplication algorithm with an example.	**[7M]**
		OR	
6	***A***	What do you mean by Addressing modes? Explain	
		i) Direct Addressing mode	**[5M]**
		ii) Indirect Addressing mode	**[5M]**
	B	Differentiate Micro programmed control and Hardwired control.	**[4M]**
		SECTION-IV	
7	***A***	What is DMA Transfer ? Explain with a neat sketch.	**[7M]**
	B	Explain various types of input and output peripheral devices.	**[7M]**
		OR	
8	***A***	How the data transfer to and from peripherals is done? Discuss with neat diagrams and examples.	**[7M]**
	B	Write short notes on asynchronous data transfer.	**[7M]**
		SECTION-V	
9	***A***	Define cache memory? Explain the different mapping functions	**[7M]**
	B	Draw and explain hardware organization of Associative Memory.	**[7M]**
		OR	
10	***A***	Define virtual memory? With the help of neat sketch explain the method of virtual to physical address translation	**[7M]**

B Explain about the memory hierarchy with neat diagram. **[7M]**

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R17

Code No: R17A0503

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, April 2023

Mathematical Foundation of Computer Science

(CSE)

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***	Show that S v R is Tautologically implied by (P v Q) ^ (P ->R) ^ (Q ->S)	**[7M]**
	B	Write about Normal forms in detail	**[7M]**
		OR	
2	***A***	Explain about Automatic Theorem Proving:	**[7M]**
	B	Show that P → S can be derived from the premises,7P V Q, 7Q V R, and R → S	**[7M]**

SECTION-II

3	***A***	Explain Equivalence Relation with examples.	**[7M]**
	B	Draw a Hasse diagram for X= {2, 3, 6, 24, 36, 48} and the relation ≤ be such that x≤y, if x divides y	**[7M]**
		OR	
4	***A***	Let f(x) = x+2, g(x)= x-2, h(x)=3x for all x∈ R where R is set of Real Numbers then find gOf, fOg, hOf, fO(gOh)	**[7M]**
	B	Explain Homomorphism of semigroups and monoids	**[7M]**

SECTION-III

5	***A***	In how many ways can 10 mathematics books, 6 history books, 6 chemistry books and 4 sociology books be arranged on the shelf so that all books of the same subject are together.	**[7M]**
	B	Explain Pigeon Hole Principle and its applications.	**[7M]**
		OR	
6	***A***	How many different outcomes are possible from tossing 12 similar dice?	**[7M]**
	B	Explain in detail about Binomial theorem:	**[7M]**

SECTION-IV

7	***A***	Find the Sequences generated by following function $(3+x)^3$	**[7M]**
	B	Solve the recurrence relation $a_n+a_{n-1}-6a_{n-2}=0$ for $n\geq 2$.Given that $a_0= -1$, $a_1=8$.	**[7M]**
		OR	
8	***A***	Solve the following recurrence relation using substitution method $a_0 = 2, a_1 = 3, a_n = a_{n-2} + 2^n + n3^n + n^2 4^n$	**[7M]**
	B	Solve the following recurrence relation $a_{n+1} - 2a_n = 2^n, n \geq 0, a_0 = 1$.	**[7M]**

SECTION-V

9	***A***	What is a Hamiltonian Cycle? Draw bipartite graph $K_{3,4}$ and prove that this graph does not have a Hamiltonian cycle.	**[7M]**
	B	Explain the Definitions i)Chromatic Number ii)Handshaking Property iii)Walk & Path	**[2M]** **[2M]** **[3M]**
		OR	
10	***A***	Give an example graph which is Hamiltonian but not Eulerian.	**[7M]**
	B	Write short notes on DFS and BFS	**[7M]**

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R17

Code No: R17A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, April 2023

Probability and Statistics

(CSE&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 F(x) is the distribution function of x is given by **[14M]**

$$F(X) = \begin{cases} 0 & if\ x \le 1 \\ k(x-1)^4 & if\ 1 < x \le 3 \\ 1 & if\ x > 3 \end{cases}$$

Determine i) f(x) ii) k iii)mean.

OR

2 A Out of 800 families with 5 children each, how many would you expect to have **[7M]**
i) 3 boys ii) atleast one boy iii) either 2 girls or 2 boys

B In a normal distribution,7% of the items are under 35 and 89% are under 63. **[7M]**
Determine the mean and variance of the distribution.

SECTION-II

3 Find the karlpearson's coefficient of correlation for the paired data: **[14M]**

wages	100	101	102	100	99	97	98	96	95	102
Cost of living	98	99	99	95	92	95	94	90	91	97

OR

4 The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches **[14M]**

Height of mother	62	63	64	64	65	66	68	70
Height of daughter	64	65	61	69	67	68	71	65

SECTION-III

5 A population consists of 5,10,14,18,13,24.Consider all possible samples of size 2 which can be drawn without replacement from the population. Find **[14M]**
i) The mean of the population ii) Standard deviation of the population
iii) The mean of the sampling distribution of means
iv) Standard deviation of the sampling distribution of means

OR

6 A Explain the procedure for Testing of Hypothesis. **[7M]**

B A normal population has a mean of 0.1 and standard deviation of 2.1.Find the probability that the mean of a sample of size 900 will be negative. **[7M]**

SECTION-IV

7 The following is the distribution of the daily number power failures reported in a city **[14M]**

No# of power failures	0	1	2	3	4	5	6	7	8	9
No# 0f days	9	43	64	62	42	36	22	14	6	2

Test the goodness of fit of Poisson distribution at 5% LOS

OR

8 The following are the average weekly losses of worker hours due to accidents in 10 industrial plant before and after a certain safety programme was put into operation: **[14M]**

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Test whether the safety programme is effective in reducing the number of accidents at 5%LOS.

