Code No.: **30503** | **MR13**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019

Subject: **Mathematical Foundation of Computer Science**

Branch: **Common to CSE & IT**

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

PART – A

I. Answer **ALL** questions of the following **5x1Mark=5 Marks**

1. Construct the truth table for $P \wedge \neg P$
2. Define aAbelian group.
3. The no. of circular permutations of n different things taken all at a time round a circle?
4. Find the coefficient of $X_1^2 X_2^2 X_3^2$ in $(2X-3Y+5Z)^{10}$
5. Define Hamiltonian graphs.

II. Answer **ALL** questions of the following **10x2Marks=20 Marks**

1. What are the well formed formulas for Quantifiers?
2. Test the following statement is a valid or not?
   If sachin hits a centuary then he gets a free car.
3. Find the sequence generated by the following function $(3+x)^3$
4. Define group and semi group.
5. What is permutation group? Explain with example?
6. The number of distinguishable words that can be formed from the letters of the word "MISSISSIPPI"
7. Find the generating functions for a_r= the number of non negative integral solutions of $e_1+e_2+e_3=r$ where $0 \le e_1 \le 3$, $2 \le e_2 \le 6$, e_3 is odd and $1 \le e_3 \le 9$.
8. Find an Explicit Formula for Fibonacci numbers?
9. Draw a diagram for four dimensional hypercube Q_4.
10. Define Hamiltonian Cycle and give an example.

PART-B

Answer **ALL** questions of the following **5x10 Marks= 50Marks**

1. a) Obtain the PDNF for $P \rightarrow ((P \rightarrow Q) \wedge \neg(\neg Q \vee P))$
   b) Obtain the PCNF for $P \rightarrow (P \wedge (Q \rightarrow P))$

OR

2. Obtain the PCNF for the following
   i) $(\sim P \rightarrow Q) \wedge (Q \leftrightarrow P)$ **ii)** $(P \wedge Q) \vee (\sim P \wedge Q)$

3. a) Show that the function $f(x) = x^3$ and $g(x) = x^{1/3}$ for $x \epsilon R$ are inverse of one another.

   b) Let $f(x) = x+2$, $g(x) = x-2$ and $h(x) = 3x$ for $x \epsilon R$, the set of real numbers. Find gof, fog, fof, gog, goh, hog, fogoh, fogoh, foh.

OR

4. Let X={1,2,3} and f,g,h & s are the functions from X to X given by

   f= {<1,2>,<2,3>,<3,1>}

   g= {<1,2>,<2,1>,<3,3>}

   h= {<1,1>,<2,2>,<3,1>}

   s= {<1,l>,<2,2>,<3,3>}

   Find fOg, gOf, fOhOg, sOg, gOs, sOs, fOs, fOh, fOsOh, fOf.

5. a) Find the number of permutations of the letters of word "MASSASAUGA". In how many of these all 4 A's are together? How many begin with S?

   b) In how many ways 28 different books can be given to 6 students, so that 2 of the students will have 4 books each and other 4 will have 5 books each?

OR

6. a) Explain about binomial and multinomial theorems with examples.

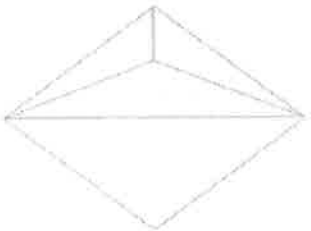
   b) Find the Number of ways placing 20 identical balls into 5 boxes with atleast one ball put into each box.

7. Solve the recurrence relation an-7an-1+12aa-2 =0 for n≥2 where ao=1, a1=2

OR

8. If a0=0, a1=1, a2=4 and a3=37 satisfy the recurrence relation an+2+ban+1+can=0,n>0, determine the constants b and c and then solve for an.

9. Define graph coloring? What is chromatic number? Find the chromatic number for the following graph?



OR

10. How many 10 digit numbers are there which contain only the digit 1, 2 and 3 with the digit 2 appearing in each number twice?

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019

Subject: **Advanced Data Structures**

Branch: **Common to CSE & IT**

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

PART – A

I. Answer **ALL** questions of the following **5x1Mark=5 Marks**

1. What is Time Complexity?
2. What is an Array?
3. Explain How Graphs are Represented Using Adjacency Matrix.
4. What are The Various Types of Searching Techniques?
5. Define B-tree.

II. Answer **ALL** questions of the following **10x2Marks=20 Marks**

1. Define Recursive Algorithm? Compute The Time Complexity of Fibonacci sequence.
2. Distinguish Linear and Non-Linear Data Structure.
3. What Is Post-Fix Expression Evaluation? Explain With Example.
4. What are The Advantages of Priority Queue?
5. What is The Threaded Binary Tree? Explain With an Example.
6. Distinguish DFS and BFS.
7. What are The Advantages of Binary search.
8. What is Radix Sort?
9. Define Red-Black.
10. What are The Drawbacks of AVL Tree?

