

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: PROBABILITY AND STATISTICS****Branch: Common to ME, CES, 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 $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{1}{4} & \frac{3}{4} \end{bmatrix}$ stochastic?

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 deviation 5% 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. A new random variable Y defined as $Y = 3X - 11$. Check whether
- X and Y are orthogonal to each other.
 - X and Y are uncorrelated to each other.

(OR)

- 4) Given bi-variate data

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

- Find the regression line y on x and hence predict y when $x = 10$.
 - 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.
- (OR)
- 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.
- (OR)
- 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 the 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 $\{X_n\}$, find P^2 and $P(X_2 = 6)$.
- (OR)
- 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) $P \rightarrow (PVQ)$ (ii) $(P \rightarrow (\sim P)) \rightarrow \sim P$
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 $0 \leq e_1 \leq 3, 2 \leq e_2 \leq 6, e_3$ is odd and $1 \leq e_3 \leq 9$.
8. Solve the recurrence relation $a_n = na_{n-1}$ for $n \geq 1$ 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 $(r \rightarrow \sim q), r \vee s, s \rightarrow \sim q, p \rightarrow q$ using indirect method of proof

OR

2. 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) $P \vee (\sim P \rightarrow (Q \vee (\sim Q \rightarrow R)))$

3. Define the following terms (i) Group (ii) Abelian 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

$$f = \{ \langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 1 \rangle \}$$

$$g = \{ \langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 3 \rangle \}$$

$$h = \{ \langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 1 \rangle \}$$

$$s = \{ \langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 3 \rangle \}$$

Find $f \circ g$, $g \circ f$, $f \circ h \circ g$, $s \circ g$, $g \circ s$, $f \circ s$, $f \circ h$, $f \circ s \circ h$, $f \circ f$.

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 $n \geq 2$ 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 $n \geq 2$

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-2017SUBJECT: Digital Logic Design

Branch: CSE

Time: 3 hours

Max. Marks: 75

PART-A**I. Answer all the questions****5x1=5M**

1. What is 2's complement. [1M]
2. What is K map? [1M]
3. Define Multiplexer? [1M]
4. Define latches. [1M]
5. What is Error Detection and correction [1M]

II. Answer all the questions**10x2=20M**

1. Convert the following binary numbers into hexadecimal format
 - a. 0101010011
 - b. 1100100110001 [2M]
2. State any three postulates of Boolean Algebra [2M]
3. Simplify the expression $f(A,B,C)=\Sigma(0,2,4,6)$ using K-Map [2M]
4. Realize the following sum of products expression using NAND gates.

$$G(A,B,C)=AB+BC+B'$$
 [2M]
5. What is Combinational Circuit [2M]
6. Implement $f(a,b,c)=\Sigma(0,2,3,7)$ using decoder. [2M]
7. What is State Reduction? [2M]
8. Draw the block diagram of a sequential circuit [2M]
9. What are the types of RAM's ? [2M]
10. Define static-1 ,static-0 [2M]

PART-B**Answer all the questions****5x10=50M**

1. i) Convert 0.640625 decimal numbers to its octal and hexa decimal equivalent [5+5]
 ii) Explain the properties and function of Boolean algebra
 (OR)
2. We can perform logical operations on strings of bits by considering each pair of corresponding bits separately (called bit wise operation). Given two eight-bit strings $A = 10110001$ and $B = 10101100$, evaluate the eight-bit result after the following logical operations
 i)AND ii)OR iii)XOR iv)NOT A v)NOT B (i.e. B') [10]

3. Simplify the following Boolean expression ,F using 5 variable K-Map
 $F(A,B,C,D,E)=\Sigma m(0,2,4,5,6,7,8,13,21,23,25,29,31)$ and realize the circuit using NOR gates. [10]
- (OR)
4. What is HDL? Explain different architectures? [10]
5. Differentiate between Encoder , Decoder ,Multiplexer and Demultiplexer.
Implement the following using 8:1 Multiplexer $G(A,B,C,D)=\Sigma m(0,2,4,6,8,9,10,11,13,15)$ [10]
- (OR)
6. Design a Decimal subtractor circuit and draw the logic diagram [10]
7. Explain i) latches ii) shift Registers [5+5]
- (OR)
8. Explain i) SR Flip Flop ii) JK Flip Flop. [5+5]
9. Write about different types of memories in detail. [10]
- (OR)
10. Explain the difference between asynchronous and synchronous sequential circuits [10]

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017**SUBJECT: Environmental Studies**

Branch: **Common to CE & Mining (MR14)**
CSE (MR13)

Time: 3 hours**Max. Marks: 75****PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. Define cybernetics.
2. What is meant by Genetic discovery?
3. List out the Primary and Secondary air pollutants.
4. What are the ozone depleting substances?
5. What is 3R approach?

