AR23

CODE: 23BHT211 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March- 2026

TRANSFORM THEORY

(ELECTRICAL AND ELECTRONICS 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

			Marks	CO	Blooms Level
		UNIT-I			
1.		Construct $L[3t^4 - 2t^3 + 4e^{-3t} - 3\sin 5t + 5\cos 2t\ ]$.	14	1	3
		(OR)			
2.	a)	Construct $L[e^{-t}\sin^2 t]$.	7	1	3
	b)	Construct $L\left\{\int_0^t \frac{1-e^{-u}}{u}du\right\}$.	7	1	3
		UNIT-II			
3.		Use convolution theorem to evaluate $L^{-1}\left\{\frac{1}{(s^2+a^2)^2}\right\}$.	14	2	5
		(OR)			
4.		Estimate the solution of $y'' - 8y' + 15y = 9te^{2t}, y(0) = 5, y'(0) = 10$ using Laplace Transforms.	14	2	5
		UNIT-III			
5.		Build the Fourier series of $f(x) = \frac{(\pi-x)}{2}$ in$(0, 2\pi)$. Deduce $$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots$$	14	3	3
		(OR)			
6.		Build the Fourier series of $f(x) = x^2\ in\ (-\pi, \pi)$, deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots$	14	3	3
		UNIT-IV			
7.		Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(b^2-a^2)}{\pi}\int_0^\infty \frac{\lambda sin\lambda x d\lambda}{(\lambda^2+a^2)(\lambda^2+b^2)}, a, b > 0$	14	4	1
		(OR)			
8.		Find $f(x)$ if its Fourier cosine transform is $\frac{1}{1+s^2}$ and Fourier sine transform is $\frac{s}{1+s^2}$.	14	4	1
		UNIT-V			
9.	a)	Build $Z(e^{-an}\sin n\theta)$.	7	5	3
	b)	Build the inverse Z-transform of $\frac{2z^2+3z}{(z+2)(z-4)}$	7	5	3
		(OR)			
10.		Using Z-transform solve the difference equation $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$ with $u_0 = 0, u_1 = 1$.	14	5	3

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CODE: 23BHT210 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, March-2026

PROBABILITY AND STOCHASTIC PROCESSES

(ELECTRONICS AND COMMUNICATION 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

			Marks	CO	BTL
		UNIT-I			
1		A die is tossed. Find the probabilities of the events A={odd number shows up}, B={number larger than 3 shows up}, $A \cup B$, and $A \cap B$.	14	1	1
		(OR)			
2	a	A and B alternately throw pair of dice. A wins if he throws six before B throws seven and B wins if he throws seven before A throws six. If A begins, show that his chance of winning is $\frac{30}{61}$.	7	1	1
	b	Companies B_1, B_2, B_3 produce 30%, 45% and 25% of the cars respectively. It is known that 2%, 3% and 2% of the cars produced from $B_1, B_2,$ and B_3 are defective. (i) What is the probability that a car purchased is defective? (ii) If a car purchased is found to be defective what is the probability that this car is produced by company B_3?	7	1	1
		UNIT-II			
3		Determine whether the following is a valid distribution function: $$F(X) = \begin{cases} 0, & x < 0 \\ 1 - e^{-x/2}, & x \geq 0 \end{cases}$$	14	2	2
		(OR)			
4	a	For real constants $b > 0, c > 0$, and any a, find a condition on constant a and a relationship between c and a (for given b) such that the function $f_x(x) = \begin{cases} a\left[1 - \left(\frac{x}{b}\right)\right], & 0 \leq x \leq c \\ 0, & elsewhere \end{cases}$ is a valid probability density.	7	2	2
	b	A discrete random variable X has possible values $x_i = i^2, i = 1,2,3,4,5$ which occur with probabilities 0.4, 0.25, 0.15, 0.1, and 0.1, respectively. Compute the mean $\bar{X} = E[X]$ of X	7	2	2
		UNIT-III			
5		Two events A and B defined on a sample space S are related to a joint sample space through random variables X and Y and are defined by $A = \{x_1 < X \leq x_2\}$ and $B = \{y_1 < Y \leq y_2\}$. Make a sketch of the two sample spaces showing areas corresponding to both events and the event $A \cap B = \{x_1 < X \leq x_2, y_1 < Y \leq y_2\}$.	14	3	2
		(OR)			
6		Construct Poisson distribution to the following data:	14	3	2

