AR18

CODE: 18ECT206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supl. Examinations, March,2021

PROBABILITY AND STOCHASTIC PROCESSES

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) (i) Give Classical and Axiomatic definitions of Probability 6M
   (ii) $P(A \cup B) = 2/3, P(\overline{A} \cup \overline{B}) \cap A) = 1/3 \& P(\overline{A} \cap B) + P(A \cap \overline{B}) = 1/2$. What is the value of $P(A/B)$
   b) A box contains 6 Red ,4 White and 5 Black balls. A person draws 4 balls at random. Find the probability that among the balls drawn there is at least one ball of each color 6M

(OR)

2. a) Explain about joint and conditional probability. 6M
   b) State and prove Baye's theorem 6M

UNIT-II

3. a) A fair die is tossed. Let X denotes twice the number appearing, and let Y denotes 1 or 3 according as an odd or an even number appears. Find the distribution, expectation, variance and standard deviation of (i) X (ii) Y (iii) X+ Y. 6M
   b) State and explain Gaussian, density and distribution functions with graphs. 6M

(OR)

4. a) Define the Distribution function and explain the properties of Distribution function? 6M
   b) A binary source generates digits 1 and 0 randomly with probabilities 0.6 and 0.4 respectively.
   i) What is the probability that two 1s and three 0s will occur in a five digit sequence?
   ii) What is the probability that at least three 1s will occur in a five digit sequence? 6M

UNIT-III

5. a) Prove that the density of sum of two independent random variable is convolution of their individual density functions. 4M

   b) The joint density function of the random variables X and Y is given as 8M

$$f_{XY}(x,y) = 8xy \quad \text{for } 0 \le x \le 1, \quad 0 \le y \le x$$

$$= 0 \quad \text{otherwise}$$

Find (i) Marginal density of X (ii) Marginal density of Y (iii) Conditional density of X (iv) Conditional density of Y

(OR)

6. a) Explain the Joint Moments of Random Variables. 4M

b) The joint pdf of a bivariate r.v. (X, Y) is given by 8M

$$f_{XY}(x, y) = \begin{cases} k(x+y) & 0 < x < 2,\ 0 < y < 2 \\ 0 & \text{otherwise} \end{cases}$$

where k is a constant.(i) Find the value of k. (ii) Find the marginal pdf's of X and Y.

UNIT-IV

7. a) Consider two random processes X(t)=Acosωt + B sinωt and Y(t)= Bcos ωt-A sin ωt where A and B are uncorrelated, zero mean random variables with same variance and 'ω' is a constant. Show that X(t) and Y(t) are jointly stationary? 6M

b) State and explain various properties of auto correlation function 6M

(OR)

8. a) A random process is defined as X(t)=A.cos(ω_ct+θ), where 'θ' is a random variable, uniformly distributed over(0,2π). Verify the process is Ergodic in the mean sense and auto correlation sense. 8M

b) When does the time average converge to the ensemble average? Justify the answer. 4M

UNIT-V

9. a) A random process has the autocorrelation function 6M

$$R_{XX}(\tau) = \frac{4\tau^2 + 6}{\tau^2 + 1}$$

Find the mean-square value, the mean value and the variance of the process.

b) Explain about Gaussian white noise process? 6M

(OR)

10. a) Explain the concept of power density spectrum in detail. 6M

b) A wide sense stationary noise process N(t) has an auto correlation function 6M

$R_{NN} = Pe^{-3|\tau|}$, where P is a constant. Find its power spectrum

***

AR16

CODE: 16OE2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI (AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2021

OPEN ELECTIVE

MATRICES AND APPLICATIONS

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a Reduce the matrix $A = \begin{bmatrix} 2 & 3 & 4 \\ 2 & 6 & 8 \\ 4 & 3 & 4 \end{bmatrix}$ into Echelon form and determine its rank. **7M**

   b Determine for what values of **a, b** the simultaneous equations **7M**

   x+y+z = 6, x+2y+3z=10, x+2y+az = b have a unique solution

(OR)

2. Determine P and Q such that the normal form of matrix $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$ is PAQ. **14M**

   Hence determine the rank of A.

UNIT-II

3. Determine the Eigen values and the corresponding Eigen vectors of the matrix **14M**

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

(OR)

4. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ and determine **14M**

   A^{-1} *and* A^3

UNIT-III

5. **14M**

   Use LU decomposition to solve the system of equations

   $2x + 4y - 6z = -4\,; x + 5y + 3z = 10\,, x + 3y + 2z = 5$

(OR)

6 Solve the system of equations 2x+3y+z=9, x+2y+3z=6, 3x+y+2z=8 **14M**

by using matrix inversion method.