II. Answer All Questions**10x2Marks=20Marks**

1. Explain the significance of bio-magnification in food chains.
2. What are Ecological pyramids? Give a note on pyramid of Biomass.
3. What are the uses of various types of minerals?
4. Write the differences between Species, Habitat, Genetic bio diversity.
5. Enumerate the benefits of CETP.
6. Differentiate between point sources and non-point sources of water pollution.
7. Write a brief note on rain water harvesting.
8. Give a brief account on Montreal protocol.
9. Discuss about Clean Development Mechanism (CDM).
10. Write any four function of Pollution Control Board.

PART-B**Answer all questions****5x10 Marks= 50Marks**

1. Explain energy flow in an ecosystem. Write a note on energy flow models with the help of diagrams.

(OR)

2. What are biogeochemical cycles? Explain the Carbon cycle with the help of neat diagram.
3. Briefly discuss growing energy needs and give an account of renewable energy resources in detail.

(OR)

4. Describe the following
 - a) Poaching
 - b) Loss of habitat
 - c) Remedial measures to reduce human animal conflict.
5. Explain about effect of water pollution in detail.

(OR)

6. Describe in detail about sewage treatment plants.
7. Define Green house Effect. Discuss the potential and contribution of these gases to global warming phenomenon.

(OR)

8. Explain methods of base line data acquisition.
9. Define various techniques an individual can follow to conserve natural resources.

(OR)

10. Define solid waste management and explain various methods of disposal for municipal and industrial solid wastes.

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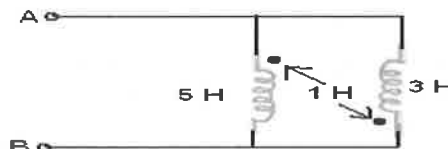
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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017**SUBJECT: Basic Electrical And Electronics Engineering****Branch: Common to ME & CSE****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer All Questions****5x1Mark=5Marks**

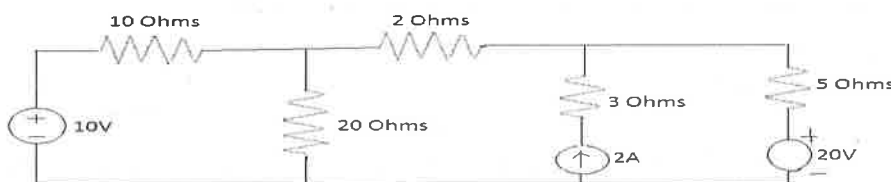
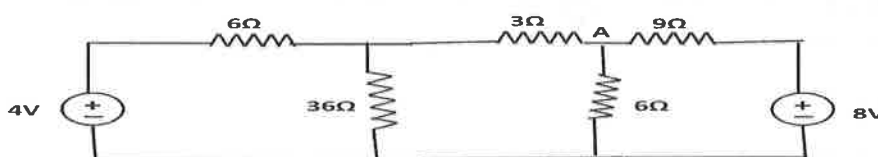
1. Define Electromagnetic force.
2. How eddy current losses can be minimized?
3. Define Slip.
4. Define a Transistor.
5. List out the applications of oscillators.

II. Answer All Questions**10x2Marks=20Marks**

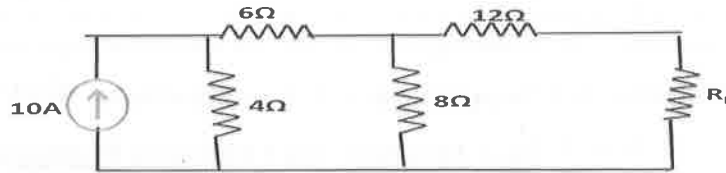
1. State Ohm's law
2. Explain Kirchhoff's laws
3. What is the equivalent inductance across AB?



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 $10\text{K}\Omega$ 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)