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-2017

SUBJECT: <u>PROBABILITY AND STATISTICS</u>

Branch: Common to ME, CSE, IT & MINING

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer all the questions   5x1M=5 Marks

1) In a binomial distribution the sum and product of the mean and variance are $\frac{25}{3}$ and $\frac{50}{3}$. Find the distribution.

2) Write the rank correlation formula for repeated ranks.

3) Write the finite population correction factor.

4) If arrival rate is 3 per hour service rate is 5 per hour then find traffic intensity.

5) Define markov chain.

II. Answer all the questions   10x2M=20 Marks

1) If X is a poisson variate such that $P(X=1) = 24\, P(X=3)$ then find $P(X=0)$.

2) If $\mu = 5$ and $\sigma = 2$ then write the normal distribution.

3) Is the data, regression coefficient Y on X is 0.7 and that of X on Y is 3.2 correct? If not justify your answer.

4) Write the formula for covariance between two continuous random variables.

5) Define unbiased estimator.

6) Define Type-I and Type-II errors.

7) If average number arrivals is 4 per hour and average number of services is 6 per hour then find the probability that a new arrival need not wait for the service.

8) Arrival rate is 10 per day service rate is 16 per day .The consists of 8 working hours find expected idle time per day.

9) Show that the transition probability matrix of markov chain $\begin{bmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{bmatrix}$ is irreducible.

10) Is the matrix $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{1}{4} & \frac{3}{4} \end{bmatrix}$ stohastic?

PART-B

Answer all questions   5x10 Marks= 50Marks

1) Using recurrence relation between the probabilities find the probabilities when x= 0, 1,2,3,4 and 5 if the mean of the poisson distribution is 3.

(OR)

2) When the mean of marks was 50% and standard deviation5% then 60% of the students failed in an examination. Determine the grace marks to be awarded in order to show that 70% of the students passed .Assume that the marks are normally distributed.

3) The random variable X has a mean value 3 and variance 2. Anew random variable Y defined as Y= 3X-11.Check whether

       (a)X and Y are orthogonal to each other.

       (b) X and Y are uncorrelated to each other.

<div align="center">(OR)</div>

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) A coin was tossed 400 times and returned heads 216 times .Test the hypothesis that the coin is unbiased. Use 0.05 level of significance.

<div align="center">(OR)</div>

6) The nine items of a sample had values 45, 47,50,52,48,49,47,53 and 51. Does the mean of nine items differ significantly from the assumed population mean of 47.57.

7) 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.

<div align="center">(OR)</div>

8) Assume the goods trains are coming in a yard at the rate of 30 trains per day and suppose that inter arrival time follows an exponential distribution .The service time per each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time, calculate the probability that e yard is empty and find the average queue length.

9) A fair die is tossed repeatedly. If X_n denotes the maximum of the numbers occurring in the first n tosses ,find the transition probability matrix P of the markov chain $\{X_n\}$,findP^2 and P(X_2=6).

<div align="center">(OR)</div>

10) Define stochastic processes,write its specification and classification.

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: **Mathematical Foundations of Computer Science**

Branch: CSE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks

1. Define predicate with one example.
2. Verify the following formulas are well formed formulas are not?
     (i) $P \to (P \lor Q)$ (ii) $(P \to (\sim P)) \to \sim P$
3. How many different arrangements are there of the letters a,a,a,b,c ?
4. Find the coefficient of $X_1^2 X_2^2 X_3^2$ in $(2X-3Y+5Z)^{10}$
5. Is $K_{2,3}$ is a complete bipartite Graph?

II. Answer All Questions   10x2Marks=20Marks

1. Write the following statement into symbolic form
     All men are mortal
     Socrates is a men
     Therefore Socrates is a mortal
2. Write Short notes on normal forms.
3. Verify and Explain the following relation R on 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. Let A={1,2,3} Determine all Partitions of A?
5. Explain Multinomial Theorem?
6. What is permutation group? Explain with example?
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. Solve the recurrence relation $a_n= na_{n-1}$ for $n \ge 1$ where $a_0=1$.
9. Define Spanning tree?
10. Draw a diagram for four dimensional hypercube Q_4.