x:	0	1	2	3	4	5	6	7	8
Observed Frequency f_i	56	156	132	92	37	22	4	0	1

UNIT-IV

Q.No	Question	Marks	CO	BL
7	Given the random process $X(t) = A\sin(\omega_0 t + \Theta)$, where A and ω_0 are constants and Θ is a random variable uniformly distributed on the interval $(-\pi, \pi)$. Define a new random process $Y(t) = X^2(t)$then (a) Develop the autocorrelation function of $Y(t)$. (b) Develop the cross-correlation function of $X(t)$ and $Y(t)$.	14	4	3
	(OR)			
8	Random variables X and Y have the joint density (a) $f_{X,Y}(x,y) = \begin{cases} \frac{1}{24}, & 0 < x < 6,\ 0 < y < 4 \\ 0 & elsewhere \end{cases}$. What is the expected value of the function $g(X,Y) = (XY)^2$?	14	4	2, 3

UNIT-V

Q.No	Question	Marks	CO	BL
9	We are given the random process $X(t) = A\cos(\omega_0 t + \Theta)$where A and ω_0 are constants and Θ is a random variable uniformly distributed on the interval $(0, \pi)$. (a) Is $X(t)$ wide-sense stationary? (b) Find the power in $X(t)$.	14	5	4
	(OR)			
10	Inspect which of the following functions can and cannot be valid power density spectrums. For those that are not, explain why? (a) $\frac{\omega^2}{\omega^6+3\omega^2+3}$ (b) $\exp[-(\omega-1)^2]$. (c) $\frac{\omega^2}{\omega^4+1} - \delta(\omega)$ (d) $\frac{\omega^4}{1+\omega^2+j\,\omega^6}$	14	5	4

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CODE: 23BHT209 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2026

NUMERICAL METHODS

(Common to 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

		Question	Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Make use of bisection method to get a root of $x^3 - 4x - 9 = 0$ upto three decimal places.	7	1	3
	b)	Make use of Newton-Rapson method to get a root of $xe^x - 2 = 0$upto three decimal places.	7	1	3
		(OR)			
2.	a)	Make use of the method of false position to get a real root of the equation $x^3 - 2x - 5 = 0$ correct to three decimal places.	7	1	3
	b)	Make use of Newton's iteration method to get a root of $x^3 - 5x + 3 = 0$ correct to 3 decimal places.	7	1	3
		UNIT-II			
3.	a)	Using Newton's forward formula, Estimate the value of $f(1.6)$, if (table A)	7	2	5
	b)	Estimate the value of $f(42)$ using Newton's backward formula, if (table B)	7	2	5
		(OR)			
4.		Given $\log_{10} 654 = 2.8156, \log_{10} 658 = 2.8182, \log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$. Using Lagrange's formula, estimate the value of $\log_{10} 656$.	14	2	5
		UNIT-III			
5.		Construct $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.1$, given that (table C)	14	3	3
		(OR)			
6.		Utilize Lagrange's formula to compute first & second derivatives at x=4 from the following table. (table D)	14	3	3
		UNIT-IV			
7.		Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule taking $h = \frac{1}{4}$.	14	4	5
		(OR)			
8.		Evaluate $\int_0^6 \frac{e^x}{1+x} dx$ using Simpson's $\frac{1}{3}rd$ rule (n=6).	14	4	5
		UNIT-V			
9.		Solve $y' = x + y, y(1) = 0$ using Taylor's method then find $y(1.1)$.	14	5	3
		(OR)			
10.		Apply Runge-Kutta method to compute an approximate value of y for $x = 0.2$ in step of 0.1 If $\frac{dy}{dx} = x + y^2, y(0) = 1.$	14	5	3

Table A (Q3 a):

x:	1	1.4	1.8	2.2
y:	3.49	4.82	5.96	6.5

Table B (Q3 b):

x:	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

Table C (Q5):

x:	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y:	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Table D (Q6):

x:	0	1	2	3	4	5
y:	4	8	15	7	6	2

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CODE: 23BHT207 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March, 2026

