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, NOVEMBER-2018

Subject: <u>ADVANCED DATA STRUCTURES</u>

Branch: CSE

Time: 3 hours   Max. Marks: 75

PART – A

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

1. What is Linked List
2. Give Applications Of Stack.
3. What Is ADT?
4. What are The Various Types of Sorting techniques?
5. Define AVL Tree.

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. What are the Linear and Non-Linear Data Structure?
2. Distinguish Single Linked List and Double Linked List.
3. What are The Applications of Stack?
4. Give an ADT For Queue.
5. What is The Binary Tree Traversal? Explain With an Example.
6. What Is Graphs? Explain Representation of Graphs.
7. Distinguish Between Linear Search and Non-Linear Search.
8. What is Heap Sort?
9. What is balanced tree? Give Various Types Of Balanced Trees.
10. Define Splay Tree.

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**
1. A).What is Algorithm? Explain Recursive Algorithm With Example.
   B). Explain Linear and Non-Linear Data Structure.
(OR)
2. Explain Singly Linked List With Example.
3. What is Stack? What are its Operations? Explain With Example.
(OR)
4. What is Circular Queue? What are its Operations? Explain Insertion and Deletion Algorithms For Circular Queue.
5. Write A Program For Binary Tree.
(OR)

6. What is Graph? Write ADT for Graph? Briefly Explain Various Graph Search Methods With an Example.

7. Write a C++ Program to Implement Binary Search Tree and Discuss its Time Complexity.
(OR)
8. Sort The Following List Using Heap Sort Algorithm 3,9,15,4,6,11,30? Explain The Procedure to Construct Heap Tree.

9. What is AVL Tree? Explain Operation of AVL Tree With Example.
(OR)

10. Explain Knuth-Morris Pratt Algorithm in Details.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, EXAMINATIONS,

DECEMBER-2018

Subject: **DIGITAL LOGIC DESIGN**

Branch: **CSE**

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

PART – A

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

1. Subtract 10101-10010 using 2's complement.
2. What are the universal gates.
3. Draw block diagram of Decoder.
4. Draw the circuit diagram for J-K Flip Flop.
5. What is Asynchronous circuit?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Convert $(68BE)_{16}$ to _____ $_{(2)}$ and _____ $_{(8)}$
2. Write 2's complement for $(110011010010)_2$
3. Realize the following sum of products expression using NAND gates.

   $G(A,B,C)=AB+ B'C+B'$

4. Write down advantages of K-map method.
5. What is Combinational Circuit
6. What is Encoders
7. What is State Reduction?
8. Explain about synchronous counters?
9. What is PAL?
10. Draw conventional and array logic diagrams for OR gate.

PART-B

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

1. Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend.

   i)   101011- 111000

   ii)   1110- 110010

   iii)   11010 - 1101

   iv)   110 -101000

   v)   11010 – 10000

OR

2. a) Write notes on octal and Hexa decimal numbers

   b) Write notes on Registers

3. a) Using K-map design a combinational logic circuit to obtain 2's complement for the given 4-bit binary
number.

b) Draw the circuit using only two input exclusive-OR gates and 2-input OR gates. What is the output
expression for 5 inputs?

OR

4. Express the following function as a sum of minterms and also as a product of maxterms:
$F(A,B,C,D)=B'D+A'D+AD$.

5. Determine the procedure of implementing a Boolean function of 'n' variables with multiplexer
that has n-1 selection inputs. Consider the function $F(x,y,z)= \Sigma(1,2,6,7)$

OR

6. Explain encoders with suitable examples.
7. Explain the Ripple counter design. Also design a decade counter.

OR

8. Explain thoroughly Mealey and Moore Machine.

9. Write short note on:
a) RAM b) PALc) Hazards in Asynchronous sequential circuits.

OR

10. Implement **F1**= AB'+AC+A'BC'   F2= (AC+BC)' as PLA

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, EXAMINATIONS,

DECEMBER-2018

Subject: <u>**DIGITAL LOGIC DESIGN**</u>

Branch: **CSE**

Time: 3 hours   Max. Marks: 75

PART – A

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

1. Convert binary 111111110010 to hexadecimal?
2. Define Karnaugh Maps?
3. Define Combinational Circuits?
4. How many flip-flops are required to produce a divide-by-128 device?
5. Define Race condition.