PART-B

Answer all questions   5x10 Marks= 50Marks

1. Show that $\sim p$ follows from the set of premises $(r \to \sim q)$, $r \lor s$, $s \to \sim q$, $p \to q$ using indirect method of proof

OR

2. Obtain POS of the following formulas
     (i) $(P \land Q \land R) \lor (\sim P \land R \land Q) \lor (\sim P \land \sim Q \land \sim R)$
     (ii) $P \lor (\sim P \to (Q \lor (\sim Q \to R)))$

3. Define the following terms (i) Group (ii) Abelion Group iii) Semi Group iv) Sub Group

OR

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

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

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

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

$s= \{<1,1>,<2,2>,<3,3>\}$

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

5. a) Find the number of non negative integral solutions to $X_1+X_2+X_3+X_4+X_5=10$

   b) Find the number of arrangements of letters "MISSISSIPPI".

OR

6. a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each.

   b) Using multinomial theorem, expand $(2X-3Y+4Z)^3$

7. Solve the recurrence relation $a_n-7a_{n-1}+12a_{n-2} =0$ for $n\geq2$ where $a_0=1$, $a_1=2$

OR

8. Find the general expression for a solution to the recurrence relation $a_n-5a_{n-1}+6a_{n-2} =n(n-1)$ for $n\geq2$

9. Find the Chromatic number of the following graphs
   (a) Complete Graph (K_3)
   (b) Complete Bipartite Graph $(K_{2,3})$
   (c) Regular Graphs (K_3)

OR

10. Explain and illustrate BFS and DFS with examples?

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: Advanced Data Structures
Branch: CSE

Time: 3 hours

Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks

1. What is Recursive Algorithm?
2. What are the different types of Queues?
3. What is Graph?
4. What are the best and worst time complexities of Radix sorting?
5. What is Binary search tree?

II. Answer All Questions   10x2Marks=20Marks

1. Give an example for insertion and deletion operations of doubly linked list.
2. Define time and space complexities.
3. Write the program segment for push operation of stack in C.
4. Give the time complexities of applications using postfix and prefix evaluation?
5. Construct max heap tree for the following elements

    10, 3, 21, 15, 5, 2, 1, 7, 34, 23, 8, 10, 22, 14

6. Define the following

    a) BFS   b) DFS

7. What are the different hashing techniques?
8. What is sorting? Give example.
9. Define tries.
10. Define AVL trees? Give an example.

PART-B

Answer all questions   5x10 Marks= 50Marks

Q1. i) Explain classification of data structures. Write notes on

    a) Linear Data structures   b) Non-linear Data Structures   [2+2+2]

    ii) Define sparse matrix? Explain its array and linked representations.   [1+3]

(OR)

Q2. Define doubly linked list? Write a C program for the following operations

    a) Insertion of a new node   b) Deletion of a node   [2+8]

Q3. Reverse the order of elements on a stack S

     (i) using two additional stacks.

     (ii) using one additional queue.   [5+5]

(OR)

Q4. Define circular queue. Write a C program to perform insertion and deletion operations.[10]

Q5. A) Define Tree. Explain the following

  i)Terminology   ii) Representation of Trees.   [1+2+2]

  B) Define Binary tree. What are its properties?   [2+3]

(OR)

Q6. Define Max priority queue ADT and write a C program for implementation of Max priority queue.

                    [10]

Q7.A) Define Hashing. Explain any three hashing functions.   [1+4]

  B) The following elements are inserted into an initially empty hash table of size 7 using hash

    function $H(x)=(2*x+2)\%7$ and linear probing. Give the hash table?   [5]

    10, 112, 165, 34, 8, 293, 387 and 7.