UNIVERSAL HUMAN VALUES

(Common to CSE, CSE(AIML), CSE(DS) & 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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	What is self- Exploration? How does Self-Exploration helps an individual to realize their core values.	7	1	K2
	b)	Describe the ethical behaviour in the work place.	7	1	K2
		(OR)			
2.	a)	Explain the Co-operation from the perspective of Universal Human Values.	7	1	K2
	b)	Define Value Education? Explain its necessity.	7	1	K2
		UNIT-II			
3.	a)	Explain the relationship: The 'I' is the Seer, the Doer, and the Enjoyer.	7	2	K2
	b)	What are the distinct activities that take place in the Self ('I') versus those in the Body?	7	2	K2
		(OR)			
4.	a)	How can we ensure harmony in self “I”.	7	2	K2
	b)	Define harmony. Explain the statement “human being is more than just a body”.	7	2	K2
		UNIT-III			
5.	a)	Discuss the human-human relationship and understanding harmony in the family.	7	3	K2
	b)	Explain the Respect is the Right Evaluation of the other human being.	7	3	K2
		(OR)			
6.	a)	How is trust the foundation value of relationships and Differentiate between intention and competence.	7	3	K2
	b)	What are the five dimensions of human endeavour in society? Explain.	7	3	K2
		UNIT-IV			
7.	a)	What are the 4 orders in the nature? how can the human order be responsible to the other?	7	4	K2
	b)	What you mean by co- existence? How are units in co-existence being in space?	7	4	K2
		(OR)			
8.	a)	Define the harmony of nature with example.	7	4	K2
	b)	Explain the recyclability in nature with example.	7	4	K2
		UNIT-V			
9.	a)	What do you understand by a Humanistic Constitution?	7	5	K2
	b)	Explain the term 'Natural Acceptance' in the context of Universal Human Values.	7	5	K2
		(OR)			
10.	a)	How is the Definitiveness of Ethical Human Conduct derived from the continuous process of Self-Exploration and Natural Acceptance?	7	5	K2
	b)	What is Humanistic Education? Explain how this educational model differs from the current system.	7	5	K2

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CODE: 20EST205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2026

Digital Logic Design

(Common To CSE & IT & AIML Branches)

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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Convert the Binary number 11010111 to decimal, octal, and hexadecimal.	5 M	1	Understand
	b)	Compute the binary code for the following excess-3 codes: (i) 10110001 (ii) 01001010	5 M	1	Understand
		(OR)			
2.	a)	Subtract (127) from (115) using eight bit 2's complement method.	5 M	1	Understand
	b)	Assume a radix-32 arbitrary number system with 0-9 and A-V as its basic digits. Express the mixed binary number $(110101.001)_2$ in this arbitrary number system.	5 M	1	Understand
		UNIT-II			
3.	a)	Prove the following Boolean theorms: (i) $x + x = x$ (ii) $x+1=1$	5 M	2	Understand
	b)	Convert the following expressions into sum of products form: i) $(AB + C)(B + C'D)$ ii) $x' + x(x + y')(y + z')$	5 M	2	Understand
		(OR)			
4.	a)	Realize basic gates using NAND and NOR gates.	5 M	2	Understand
	b)	Minimize the following function using K-map and realize using NAND gates: $F(w,x,y,z) = \sum(0,2,3,4,6,7,8,10,13) + d(5,14)$	5 M	2	Apply
		UNIT-III			
5.	a)	Draw the Truth table and Logic diagram of a Full subtractor.	5 M	3	Understand
	b)	Construct a full adder circuit using two half adders. Explain it.	5 M	3	Understand
		(OR)			
6.	a)	Draw and explain the circuit diagram of a look-ahead carry generator.	5 M	3	Understand
	b)	Draw and explain a 4-bit adder-subtractor circuit.	5 M	3	Understand
		UNIT-IV			
7.	a)	Difference between encoder and decoder	5 M	4	Understand
	b)	. Implement BCD to 7-segment decoder for cathode type using 4:16 decoder?	5 M	4	Apply
		(OR)			
8.	a)	Give a detailed note on the following a) Priority Encoder b) Design 4 bit parallel Adder	5 M	4	Understand
	b)	Draw the Block diagram, Truth table and Logic diagram of a 1×4 De-multiplexer.	5 M	4	Understand