UNIT-IV

7. Determine rank, index, signature and nature. the quadratic from **14M**
$x^2 - 2y^2 + 3z^2 + 6xz - 4yz$ and reduce its canonical form .

(OR)

8. **14M**
Reduce the quadric form to the canonical form by an orthogonal reduction
$$3x^2 + 5y^2 + 3z^2 - 2xy - 2yz + 2xz$$

UNIT-V

9. Write the matlab code to solve the linear system of equation
$a_{11}x + a_{12}y + a_{13}z = b_1; a_{21}x + a_{22}y + a_{23}z = b_2; a_{31}x + a_{32}y + a_{33}z = b_3$ **14M**

(OR)

10. Write the matlab code to find the eigen values and the corresponding eigen vectors of **14M**
$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$.

***

AR16

CODE: 16OE2012 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Suppl. Examinations, March,2021

OPEN ELECTIVE

WATER SHED MANAGEMENT

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define watershed and discuss the concept of watershed development	7 M
	b)	Explain about the need of watershed development in India	7 M
		(OR)	
2.		Discuss how the watershed is influenced by the characteristics of shape and size, climate, land use, geology, hydrology, hydrogeology and slope	14 M

UNIT-II

3.		List out various causes of soil erosion and explain any four causes in detail	14 M
		(OR)	
4.	a)	Discuss in detail about Erosion control methods with a neat sketch: Furrowing and bunding	6 M
	b)	Explain in detail how the following measures arrest the soil erosion in a watershed By Gully Control and Trenching	8 M

UNIT-III

5.	a)	Define rain water harvesting and explain its merits.	7 M
	b)	Discuss in detail about water harvesting structures	7 M
		(OR)	
6.		Describe how the moisture loss is happen in the soils through evapotranspiration and explain how it is conserve by organic matter, spreading manure or compost and green manuring techniques	14 M

UNIT-IV

7.		Define the terms Land use and Land capability? Explain in detail about the classification of land capability	14 M
		(OR)	
8.	a)	Explain the management of Forest land and Grass land in a watershed management	7 M
	b)	Classify the reasons for soils to turn into saline and alkaline soils and what are the steps to reclaim to normal state	7 M

UNIT-V

9.	a)	Classify the cropping pattern for soil enrichment in a watershed program	6 M
	b)	Explain the crop husbandry and sustainable agriculture in a watershed programme	8 M
		(OR)	
10.		What is cropping pattern and explain how do you attempt ecosystem management with the Biomass management	14 M

***

AR16

CODE: 16OE2013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2021

OPEN ELECTIVE

INTRODUCTION TO MATLAB

(COMMON TO CSE,IT, ECE, CIVIL & MECH)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) List the key features and applications of MATLAB? 7M
   b) List the broad classification of operators available in the MATLAB. 7M

(OR)

2. a) Explain different arithmetic operators available in MATLAB with suitable examples? 7M
   b) Explain different format functions available in the MATLAB and their purpose? 7M

UNIT-II

3. a) Develop an program to find the roots of the quadratic equation X^2-7X+10 using MATLAB. 7M
   b) Given A=[2 3 -1 2;3 1 5 1;2 5 -2 1;3 1 3 -1;],B=[3 -2 1 -2; 2 3 4 0; 3 2 1 2;], C=[0;3;5;-3;-2;1] determine the following. 7M
      i) Length of C
      ii) Size of A
      iii) A(2,3)+B(3,1)
      iv) B(3,:)
      v) A(:,3)
      vi) B(3,:) = [ ]
      vii) A([3:4],:)

(OR)

4. a) Explain how write 'function' with a suitable example. 7M
   b) Explain 'Nested function (function calling another function)' structure; explain with it a suitable example. 7M

UNIT-III

5. a) Develop a script file to find maximum number in a given set of 3 values using 'if-else' condition — 7M

   b) Develop a script file to the factorial of a given number using 'for loop'. — 7M

(OR)

6. Explain the different 'condition statements' available in the MATLAB with suitable examples — 14M

UNIT-IV

7. a) Develop the code for evaluating the following functions — 8M

   i) $\int_1^2 3x^3$

   ii) $\frac{dy}{dx}$, at x=2 where $y=3x^2+4x+1$;

   b) Develop the code for plotting parabola $y=2t^2$ $0 \le t \le 20$ with suitable labels and title of graph. — 6M