(OR)

Q8. Define Quick sort and write a C program to implement it.   [10]

Q9. A) Define structure of a Btree.Explain the process for inserting an element into a B tree.   [5]

  B) Define Red-Black and Splay trees with examples.   [2.5+2.5]

(OR)

Q10. Write a C program that implements kunth-morris-pratt pattern matching algorithm to determine
the index of the string S1 of length m in the string S2 of length n, where m<n.   [10]

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: <u>Digital Logic Design</u>

Branch: CSE

Time: 3 hours   Max. Marks: 75

PART-A

I. Answer all the questions   5x1=5M

1. Find the two's complement of $(10110)_2$
2. What is the even parity bit for the binary number 1011_2
3. State the principle of encoder.
4. Convert SR flip flop to D Flip Flop.
5. What is PAL and how it differs from PROM and PLA?

II. Answer all the questions   10x2=20M

1. Convert the binary code $(11001)_2$ to gray code
2. Perform the binary addition and binary subtraction on the following binary numbers
   $(11101)_2$, $(10111)_2$
3. State which of the following expressions are not in SOP form
   a. $RS\overline{T} + \overline{R}S\overline{T} + \overline{T}$
   b. $A\overline{D}\overline{C} + \overline{A}DC$
4. Define essential prime implicants?
5. State the principle of demultiplexer and 1X2 demultiplexer
6. Define combinational circuit with an example
7. When the toggling condition occurs in J-K Flip flop?
8. What is the reason for using D Flip flop for storing data?
9. Compare static RAM and Dynamic RAM
10. List out various types of hazards.

PART-B

Answer all the questions   5x10=50M

Q1. Minimize the following Boolean expressions to the required number of literals.
a. $BC+AC^1+AB+BCD$ to 4 literals
b. $ABC+A^1B^1C + A^1BC+ABC^1+A^1B^1C^1$ to 5 literals

(OR)

Q2.
a. Given that $(16)_{10}= (100)_b$, determine the value of b.
b. Given that $(292)_{10}= (1204)_b$, determine the value of b.

Q3.
a. Implement the following function using only NOR gates
   $F=a(b+cd) + (b\overline{c})$

b. Implement the following function using only NAND gates
   $G = (a + b)(cd + \overline{e})$

(OR)

Q4.

a. Minimize the following expression using K-map

$f(A, B, C, D) = \Sigma(1,4,7,10,3) + \Sigma d\,(5,14,15)$

b. Find the complement and dual of the function below and then reduce it to a minimum number of literals in each case

$f = \left(\left(\overline{ab}\right)a\right)\left(\left(\overline{ab}\right)b\right)$

Q5. Write a dataflow description for the BCD-to-excess 3 converter using the Boolean expressions.

(OR)

Q6. Design a combinational circuit whose input is a 4-bit no & whose output is the 2's comp of the input no.

Q7. Design and realize synchronous counter for the following count sequence using SRFF's

$0\to2\to5\to1\to7\to0$

(OR)

Q8. a. Design a 4 bit synchronous counter with DFF

b. Design a counter with the following binary sequences: -

0, 1,2,3,4 use JK FF's

Q9. A 12 bit Hamming cod containing 8 bits of data and 4 parity bits is read from memory. What was the original 8 bit word if the 12 bit read out is as follows?

a. 0000   1110   1010

b. 1011   1000   0110

(OR)

Q10 Compare the merits and demerits of SRAM and DRAM

MR 14

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: Managerial Economics And Financial Analysis

Branch: CSE

Time: 3 hours

Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks

1. Define Law of Demand.
2. Isoquants and Isocosts.
3. Bundling Pricing.
4. Trial Balance
5. Current Ratio

II. Answer All Questions   10x2Marks=20Marks

1. What is the Scope of Managerial Economics?
2. Define Law of Diminishing Marginal Utility
3. State the difference between Explicit costs Vs. Implicit costs
4. What is Equilibrium Price?
5. What is smart pricing?
6. Define Memorandum of Association?
7. What is dual aspect concept?
8. Define Accounting Rate of Return (ARR)
9. Limitations of ratio analysis
10. Define Inventory turnover ratio?

