Code No: R15A0505 **R15**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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

Principles of Programming Languages

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 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 are the key principles of object-oriented programming (OOP)? Give an example of an object-oriented programming language.	**[2M]**
	b	Discuss the language evaluation criteria. Name two criteria and briefly explain their significance in language design.	**[3M]**
	c	Define a primitive data type. Provide an example of a primitive data type commonly used in programming.	**[2M]**
	d	Explain the concept of an array in programming. Provide a simple example to illustrate its usage.	**[3M]**
	e	Differentiate between a compound statement and an unconditional statement.	**[2M]**
	f	Define overloaded subprograms and provide an example.	**[3M]**
	g	Differentiate between C++, Java, C#, and Ada 95 in the context of abstract data types.	**[2M]**
	h	Explain the concept of semaphores in the context of concurrency.	**[3M]**
	i	Discuss the key features of ML (Meta Language) in the context of functional programming.	**[2M]**
	j	What is Haskell, and how does it contribute to the functional programming paradigm?	**[3M]**

PART-B (50 MARKS)

SECTION-I

2		Explain the syntax and semantics of programming languages. Discuss the general problem of describing syntax and semantics.	**[10M]**
		OR	
3		Explore the concepts of programming domains. Provide examples of different programming domains and how they influence language design.	**[10M]**

SECTION-II

4		Discuss reference types in programming. How are they used, and how do they differ from pointers?	**[10M]**
		OR	
5		Explain the importance of variable initialization in programming. Discuss scenarios where uninitialized variables can lead to errors and how proper initialization can prevent such issues.	**[10M]**

SECTION-III

6	Provide an in-depth explanation with example of subprograms, covering fundamentals, scope, and lifetime of variables.	**[10M]**
	OR	
7	Differentiate between static and dynamic scope in subprograms. Discuss scenarios where each is beneficial.	**[10M]**

SECTION-IV

8	Provide a detailed comparison of how abstract data types are implemented in C++, Java, C#, and Ada 95. Discuss the similarities and differences.	**[10M]**
	OR	
9	Discuss Java threads and C# threads, highlighting their similarities and differences.	**[10M]**

SECTION-V

10	Explore real-world examples of problems that are well-suited for solution using logic programming languages. Discuss how logic programming simplifies the solution process.	**[10M]**
	OR	
11	Provide a detailed introduction to LISP, a significant functional programming language. Discuss its origins, key features, and applications.	**[10M]**

***

R15

Code No: R15A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June 2024

Probability and Statistics

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 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 Define Correlation Coefficient **[2M]**

b Calculate the regression coefficient **[3M]**

X	1	2	3	4	5	6	7
Y	9	8	10	12	11	13	14

c A continuous random variable has the pdf $f(x) = \begin{cases} kx, & for\ 0 < x < 1 \\ 0, & otherwise. \end{cases}$ **[2M]**

Determine k.

d The mean and variance of a Binomial distribution are 4 and 4/3, then find P(X≥1). **[3M]**

e Find the value of the finite population Correction factor for n=10, N=1000. **[2M]**

f A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95 % confidence. **[3M]**

g Write the formula of chi-Square Test. **[2M]**

h Write the properties of t-distribution. **[3M]**

i Define Stochastic Matrix. **[2M]**

j Define mean arrival rate in the Queuing Theory. **[3M]**

PART-B (50 MARKS)

SECTION-I

2 Calculate the coefficient of correlation for the following data **[10M]**

X	9	8	7	6	5	4	3	2	1
Y	15	16	14	13	11	12	10	8	9

OR

3 The equations of two regression lines are 7x-16y+9=0 and 5y-4x-3=0. **[10M]**
Find the Coefficient of Correlation and the means of x and y.

SECTION-II

4 A random variable X has the following distribution **[10M]**

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

(i) Determine k (ii) Evaluate P(X< 6), P(X≥ 6) (iii) P(0< X< 5).

OR

5 In a Normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the Mean and Variance of the distribution. **[10M]**

SECTION-III

6 A population consists of 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 **[10M]**

a) The mean of the population
b) The standard deviation of the population
c) The mean of sampling distribution of means
d)The standard deviation of the sampling distribution of means

OR

7 An oceanographer wants to check whether the mean depth of the ocean in a certain region is 57.4 fathoms, as had previously been recorded. What can he conclude at the level of significance α = 0.05, if soundings taken at 40 random locations in the given region yielded a mean of 59.1 fathoms with a standard deviation of 5.2 fathoms? Also calculate 95 % confidence interval. **[10M]**

SECTION-IV

8 Two horses A and B were tested according to the time to run a particular track with the following results. Test whether two horses have the same running capacity. **[10M]**

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	--

OR

9 Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins, show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal. **[10M]**

SECTION-V

10 A training process is considered as a two state Markov Chain. If it rains, it is considered to be in state '0' and if doesn't rain, the chain is in the state of '1'. The transition probability of the Markov Chain is defined by **[10M]**

$$P = \begin{pmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{pmatrix}$$

Find the probability that it will rain for 3 days from today assuming that it is raining today. Assume that the mutual probability of state 0 or state 1 as 0.4 and 0.6 respectively.