PART-B

Answer **ALL** questions of the following **5x10 Marks= 50Marks**

1. What are asymptotic notations?. Explain Different Asymptotic Notations With an Example?

OR

2. Explain Doubly-Linked List With Example?
3. Describe The Procedure for Converting Infix to Postfix Expression, Write an Algorithm to evaluate Postfix Expression?

OR

4. What is Queue? What are its Operations? Explain With an Example?
5. Write Iterative Program for in order Traversal of Binary trees?

OR

6. Briefly Explain Various Graph Search Methods With examples?
7. Write a C++ Program to Implement Linear Search? Discuss its Time Complexity?

OR

8. Explain The Algorithm For Selection Sort And Give a Suitable Example?
9. What is B-Tree? Explain Operations Of B-Trees Write An Algorithm to Insert an Element into Tree? Explain With an Example?

OR

10. Explain Knuth-Morris Pratt Algorithm in Details?

Code No.: **30M10/40M05**

MR13/MR14

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019

Subject: **Probability and Statistics**

Branch: **Common to ME, CSE, IT & MINING**

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

PART – A

I. Answer **ALL** questions of the following **5x1Mark=5 Marks**

1. Define Probability density function
2. Write the finite population correction factor.
3. If arrival rate is 3 per hour service rate is 5 per hour then find traffic intensity.
4. Define markov chain.
5. Write Rank Correlation formula.

II. Answer **ALL** questions of the following **10x2Marks=20 Marks**

1. If X and Y are two discrete random variables, then prove that E(X+Y) = E(X) + E(Y) provided E(X) E(Y) exist.
2. If $f(x) = kxe^{-\lambda x}$, $\lambda > 0$, $x > 0$
   $= 0$, otherwise find K
3. Write regression lines for three variables.
4. Define the statistically independence of two jointly distributed random variables.
5. What is the value of correction factor if n=5 and N=200.
6. Define null hypothesis and alternative hypothesis.
7. Describe M/M/1 Models.
8. Write the relations between Lq, Ls, Wq, and Ws in (M/M/1) : (∞/FIFO) model.
9. Write any two classifications of Markov chain.
10. Is the matrix $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{1}{4} & \frac{3}{4} \end{bmatrix}$ stochastic?

PART-B

Answer **ALL** questions of the following **5x10 Marks= 50Marks**

1. Fit a binomial distribution to the following data

X	2	4	6	8	10
f	1	4	6	4	1

OR

2. Fit a poisson distribution to the following data

X	0	1	2	3	4	5
f	142	156	69	27	5	1

3. In a partially destroyed laboratory data, only the equations giving the two lines of regression are available and are $7x - 16y + 9 = 0$ and $5y - 4x - 3 = 0$. Calculate the coefficient of correlation and the means of X and Y.

OR

4. Calculate Karl Pearson's correlation co-efficient for the following data.

x	38	45	46	38	35	38	46	32	36	38
y	28	34	38	34	36	26	28	29	25	36

5. 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 distribution is normal, test hypothesis that the true variances are equal.

OR

6. A sample of 100 electric bulbs produced by manufacturer A showed a man life time of 1190 hours and a standard deviation of 90 hours. A sample of 75 bulbs produced by manufacturer B showed a mean life time of 1230 hours with a standard deviation 120 hours. Is there a significant difference between the mean life time of two brands at a significance level of 1)0.05 (ii) 0.01
7. Aone person barber shop has six chairs to accommodate people waiting for haircut. Assume that customers who arrive when all the six chairs are full leave without entering the shop. Customers arrive at the average rate of 3 per hour and spend an average of 15 minutes for service. Find
   a) The probability that a customer can get directly in to the barber chair upon arrival.
   b) Expected number of customers waiting for a haircut.
   c) Effective arrival rate.

OR

8. A car park contains 5 cars. The arrival of cars is poisson with a mean rate of 10 per hour. The length of time each car spends in the car park has negative exponential distribution with mean 2 hours. How many cars are in the car park on average and what is the probability of newly arriving customer finding the car park full and having to park his car elsewhere?
9. A market survey is made on two brands of breakfast foods A &B .Every time a customer purchases, he may buy the same brand or switch to another brand. The transition matrix is given below

		TO	
		A	B
	A	0.8	0.2
From	B	0.6	0.4

At present, it is estimated that 60% of the people buy brand A and 40% buy brand B. Determine the market shares of brand A and brand B in the steady state.

OR

10. a) Define the types of stochastic process with an example

    b) The transition probability matrix of a markov chain is given by $\begin{bmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{bmatrix}$ is this matrix irreducible?

    c) Define regular matrix with an example