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Convert   the binary equivalent of the decimal number 368?
2. Convert Gray code for decimal number 6 is equivalent to?
3. The Boolean expression A.B+ A.B+ A.B is equivalent to?
4. The simplification of the Boolean expression (ABC)+ (ABC) is ?
5. The logic circuit shown in the given fig. can be minimised to
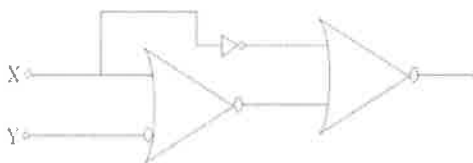
6. Define about PPL?
7. How many flip flops are required to construct a decade counter
8. How many flip-flops are required to construct mod 30 counter
9. What is meant by hazard and how it could be avoided?
10. Bring out the difference between fundamental mode and pulse mode sequential circuits

PART-B

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

Q1. a) Convert the following: [10M]
    i) $9970 = (\ )_{16}$ ii)$2570 = (\ )_8$ iii) $6540 = (\ )_2$ iv) $1011_6 = (\ )_{10}$
                                          (OR)
Q2. a) Explain about Weighted and non-weighted codes   [5M]
    b) Explain different methods used to represent negative numbers in binary system

Q3. Obtain the complement of the following Boolean expression.   [10M]
    i) B'C'D+(B+C+D)+B'C'D'E   iii) AB+(AC)'+(AB+C)
    ii) A'B'C+A'BC'+AB'C+ABC'   iv) AB+(AC)'+AB'C

(OR)

Q4.a) Write the map entered variable K-Map for the Boolean Function
    $F(w,x,y,z)=\sum m(2,9,10,11,13,14,15)$
    b) What do you mean by K-map? Draw the K-maps up to 4 variables and list 'its advantage and disadvantage

Q5. a) Draw the circuit for 3 to 8 decoder and explain.
    b) Design 2x4 decoder using NAND gates.

(OR)

Q6. Implement the following function using a PROM.
    i) $F(w,x,y,z) = \_ (1,9,12,15)$
    ii) $G(w,x,y,z) = \_ (0,1,2,3,4,5,7,8,10,11,12,13,14,15)$

Q7. a) Draw the logic diagram for a 4-bit binary ripple down counter using positive edge triggered flip-flops.
    b) Explain different types of shift registers.

(OR)

Q8. a) Design a modulo 10 counter JK flip-flops.
    b) Draw and explain 3-bit asynchronous up counter using flip-flops and explain with output

Q9. Find the circuit that has no static hazards and implement the Boolean function $F(A,B,C,D)=\sum m(1,,5,6,7)$

(OR)

Q10 a) Explain the different between synchronous and asynchronous sequential circuits .what is the different stable and unstable state?
    b) Explain race free state assignment hazards give examples?

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: <u>**Mathematical Foundation for Computer Science**</u>

Branch: **Common to CSE & IT**

PART – A

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

1. Show that $(P \wedge Q) \rightarrow (P \vee Q)$ is a tautology?
2. Let A= {1,2,3}, B={1,2,3,4} then find A X B.
3. How many different arrangements are there of the letters a,a,a,b,c ?
4. Find the sequence generated by $(3+x)^3$
5. Define a Loop?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Write each of the following in symbolic form
   a) All men are good
   b) No men are good
2. Write Short notes on normal forms.

3. Verify and Explain the following relation Ron X={ 1,2,3,4} is equivalence relation or

   not R={(1,1),(1,4), (4,1),(2,2),(3,4),(3,3),(3,2),(4,3),(4,4)}.