OR

11 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 the space, if necessary .It takes 15 minutes on an average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following **[10M]**

a) The probability that the facility is idle.
b) The expected number of customers waiting to be served.

***

R15

Code No: R15A0401

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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

Electronic Devices and Circuits

(ECE & CSE)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 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	Draw the Zener Diode V-I characteristics	**[2M]**
b	Briefly discuss the semiconductor photo diode	**[3M]**
c	What is meant by Rectifier?	**[2M]**
d	Compare half wave rectifier and full wave rectifier	**[3M]**
e	What are the three regions of a Transistor?	**[2M]**
f	Why Transistor is called Current Controlled Device?	**[3M]**
g	What is the need of biasing?	**[2M]**
h	What is DC load line?	**[3M]**
i	Draw the symbols of JFET (N Channel) MOSFET (Depletion MOSFET (p-channel)and Enhancement MOSFET (n-channel)	**[2M]**
j	Draw the JFET Small signal Model	**[3M]**

PART-B (50 MARKS)

SECTION-I

2	Explain the operation of silicon p – n junction diode and obtain the forward bias and reverse bias Volt – Ampere characteristics	**[10M]**
	OR	
3	Explain the operation and characteristics of Tunnel diode.	**[10M]**

SECTION-II

4	Explain the working of capacitor filter connected at the output of a full wave rectifier. With all the corresponding waveforms	**[10M]**
	OR	
5	Compare C, L, L-section and π-section Filters in all respects	**[10M]**

SECTION-III

6	Draw and explain the input and output characteristics of CE configuration.	**[10M]**
	OR	
7	Explain how Transistor acts as an Amplifier	**[10M]**

SECTION-IV

8	Draw the self-bias circuit and derive the expression for the stability factor S. What are the limitations of this circuit?	**[10M]**

OR

9	Explain DC and AC load lines with equations	**[10M]**

SECTION-V

10	Explain the construction of JFET and write down principle of operation of JFET?	**[10M]**

OR

11	Why a Field Effect Transistor is called unipolar & voltage controlled device? Explain the drain & transfer characteristics of a JFET in detail	**[10M]**

***

Code No: **R15A0503** **R15**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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

Mathematical Foundation of Computer Science

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 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	Let p, q, r be the proposition p: You have the flu q: You miss the final examination r: You pass the course Write the following propositions into English sentences 1. $\neg p \rightarrow r$ 2. $q \rightarrow \neg r$	**[2M]**
b	Write each of the following sentences symbolically i) It is not hot but it is sunny. ii) It is neither hot nor sunny.	**[3M]**
c	Define a Semi group and Monoid.	**[2M]**
d	If $f(x) = x^2+6$, then find $f^{-1}(x)$.	**[3M]**
e	State pigeonhole principle.	**[2M]**
f	How many permutations can be made with letters of the word MASSASAUGA?	**[3M]**
g	What is the generating function of the sequence 2,5,8,11,14……..	**[2M]**
h	Find the coefficient of x^{2024} in the generating function $1/ (1 + 5x)^2$	**[3M]**
i	Define Bipartite Graph.	**[2M]**
j	Is there a simple graph with 1,1,3,3,3,4,6,7 as the degrees of its vertices ?	**[3M]**

PART-B (50 MARKS)

SECTION-I

2.a)	Obtain the principle disjunctive normal form of $(P \wedge Q) \vee (\neg P \wedge R) \vee (Q \wedge R)$.	**[5M]**
b)	Translate each of these statements into logical expressions using predicates, quantifiers and logical connectives. i) Something is not in the correct place. ii) All tools are in the correct place and are in excellent condition. iii) Everything is in the correct place and in excellent condition. iv) Nothing is in the correct place and is in excellent condition. v) One of your tools is not in the correct place, but it is in excellent condition.	**[5M]**

OR

3.a)	Show that the following argument is valid. If today is Tuesday, I have a test in Mathematics or Economics. If my Economics professor is sick, I will not have a test in Economics. Today is Tuesday and my Economics professor is sick.Therefore I have a test in Mathematics.	**[5M]**
b)	Prove that $(\exists x)(P(x) \vee Q(x)) \Longrightarrow (\exists x)P(x) \vee (\exists x)Q(x)$.	**[5M]**