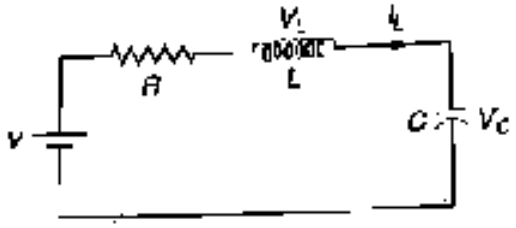
(OR)

8. a) Develop the code to evaluate the maxima and minima of the function
   $f(x)= x^3-6x^2+9x+15$ — 8M

   b) Explain the commands 'solve' and 'roots' available in MATLAB with suitable example — 6M

UNIT-V

9. a) Develop Simulink model for a simple R-L-C series circuit supplied with step input with the following parameters: R=10ohms, L=1mH,C=100μF, V=100V. Assume initial conditions to be zero. — 7M



   b) List the applications of Simulink. — 7M

(OR)

10. a) List the advantages of Simulink. — 6M

    b) Explain briefly the conversion of mathematical model into a Simulink model with suitable example. — 8M

AR16

CODE: 16OE2015 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March, 2021

OPEN ELECTIVE

INTODUCTION TO ELECTROINC MEASUREMENT

(Common to CE, EEE, MECH, CSE)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define following static performance characteristics a) Accuracy b) resolution c) precision	6M
	b)	Draw and explain the circuit and operation of shunt type Ohm meter.	8M
		(OR)	
2.	a)	Define following dynamic performance characteristics a) Speed of response b) Sensitivity (c) Expected value	6M
	b)	Explain Thermocouple type Ammeter.	8M

UNIT-II

3.	a)	Explain with neat sketch function Generator?	7M
	b)	Draw and explain Wave Analyzer?	7M
		(OR)	
4.	a)	Explain with neat sketch AF sine generator?	7M
	b)	Draw and explain Harmonic distortion analyzer?	7M

UNIT-III

5.	a)	List and briefly explain CRT features	6M
	b)	Explain with neat sketch Digital storage oscilloscope?	8M
		(OR)	
6.	a)	Draw and explain the Block Diagram of CRO?	7M
	b)	Explain with neat sketch Dual trace oscilloscope?	7M

UNIT-IV

7.	a)	Draw and explain Maxwell's bridge for Measurement of inductance?	7M
	b)	A Wheatstone consist of Following values R_1=4kΩ, R_2=5kΩ R_3=100kΩ find unknown resistance R_x?	7M
		(OR)	
8.	a)	Draw and explain Shearing Bridge for Measurement of capacitance?	7M
	b)	An AC bridge consist of Following values C_1=0.5μF, R_1=1kΩ, R_2=2kΩ C_3=0.5μF find unknown capacitance and resistance	7M

UNIT-V

9.	a)	Define Transducer and classify different transducer with Examples?	7M
	b)	Explain with neat sketch Linear Variable Differential Transformer?	7M
		(OR)	
10.	a)	Write short notes on thermocouples?	7M
	b)	Explain with neat sketch Data acquisition systems?	7M

AR16

CODE: 16OE2016 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2021

UNIX UTILITIES

(Common to CIVIL, EEE, ME, ECE, IT)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a	Compare and Contrast UNIX and WINDOWS	7M
	b	Explain about UNIX operating system	7M
		(OR)	
2.	a	Draw the diagram of UNIX architecture. Explain each component	6M
	b	Explain the purpose of any four special characters	8M

UNIT-II

3.	a	What is a root Directory? Explain with examples (i) pwd (ii) mkdir (iii) rmdir	8M
	b	Explain UNIX File system with diagram	6M
		(OR)	
4.	a	Explain file access permissions with examples using **'***chmod***'** command	8M
	b	Write short notes on standard display of '*vi*' editor.	6M

UNIT-III

5.	a	Define process. Explain process commands with examples (i) ps (ii) kill	6M
	b	What is the need for redirection? Explain with examples the symbols used for redirection.	8M
		(OR)	
6.	a	Write short notes on (i) pipes (ii) filters	8M
	b	What is the need for Electronic Mail? Explain with example	6M

UNIT-IV

7.	a	Explain with examples (i) cat (ii) ls (iii) cp (iv) mv	8M
	b	Write a shell script to find the sum of even numbers in a given list	6M
		(OR)	
8.	a	Write a shell script to find the number of users currently logged on to the Unix environment	7M
	b	Write a shell script to find the average of given 'n' numbers	7M