PART-B

Answer all questions   5x10 Marks= 50Marks

Q1. Define Managerial Economics. Illustrate how it helps in solving managerial problems.

(OR)

Q2. Explain the nature of demand. What could be the different variations in the nature of demand?

Q3. Discus the Economies of scale that accrue to a firm

(OR)

Q4. From the following data, you are required to calculate:

(a) P/V ratio

(b) Break-even sales with the help of P/V ratio.

(c) Sales required to earn a profit of Rs. 4,50,000

Fixed Expenses = Rs. 90,000

Variable Cost per unit:

Direct Material = Rs. 5

Direct Labour = Rs. 2

Direct Overheads = 100% of Direct Labour

Selling Price per unit = Rs. 12.

Q5. Define partnership. Explain its features. Evaluate it as against sole proprietorship.

(OR)

Q6. Illustrate the different phases in Business Cycles.

Q7. From the following Trial balance of NTJS Traders, prepare final accounts for the year ended 31-12-2013.

Particulars	Debit (Rs.)	Credit (Rs.)
Capital		3,00,000
Cash	5,000	
Purchases	19,000	
Purchases returns		500
Sales		20,000
Wages	1,000	
Salaries	800	
Factory Insurance	200	
Rent	650	
Carriage	150	
Office expenses	200	
Carriage outwards	200	
Machinery	8,000	
Furniture	6,000	
Discount allowed	250	
Discount received		1,500
Goodwill	3,550	
Opening Stock	1,500	
Debtors	8,500	
Creditors		3,000
Total:	55,000	55,000

(OR)

Q8. A) Define Capital budgeting. Explain its importance.

   B) The cost of a project is Rs. 2, 40,000 and the annual cash inflows for the next five years are Rs. 60,000. What is the Payback period for the project?

Q9. From the data, calculate :

(i) Gross Profit Ratio   (ii) Net Profit Ratio   (iii) Return on Total Assets
(iv) Inventory Turnover (v) Working Capital Turnover (vi) Net worth to Debt

Sales	25,20,000	Other Current Assets	7,60,000
Cost of sale	19,20,000	Fixed Assets	14, 40,000
Net profit	3,60,000	Net worth	15,00,000
Inventory	8,00,000	Debt.	9,00,000
Current Liabilities	6,00,000		

(OR)

Q10 What is a ratio? What are the types of ratios?

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: **Basic Electrical And Electronics Engineering**

Branch: **Common to ME & CSE**

Time: 3 hours
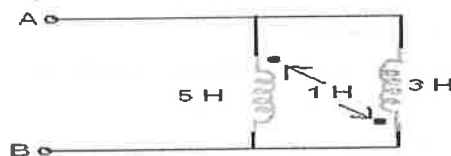
Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks
1. Define Electromagnetic force.
2. How eddy current losses can be minimized?
3. Define Slip.
4. Define a Transistor.
5. List out the applications of oscillators.

II. Answer All Questions   10x2Marks=20Marks
1. State Ohm's law
2. Explain Kirchhoff's laws
3. What is the equivalent inductance across AB?