4. Explain algebraic structure ring and Cumulative ring?
5. Expand $(x+y)^7$
6. The English alphabet contains 21 consonants and 5 vowels. Consider 7 letter words with 3 different vowels and 4 different consonants. a) How many such words can be formed? B) How many such words contains letter a?
7. Solve the recurrence relation by substitution $a_r = a_{r-1} + r^2$, $a_0 = 3$.
8. Solve the recurrence relation $a_n = a_{n-1} + \frac{1}{x(n+1)}$ where $a_0=1$.
9. Define indegree and outdegree?
10. What is edge coloring and vertex coloring?

PART-B

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

1. Obtain POS of the following formulas

   i) $(P \wedge Q \wedge R) \vee (\sim P \wedge R \wedge Q) \vee (\sim P \wedge \sim Q \wedge \sim R)$

   ii) $PV(\sim P \rightarrow (QV(\sim Q \rightarrow R)))$

OR

2. a) Obtain the PCNF for the following formula $(P \wedge Q) \vee (\neg Q \wedge R)$

   b) Show that $\neg(P \leftrightarrow Q) <=> (P \wedge \neg Q) \vee (\neg P \vee Q)$

3. a) Let f and g be the functions from positive real numbers to positive real numbers defined by

$f(x) = 2x,$

$g(x) = x^2$ calculate fog and gof.

b) Let $f(x) = x+3$, $g(x) = x^3$ be two functions defined on the set of real numbers. Show that gof≠ fog.

OR

4, Show that intersection of two submonoid of a monoid is a monoid?

5. a) Find the independent term of x in the expansion of $(x^2 + \frac{1}{x})^{12}$

b) Find the co efficient of xyz^5 in the expansion of $(x+y+z)^7$

OR

6. a) 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 Group or Not?

b) Let R={1,2,3,4 } and R={(1,1),(1,2),(1,3),(2,1),(2,2),(2,3),(3,1),(3,2),(3,3),(4,4)} is R is an equivalence relation.

7. Find the solution of the recurrence relation $a_n -7a_{n-1}+10a_{n-2} = 0$, n≥2, with $a_0 =10$ and $a_1 = 41$ by using characteristic roots.

OR

8. Find the solution of the recurrence relation with $a_{n+2}^2 - 5a_{n+1}^2 + 4a_n^2 = 0$, $a_0 = 4$ and $a_1=13$ by using characteristic roots

9. What is minimum cost spanning tree? What are the different ways of creating spanning trees, illustrate with example?

OR

10. Write an algorithm for depth first search spanning trees.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Basic Electrical and Electronics Engineering**

Branch: **Common to ME & CSE**

Time: 3 hours   Max. Marks: 75

PART – A

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

1. Define electric power?

2. What is transformation ratio?

3. List out the various armature windings in DC machines.

4. Draw the symbols of PNP and NPN junction transistors?

5. What is meant by electro static deflection sensitivity?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. What are the equivalent resistances in delta when three 1Ω resistances are connected in star configuration?

2. State faraday's laws of electromagnetic induction.

3. Define electric flux and reluctance.

4. Distinguish between core type and shell type transformers.

5. Write the simple classification of DC motors.

6. When a 4-pole, 50 Hz, 415V induction motor runs at a speed of 1470 rpm, Find the slip frequency.

7. Draw the V-I characteristics of p-n junction diode?

8. Write the applications of a Diode.

9. What is a Barkhausen criterion in oscillators? Write its importance.

10. Explain the frequency measurement of a waveform using a CRO with an example.

PART-B

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

1. a) State and explain Kirchhoff's laws.

   b) Discuss passive and active elements?

(OR)

2. a) State and explain superposition theorem with an example.

   b) Write the difference between series and parallel circuits.

3. a) Explain the principle of operation of a single phase transformer.

  b) A 2 kVA, 230V /115V single-phase transformer, its Copper loss is 240W and iron loss is 40 W. Calculate the efficiency of the transformer at full load and 0.8 pf.

(OR)

4. Explain the procedure to conduct O.C. and S.C. test on single phase transformer with neat circuit diagrams.

5. a) Derive the EMF equation of a DC generator.

  b) Discuss the operation of a DC machine as a motor.