UNIT-V

9.	a)	Construct the PROM using the conversion from BCD code to Excess-3 code?	5 M	5	Understand
	b)	Implement the following function using PAL $F=\Sigma m(0,2,3,7,9,11,15)$	5 M	5	Apply

(OR)

10.	a)	List the major differences between PLA and PAL	5 M	5	Remember
	b)	Implement the following Boolean functions with a PLA having three inputs, four products and two outputs.$F1(X,Y,Z)= \Sigma(0,1,2,4)$ $F2\ (X,Y,Z)= \Sigma(0,5,6,7)$	5 M	5	Apply

UNIT-VI

11.	a)	Draw the logic diagram of positive edge-triggered D-flipflop using NAND gates and explain.	5 M	6	Understand
	b)	Draw the logic diagram of clocked master-slave JK-flipflop using NAND gates and explain. Also draw the timing relationships. between sequential and combinational circuits.	5 M	6	Understand

(OR)

12.	a)	Draw and explain the circuit diagram of a 4-bit BCD ripple counter.	5 M	6	Understand
	b)	Design a counter with the following repeated binary sequence: 0,1,3,5,7. Use T flip-flops.	5 M	6	Apply

AR20

CODE: 20BST208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2026

PROBABILITY AND STOCHASTIC PROCESS

(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

		Marks	CO	Blooms Level
	UNIT-I			
1. a)	In a game of dice, a "shooter" cam win outright if the sum of the two numbers showing up is either 7 or 11 when two dice are thrown. Find his probability of winning outright?	5M	CO1	K1
b)	A pair of fair dice are thrown in a gaming problem. Person *A* wins if the sum of numbers showing up is six or less and one of the dice shows four. Person *B* wins if the sum is five or more and one of the dice shows a four. Find (i) the probability that *A* wins, (ii) the probability of *B* winning, and (iii) the probability that both *A* and *B* win.	5M	CO1	K1
	(OR)			
2. a)	Find the probability of drawing two red balls, in succession from a bag containing 3 red and 6 black balls when (i) the ball that is drawn first is replaced (ii) it is not replaced.	5M	CO1	K1
b)	An urn *A* contains 5 white and 3 black balls. Another urn *B* contains 3 white and 5 black balls. Two balls are taken from urn *A* randomly and are placed in urn *B*. Now, one ball is taken from urn *B*. what is the probability that it is a black balls?	5M	CO1	K1
	UNIT-II			
3. a)	A random variable X has the following probability function: (table below) (i) Determine k (ii) Evaluate $P(X<4), P(X\geq 5)$ and $P(3<X\leq 6)$	5M	CO2	K4
b)	Consider the distribution function for X defined by $F(X)=\begin{cases}0, & x<0\\ 1-\frac{1}{4}e^{-x}, & x\geq 0\end{cases}$. Determine $P(X=0)$and $P(X\geq 0)$.	5M	CO2	K4
	(OR)			
4. a)	A discrete random variable X has possible values $x_i=i^2, i=1,2,3,4,5$, which occur with probabilities 0.4, 0.25, 0.15, 0.1 and 0.1, respectively. Determine the mean value of $\bar{X}=E[X]$ of X.	5M	CO2	K4
b)	For any discrete random variable X with values x_i having probabilities of occurrence $P(x_i)$, show that the moments of X are: $m_n=\sum_{i=1}^{N} x_i^n P(x_i), \mu_n=\sum_{i=1}^{N}(x_i-\bar{X})^n P(x_i)$. Where N may be infinite for some X.	5M	CO2	K4
	UNIT-III			
5.	Construct a binomial distribution to thefollowing data: (table below)	10M	CO3	K3

Table for 3 a):

x	0	1	2	3	4	5	6
$P(x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

Table for 5:

X	0	1	2	3	4
f	30	62	46	10	2

(OR)

6. a) Constructa Poisson distribution to the following data: 5M CO3 K3

x:	0	1	2	3	4	5
Observed Frequency f_i	142	156	69	27	5	1

b) Out of 800 families with 5 childreneach, how many would you expect to have (i) 3boys (ii) 5 girls (iii) either 2 or 3 boys? Assume equalprobabilities for boys and girls. 5M CO3 K4