4. Explain why transformer rating is mentioned in kVA?
5. What are the two functions of a commutator in DC Machine?
6. Explain the basic principle of operation of a DC generator.
7. Define ripple factor for all types of rectifier and formulate.
8. What is the major difference in between Avalanche break down voltage and Zener break down voltage?
9. List out the applications of CRO.
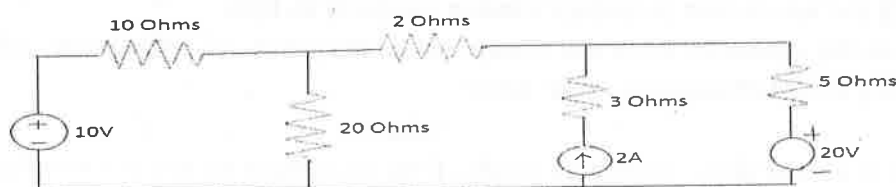10. Draw the circuit diagram of a colpitt's oscillator.
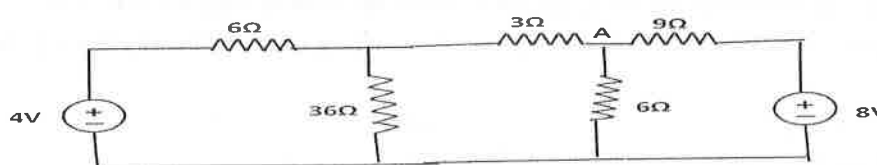
PART-B

Answer all questions   5x10 Marks= 50Marks
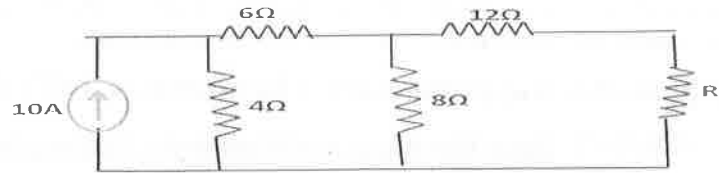**Q1. a).** Find current flowing through 2Ω Resistor using nodal Analysis.   (5M)

b). Find the current through 6Ω resistor by using Thevenin's theorem.   (5M)

(OR)

Q2. a) Find the value of R_L for receiving maximum power from the source. Also determine the maximum power. (6M)

b). Find the equivalent resistance between A & B for the following network. (4M)

Q3. a). Derive an expression for the emf of an Ideal transformer. (4M)

b). A 25 kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. compute: i) Full load primary current ii) The induced voltage in the secondary winding iii) Max Flux. (6M)

(OR)

Q4. a). The iron loss in a transformer core at normal flux density was measured at frequency of 30 Hz and 50 Hz, the results being 30 W and 54 W respectively. Compute

      i) The hysteresis loss and

      ii) The eddy current loss at 50 Hz. (6M)

b). Explain self and mutual inductances. (4M)

Q5. a). Distinguish between generator action and motor action .Derive the equation for the back emf of a DC motor. (5M)

b). The armature of 6 pole DC generator has a wave winding containing 664 conductors. Compute the generator emf when flux per pole is 0.06 Weber and the speed is 250 rpm. At what speed must be the armature an emf of 250 V if the flux per pole is reduced to 0.058 Weber. (5M)

(OR)

Q6. a). Draw and explain the complete torque – speed characteristic of a three – phase induction machine for all ranges of speed. (5M+5M)

b). A 3-phase 12 -poles delta connected induction motor has a full load slip of 5%,if the supply frequency is 100Hz,find the synchronous speed, full load speed and frequency of rotor e.m.f.

Q7. a) Draw the circuit diagram of half wave rectifier with capacitor input filter. Explain the operation with waveforms. (4M)

(b) A HWR circuit fed a resistive load of 10KΩ through a power transformer having a step-down turns ratio of 8:1 and operated from 230V, 50Hz A.C. Assume the forward resistance of diode to be 40Ω and transformer secondary winding resistance as 12Ω.
Calculate the maximum, RMS and average values of current, DC O/P voltage and power, efficiency of rectification and ripple factor. (6M)

(OR)

Q8. a). What is a zener diode? How does it differ from an ordinary pn-junction rectifier diode? (3M)

b). Give the V-I characteristics of zener diode and explain its salient features in relation to that of pn diode. (4M)

c). Give the equivalent model of zener diode under the reverse biased condition. (3M)

Q9. With the help of a block schematic, explain the working of a CRO and what are the applications of CRO? (10M)

(OR)

Q10. a). Explain the working of Hartley Oscillator. (5M)

b). Explain the working of wein Bridge Oscillator. (5M)