UNIT-V

9.	a	Explain with examples network related commands (i) ftp (ii) rlogin	8M
	b	Write short notes on X Windows	6M
		(OR)	
10.	a	Explain with examples network related commands (i) ping (ii) telnet.	8M
	b	Write short notes on Window Manager	6M

***

AR16

CODE: 16OE2017 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2021

Open Elective

IT SYSTEMS MANAGEMENT

(Common to CE, EEE, ME, ECE, CSE)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	With a neat sketch explain in detail about Von- Neumann Architecture	7M
	b)	Define IT Infrastructure. Explain IT infrastructure Management Activities	7M
		(OR)	
2.	a)	Write about the services of Cloud Computing	7M
	b)	Explain in brief client- Server Architecture	7M

UNIT-II

3.		Explain in detail about Information Technology Infrastructure Library(ITIL)	14M
		(OR)	
4.	a)	What is an Organization? Explain the factors to consider in designing IT Organization.	7M
	b)	Explain the process of identifying customer's requirements in designing process strategy.	7M

UNIT-III

5.	a)	Explain about Strategy-Tactics-Operations (STO) approach in detail	7M
	b)	Explain about People-Process-Technology(PPT) approach in detail	7M
		(OR)	
6.	a)	Explain about e-Waste disposal	7M
	b)	Define Model? Explain about Use Case Diagram in modelling	7M

UNIT-IV

7.	a)	Explain in detail about Communication Protocols and Standards	7M
	b)	List out the challenges of IT Managers	7M
		(OR)	
8.		Explain Network Management Goals, Organization and Functions	14M

UNIT-V

9.	a)	Explain about Hierarchical storage management	7M
	b)	Explain about Archive and Retrieve	7M
		(OR)	
10.	a)	Explain Storage Management Process and Activities	7M
	b)	Explain Backup Requirements and Restore policies	7M

AR13

CODE: 13EC2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March, 2021

SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE & EEE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Find the 2's complement number of $(1001101)_2$
   b) Find the 10's complement number of $(1950)_{10}$
   c) A(A+B)= ----------
   d) $(A+B+C)' =$ ----------
   e) The number of distinct Boolean expressions of 3 variables is----------
   f) How many variables are eliminated when 8-ones are grouped in K-map of 4-variables
   g) If A, B and C are the inputs of a full adder then the sum is given by _
   h) In 1-to-8 demultiplexer, how many select lines are required?
   i) A Johnson counter with 5 flip flops will have ……. states.
   j) Write the characteristic equation of T flip-flop.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Express the following numbers in decimal: [6M]
   (i) $(26.2)_8$ (ii) $(16.5)_{16}$
   b) What are Self complementing codes? Give examples. [6M]

(OR)

3. What are Gray codes? Justify how gray code is an Un-weighted code. Why Gray code is called as cyclic code. Create 4-bit Gray codes using reflection method. [12M]

UNIT-II

4. a) Determine the complements of the following function. [6M]
   i. A + B[A +(B+C)'D] ii. AB + A'B' + A'BC
   b) For the following functions draw the truth table. [6M]
   i. F1 = x'yz ii. F2 = xy' + x'z

(OR)

5. a) Express the following functions in sum of minterms and product of maxterms. [6M]
   i. F(A,B,C,D)=B'D+'D+BD ii. F(x,y,z)=(xy+z)(xz+y)
   b) Obtain the Dual of the following Boolean expressions. [6M]
   i. AB'C+AB'D+A'B' ii. A'B'C+ABC'+A'B'C'D

UNIT-III

6. Minimize the the following multiple output functions. [12M]
   f1 = ∑m(0, 2, 6, 10, 11, 12, 13) + d(3, 4, 5, 14, 15)
   f2 = ∑m(1, 2, 6, 7, 8, 13, 14, 15) + d(3, 5, 12).

(OR)

7. Minimize following function using Tabular minimization. [12M]
   f1 = ∑m(1, 4, 6, 7, 8, 9, 10, 11, 15)

UNIT-IV

8. Design and implement a 4 bit comparator using logic gates. [12M]

(OR)

9. a) Draw the logic diagram and truth table of 1:4 demultiplexer. [6M]
   b) Realize the logic function using 8:1 multiplexer [6M]
   F(w,x,y,z) = ∑m(0,1,3,5,6,15)

UNIT-V

10. a) Design a clocked SR flip flop. Explain its operation with the help of characteristic table and characteristic equation. Give the symbol of edge triggered SR flip-flop. [6M]
    b) Design a 3 bit Ring counter. Discuss how Ring counters differ from Twisted Ring counter. [6M]

(OR)

11. Design a 3-bit synchronous binary counter with T-flip flops. [12M]