(OR)

6. Develop the expression for Torque in a three phase induction motor.

7. a) Draw and explain the characteristics of zener diode.

  b) Transistor acts as an amplifier? Justify.

(OR)

8. Describe the operation of half wave rectifier, draw its output waveform and derive its ripple factor.

9. Explain the difference between Hartley and Colpitts oscillators in detail.

(OR)

10. Draw the structure of CRT and explain the main components of CRT.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018
Subject: PROBABILITY & 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 discrete and continuous random variable.
2. Define correlation coefficients.
3. Write the finite population correction factor.
4. Define Poisson distribution
5. Write conditions for periodic matrix.

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. If X is a random variable, and A and B are constants, then prove that E(AX+B)= A E(X)+B, where E(X) is expected value of X.
2. What are the conditions under which Poisson distribution is a limiting case of Binomial Distribution
3. What do you mean by Correlation between two random variables?
4. Discuss briefly the Bernoulli's distribution.
5. Define Type-I and Type-II errors.
6. State central limit theorem.
7. Write the relations between Lq, Ls, Wq, and Ws in (M/M/1) : (∞/FIFO) model.
8. Write some applications of queuing theory
9. Suppose that the probability of a dry day (state 0) follows a rain day (state 1) is 1/3 and probability of a rain day follows a rain day is 1/2. Find out the two state Markov chain and transition probability matrix.
10. Test the matrix $\begin{bmatrix} 1 & 0 \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ is stochastic or not.

PART-B

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

1. In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.

OR

2. The probability that a bomb dropped from a plane will strike the target is 1/5. If six bombs are dropped, find the probability that (i) exactly two will strike the target (ii) at least two will strike the target.

3. In a partially destroyed laboratory record, only the lines of regression of y on x and x on y are available as 4x-5y+33=0 and 20x-9y=107 respectively. Calculate $\bar{x}$, $\bar{y}$ and the coefficient of correlation between x and y.

OR

4. Given bi-variate data

x	1	5	3	2	1	1	7	3
y	6	1	0	0	1	2	1	5

    a) Find the regression line y on x and hence predict y when x= 10.

    b) Find the regression line x on y and hence predict y when y= 2.5.

5. ON the basis of their total scores, 200 candidates of a Civil service examination are divided into two groups, the upper 30% and the remaining 70%. Consider the first question of the examination. Among the first group, 40 had the correct answer, where as among the second group, 80 had the correct answer. On the basis of these results, can one conclude that the first question is not good at discriminating ability of the type being examined here?

OR

6. The following table gives the number of aircraft accidents that occurred during the various days of the week. Find whether the accidents are uniformly distributed over the week

Day	SUN	MON	TUE	WED	THU	FRI	SAT	TOTAL
No. of accidents	14	16	8	12	11	9	14	84

7. At a certain petrol pump, customers arrive in a Poisson process with an average time of five minutes between arrivals. The time intervals between serves at the petrol pump follows exponential distribution and the mean time taken to service a unit is two minutes . Find the following: a) Average time a customer has to wait in the queue. b) By how much time the flow of the customers be increases to justify the opening of another service point, where the customer has to wait for five minutes for the service.

OR

8. Consider a single server queueing system with poisson input and exponential service time. Suppose the mean arrival rate is 3 calling units per hour with the expected service time as 0.25 hours and the maximum possible number of calling units in the system is 2.Obtain the steady state probability distribution of the number of calling units in the system and then calculate the expected number in the system.

9. a) Write classification of stochastic process.

    b) Define irreducible and ergodic matrix.

OR

10. a) Check whether the following markov chain is ergodic and regular.   [8M]

$$\text{i) } P = \begin{bmatrix} 0 & \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{2} & 0 & 0 & \frac{1}{2} \\ \frac{1}{2} & 0 & 0 & \frac{1}{2} \\ 0 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \end{bmatrix} \qquad \text{ii) } P = \begin{bmatrix} 0 & \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{2} & 0 & 0 & \frac{1}{2} \\ \frac{1}{2} & 0 & 0 & \frac{1}{2} \\ 0 & \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$$

    b) Define regular stochastic matrix and give an example.   [2M]