UNIT-IV

7. a) Two events A and B defined on a sample space S are related to a joint sample space through random variables X and Y and are defined by $A = \{X \leq x\}$ and $B = \{y_1 < Y \leq y_2\}$. Make a sketch of the two sample spaces showing areas corresponding to both events and the event $A \cap B = \{X \leq x, y_1 < Y \leq y_2\}$. 5M CO4 K3

b) (i) Find a constant b (in terms of a) so that the function 5M CO4 K1

$f_{x,y}(x,y) = \begin{cases} be^{-(x+y)}, & 0<x<a \ \ and\ 0<y<\infty \\ 0 & elsewhere \end{cases}$ is a valid joint density function.

(ii) find an expression for the joint distribution function.

(OR)

8. Two random variables X and Y have a joint probability density function$f_{X,Y}(x,y) = \begin{cases} \frac{5}{16}x^2 y, & 0 < y < x < 2 \\ 0 & elsewhere \end{cases}$ 10M CO4 K3

(i) Find the marginal density functions of X and Y

(ii) Are X and Y statistically independent?

UNIT-V

9. a) A random experiment consists of selecting a point on some city street that has two-way automobile traffic. Define and classify a random process for this experiment that is related to traffic flow. 5M CO5 K2

b) If the autocorrelation for a stationary process is $R_{XX}(\tau) = 25 + \frac{4}{1+6\tau^2}$ then evaluate the mean value and variance of the process $X(t)$. 5M CO5 K5

(OR)

10. a) Define (i) stationary random process (ii) wide sense stationary random process (iii) Ergodic random process 5M CO5 K2

b) Given the random process $X(t) = A\cos(\omega_0 t + \Theta)$ is wide-sense stationary if it is assumed that A andω_0 are constants and Θ is a uniformly distributed random variable on the interval $(-\pi, \pi)$. Define a new random process $Y(t) = X^2(t)$. Are $X(t)$ and $Y(t)$ wide- sense stationary? 5M CO5 K5

UNIT-VI

11. a) State and explain various properties power spectral density function. 5M CO6 K2

b) Consider the random process $X(t) = A\cos(\omega_0 t + \Theta)$ where A and ω_0 are constants and Θ is a uniformly distributed random variable on the interval $(0, \pi/2)$. Find δ_{XX} in $X(t)$. 5M CO6 K1

(OR)

12. a) Illustratewhether the function $\frac{\omega^2}{\omega^6+3\omega^2+3}$ be a valid power density spectrum? 5M CO6 K2

b) Suppose a cross-power spectrum is defined by 5M CO6 K1

$\delta_{XY}(\omega) = \begin{cases} a + \frac{jb\omega}{W}, & -W < \omega < W \\ 0 & elsewhere \end{cases}$, where $W > 0, a,\ and\ b$ are constants. Then find the cross-correlation function.

AR20

CODE: 20BST203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, February-2026

COMPLEX VARIABLES AND STATISTICAL METHODS

(EEE & MECH)

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	Marks	CO	Blooms Level
1.	Identify whether the function $f(z)$ defined by $f(z) = \begin{cases} \frac{(\bar{z})^2}{z}, (z \neq 0) \\ 0 \quad (z = 0) \end{cases}$ Satisfies Cauchy-Riemann conditions and derivate at origin or not?	10M	CO1	Apply K3
	(OR)			
2.	Show that the function $u(x,y) = e^{-x}(x\sin y - y\cos y)$ is harmonic. Determine its harmonic conjugate $v(x,y)$ and hence find an analytic function $f(z) = u + iv$	10M	CO1	Apply K3

	UNIT-II	Marks	CO	Blooms Level
3.	Verify Cauchy's theorem for the function $f(z) = z^3 - iz^2 - 5z + 2i$, C is the circle $\lvert z\rvert = 1$.	10M	CO2	Evaluate K5
	(OR)			
4.	Using Cauchy's theorem, Calculate $\oint_C \frac{(z+4)dz}{(z^2+2z+5)}$ where C is the circle (1)$\lvert z\rvert = 1$ (2) $\lvert z+1+i\rvert = 2$ (3)$\lvert z+1-i\rvert = 2$.	10M	CO2	Evaluate K5