SECTION-II

4.a) Consider the following relation on{1,2,3,4,5,6} R={(i, j) : i-j=2} Is R transitive? Is R reflexive? Is R Symmetric? **[5M]**

b) Consider the group G = {1,2,4,7,8,11,13,14} under multiplication modulo 15. Construct the multiplication table of G and verify whether G is cycle or not. **[5M]**

OR

5.a) Explain the properties of Lattices. **[4M]**

b) Show that the set N of natural numbers is a semi group under the operation x * y =max {x, y}. Is it a Monoid? **[6M]**

SECTION-III

6.a) We choose 12 cards from the deck of 52 playing cards. **[4M]**
i) How many ways can it be done if they must all come from the same suit?
ii) How many ways can it be done if we need exactly 3 kings and 3 queens?

b) Obtain the coefficient of $x^{99}\ y^{60}\ z^{14}$ in $(2x^3 + y - z^2)^{100}$ using multinomial theorem. **[6M]**

OR

7.a) Using the digits 1,2,3 and 5, how many 4 digit numbers can be formed if **[4M]**
i) The first digit must be 1 and repetition of the digits is allowed?
ii) The first digit must be 1 and repetition of the digits is not allowed?

b) How many bits of string of length 10 contain **[6M]**
i) At most four 1's
ii) Equal number of 0's and 1's
iii) At least four 1's

SECTION-IV

8 Using Generating functions method, Solve the recurrence relation $a_n - 7a_{n-1} + 26a_{n-2} - 24a_{n-3} = 0$ for n>= 2. **[10M]**

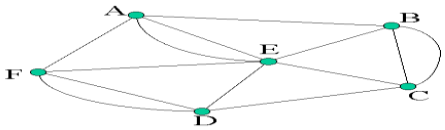
OR

9 Solve the recurrence relation $a_n + 2a_{n-1} - 3a_{n-2} = 0$ for $n \geq 2$ using characteristic root method. **[10M]**

SECTION-V

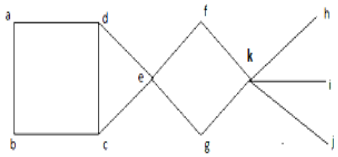
10.a) Show that complete graph K_5,complete bipartite graph $K_{3,3}$ are non planar. **[5M]**

b) Find the Euler circuit if exists of the following graph. **[5M]**

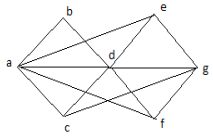


OR

11.a) Draw the spanning tree for the following graph using DFS Algorithm. **[5M]**



b) Define Chromatic Number. Find the Chromatic Number of the following Graph **[5M]**



******

R15

Code No: R15A0461

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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

Digital Logic Design

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 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	Evaluate the 2's and 1's complement of the binary number 1010110	**[2M]**
b	List the max terms of the function F(x,y,z)=xyz+x′z	**[3M]**
c	Define pair, quad and octet in K – maps	**[2M]**
d	What is don't-care conditions? Explain it use	**[3M]**
e	Design a half Subtractor circuit	**[2M]**
f	Define Encoder	**[3M]**
g	Write characteristic table & equation for JK flip-flop	**[2M]**
h	What are the basic types of shift registers?	**[3M]**
i	What is the difference between PLA and PAL?	**[2M]**
j	Define PROM	**[3M]**

PART-B (50 MARKS)

SECTION-I

2	a) Convert the given Gray code number to equivalent binary number $(1001001011110010)_G$.	**[5M]**
	b) Convert $(A0F9.0EB)_{16}$ to binary and octal.	**[5M]**
	OR	
3	What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates	**[10M]**

SECTION-II

4	Simplify the expression Y= ∑m (7, 9, 10, 11, 12, 13, 14, 15) using the k-map method and Implement using logic gates	**[10M]**
	OR	
5	Simplify the Boolean expression using K-map and implement using NAND gates F(A,B,C,D) = ∑m(0,2,3,8,10,11,12,14)	**[10M]**

SECTION-III

6	Design a full binary adder with two half adders and a OR gate. & Design a circuit for 2-bit binary multiplier	**[10M]**
	OR	
7	Design 4- bit magnitude comparator and explain its working.	**[10M]**

SECTION-IV

8 What is race around condition? Describe the conversion of SR-Flip-Flop to JK-Flip-Flop **[10M]**

OR

9 Design 4-bit shift register using D flip-flops and explain its working with the help of timing diagrams **[10M]**

SECTION-V

10 Implement the following functions using PLA. **[10M]**

$A(x,y,z) = \sum m(1,2,4,6)$

$B(x,y,z) = \sum m(0,1,6,7)$

$C(x,y,z) = \sum m(2,6)$

OR

11 Discuss about Programmable Array Logic (PAL) **[10M]**

***