SECTION-V

9 A fast food restaurant has one drive in window . It is estimated that cars arrive according to a Poisson distribution at the rate of 2 every 5 minutes and that there is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside this space , if necessary . It takes 15 minutes on the average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following **[14M]**

a) The probability that the facility is idle

b) The expected number of customers waiting to be served.

OR

10 A professor has three pet questions , one of which occurs on every test he gives . He never uses the same question twice in successive examinations. If he used the question no#1, he tosses a coin and uses the question no# 2,if head appears. If he uses the question no# 2, he tosses two coins and use the question no#3, if both are heads. If he uses the question no#3, he tosses three coins and use the question no#1, if all are heads. In long run which question does he use most often and with how much frequency is it used. **[14M]**

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Code No: R17A0401 **R17**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, April 2023

Electronic Devices and Circuits

(EEE, ECE, CSE & 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***	The reverse saturation current of a germanium diode is 100μA at room temperature of 27^0 C. Calculate the current in forward biased condition, if forward bias voltage is 0.2V at room temperature. If temperature is increased by 20^0 C , calculate the reverse saturation current and the forward current for same forward voltage at new temperature	**[7M]**
	B	Explain the operation of Zener diode and explain how it act as voltage regulator in detail.	**[7M]**
		OR	
2	***A***	(i) Compare Zener and Avalanche break downs (ii) Determine the value of forward current in the case of p-n junction silicon diode with I_0 = 10 μA, V_f = 0.8V , T= 300 K.	**[7M]**
	B	Explain in detail about the forward and reverse biased conditions of p-n junction diode and also explain about the estimation of static and dynamic resistances.	**[7M]**

SECTION-II

3	***A***	Derive the expression for the following parameters (i)I_{DC} (ii) E_{DC} (iii) I_{rms} (iv) efficiency (v) ripple factor of a Full-wave-rectifier.	**[7M]**
	B	A 230 V, 50Hz voltage is applied to the primary of a 3:1 step down transformer used in a Half wave rectifier having a load of 10KΩ. If the diode resistance and the secondary coil resistance are 75 Ω and 10 Ω, determine maximum, average and RMS values of current , DC voltage across the load, efficiency, ripple factor.	**[7M]**
		OR	
4	***A***	Derive the expression for the following parameters (i)I_{DC} (ii) E_{DC} (iii) I_{rms} (iv) efficiency (v) ripple factor of a Half Wave rectifier.	**[6M]**
	B	A centre tapped full wave rectifier circuit the RMS half secondary voltage is 9V assuming ideal diodes and load resistance R_L = 1KΩ. Calculate	
		i) Peak Curent	**[2M]**
		ii) DC load Voltage	**[2M]**
		iii) I_{rms}	**[2M]**
		iv) ripple factor	**[2M]**

SECTION-III

5 ***A*** For a certain transistor I_C = 5.255mA, I_B =100 µA and I_{CBO} = 5 µA **[7M]**

(i) calculate α, β and I_E.

(ii) Detrmine the new level of I_B required to make I_C =15 mA

B Explain in detail about the operation of Transistor in CB configuration with suitable diagrams . **[7M]**

OR

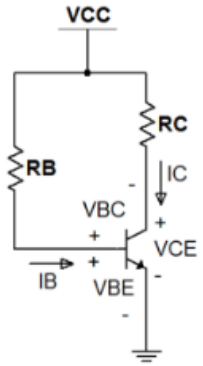
6 ***A*** For a single-stage Transistor Amplifier, R_S = 2 kΩ and R_L = 5 kΩ. The *h*-parameter values are h_{fb} = 0.98, h_{ib} = 21Ω, h_{rb} = $2.9*10^{-4}$ and h_{ob} = 0.49 µA/V. Find A_I, A_V, R_i and R_o for CB transistor configuration **[7M]**

B Differentiate CB, CE, CC configurations on indicating all parameters necessary and with suitable basic diagrams of configurations. **[7M]**

SECTION-IV

7 ***A*** Define biasing? Draw the Self bias circuit and obtain the expression for the stability factor? **[7M]**

B **[7M]**



For circuit shown is subjected to temperature change ; and the value of β = 100 at 25^0 C and β = 125 at 75^0 C determine the percentage change in the Q-point values over the temperature range .

OR

8 ***A*** What is the need for biasing and explain the DC and AC load line analysis for Q- point identification **[7M]**

B Design a collector to base bias circuit using silicon transistor to achieve a stability factor of 20, with the following specifications: **[7M]**
V_{CC} = 16V, V_{BE} = 0.7V, V_{CEQ} = 8V, Icq=4ma & β=50

SECTION-V

9 ***A*** Explain the construction and operation of JFET with its characteristics and explain the different regions in VI characteristics? **[7M]**

B Analyze the operation of FET with fixed bias and derive the values of Input impedance, output impedance, voltage gain. **[7M]**

OR

10 ***A*** Explain the construction & operation of a n-channel MOSFET in enhancement and depletion modes with the help of static drain characteristics and transfer characteristics? **[7M]**

B Compare BJT and FET and list our their advantages and disadvantages. **[7M]**

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