	UNIT-III	Marks	CO	Blooms Level
5.	Acquire all the residues of $\frac{z^2}{(z-1)^2(z^2+1)}$	10M	CO3	Apply K3
	(OR)			
6.	Show that $\int_0^{2\pi} \frac{d\theta}{2+Cos\theta} = \frac{2\pi}{\sqrt{3}}$.	10M	CO3	Apply K3

	UNIT-IV	Marks	CO	Blooms Level
7.	Fit a binomial distribution to the following frequency distribution	10M	CO4	Remembering K1

x	0	1	2	3	4	5	6
F(x)	13	25	52	58	32	16	4

		Marks	CO	Blooms Level
	(OR)			
8.	If z is normally distributed with mean 0 and variance 1. Find (i) $P(z \geq -1.64)$ (ii) $P(-1.96 \leq z \leq 1.96)$	10M	CO4	Remembering K1

UNIT-V		Marks	CO	Blooms Level
9.	Calculate the mean and Standard deviation of sampling distribution of variances (S.D.V.) for the population2, 3, 4, 5 by drawing samples of size two without replacement.	10M	CO5	Apply K3
	(OR)			
10.	Assuming that the population standard deviation is 0.3.Construct 95% confidence interval for the mean lead concentration in a river if the mean lead concentration recovered from a sample of lead measurements in 36 different locations is 2.6 gms/ml.	10M	CO5	Apply K3

UNIT-VI		Marks	CO	Blooms Level
11.	A sample of 26 bulbs gives a mean life of 990 hours with a standard deviation of 20 hours. The manufacturer claims that the mean of the bulbs is 1000 hours. Is the sample not.	10M	CO6	Analysing K4
	(OR)			
12.	A study was conducted with parents200 from north, 150 from south, 100 from east and100 from west regions of India to determine the current attitudes about prayers in public schools. Test at 0.01 L.O.S. for homogeneity of attitudes of parents among the four regions concerning prayers in the public schools.	10M	CO6	Analysing K4

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AR18

CODE: 18EST206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March,2026

Digital Logic Design

(COMMON TO CSE & IT)

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) Add and Subtract in binary. i) 1111 and 1010 ii) 110110 and 11101 iii) 100100 and 10110 iv) 1101001 and 11011 (6M)

   b) Convert the following numbers. i) (100111.0011)2 to Base 10. ii) (23.225)10 to base 8. iii) (1110101101101)2 to base 8 (6M)

(OR)

2. a) Obtain the canonical sum of product form of (6M)
   i) f=AB+ACD
   ii) f = x y + x z + y z

   b) State and prove the following laws of Boolean algebra. (6M)
   i) Commutative ii) associative iii) distributive

UNIT-II

3. a) Simplify the following functions using K-Map (6M)
   i) f(a,b,c,d)= ∑m(3,7,11,12,13,14,15)
   ii) f (x,y,z,w) =∑ m (1,2,4,15) +∑ d(0,3,14)

   b) Explain the working of carry look-ahead generator. (6M)

(OR)

4. a) Design a full adder by using two half adders. (6M)

   b) What is full subtractor. Explain with truth table. (6M)

UNIT-III

5. a) Design a 16:1 multiplexer using two 8:1 and 2:1 multiplexers. (6M)

   b) Design a priority encoder. (6M)

(OR)

6. a) Design 2 bit comparator? (6M)

   b) Design a 4-bit Binary to Gray Code convertor. (6M)

UNIT-IV

7. a) Implement the following functions using PLA (6M)
   F1 = B'C' + A'C , F2 = A'B + A'C + AB'

   b) Compare PROM, PAL and PLA with various performance parameters (6M)

(OR)

8. a) Implement the following function using PLA (6M)
   F1 = AB'+AC+A'BC'
   F2 = (AC+BC)'

   b) Implement the Full adder circuit using (i) PLA and (ii) PROM (6M)

UNIT-V

9. a) Describe the operation of master slave JK flip flop. (6M)

   b) Design a mod 8 ripple counter using JK flipflops (6M)

(OR)

10. a) Convert SR flip flop to T flip flop (6M)

    b) Write the differences between sequential and combinational circuits with an example. (6M)