SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. Minor 1 Examination, 2022-23, Odd Semester

Entry No: 2 1 B E C 0 0 1 **Total Number of Pages: [02]**

Date: 30-09-2022 **Total Number of Questions: [15]**

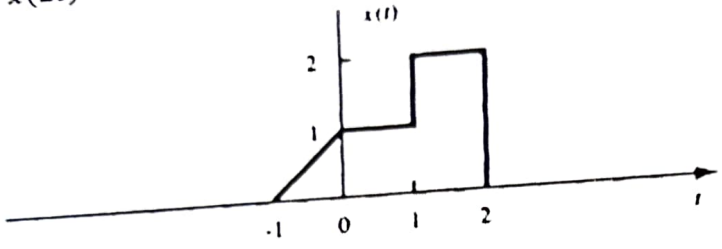
Course Title: Signal & Systems
Course Code: ECL 3180

Time Allowed: 1.5 Hours **Max Marks: [20]**

Instructions / NOTE

i. Attempt All Questions. Scientific Calculator is allowed in this paper.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume any appropriate data / information, wherever necessary / missing.
iv. **All answers should be brief and to the point.**

1. Consider a dice with the property that the probability of a face with n dots showing up is proportional to n. The probability of a face showing 4 dots is_____.	2. If $\Sigma P(x) = k^2 - 8$ then, the value of k is?	02
3. Let X be a random variable with probability distribution function f (x)=0.2 for $\|x\|<1$ = 0.1 for $1 < \|x\| < 4$ = 0 otherwise The probability P $(0.5 < x < 5)$ is _____ a. 0.2 b. 0.4 c. 0.5 d. 0.8	4. Runs scored by a batsman in 5 one day matches are 50, 70, 82, 93, and 20. The standard deviation is _____. a. 25.34 b. 25.56 c. 25.00 d. 25.79	02
5. Find the expectation of a random variable X if $f(X) = ke^{-x}$ for x>0 and 0 otherwise. a. 0 b. 1 c. 2 d. 3	6. Which of the following mentioned standard Probability density functions is applicable to discrete Random Variables? a. Gaussian Distribution b. Poisson Distribution c. Rayleigh Distribution d. Exponential Distribution	02
7. A variable that can assume any value between two given points is called _____	8. The expected value of a discrete random variable 'x' is given by _____.	02
9. The shape of the Normal Curve is _____	10. Normal Distribution is symmetric is about _____.	02
11. Calculate the Power of $x(t) = A_0 \sin(2\omega_0 t + t_0)$.		02
12. Find the Even and Odd components of $x(t)=e^{jt}$.		02

13. A continuous-time signal $x(t)$ is shown in Fig. 1. Sketch and label each of the following signals: i. $x(2t)$ *ii.* $x(2t+3)$ iii. $x(-t)$ iv. $x(-2t+1)$  **Fig. 1**	02
14. Define the following terms with suitable formula: a. Moments b. Standard Normal Distribution c. pdf	02
15. A continuous Random Variable X has density function, given by $f(X) = 2e^{-2x}$ for x>0, and 0 for other values of x. Find the expected value and variance of x.	03

CO	Question Mapping	TotalMarks	Total Number of Students (to be appeared in Exam)
CO1	Q.1, Q.2, Q.3 to Q10	10	86
CO2	Q.10 to Q.15	10	
CO3			
CO4			
CO5			
TOTAL		**20**	

the following

02

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. Major Examination, 2022-23, Odd Semester

Entry No: | 2 | 1 | B | E | C | 1 | 2 | | |

Total Number of Pages: [02]

Date: 22-12-2022

Total Number of Questions: [17]

Course Title: Signal & Systems
Course Code: ECL 3180

Time Allowed: 3 Hours **Max Marks: [50]**

Instructions / NOTE

i. Attempt All Questions. Scientific Calculator is allowed in this paper.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume any appropriate data / information, wherever necessary / missing.
iv. All answers should be brief and to the point.

Q1	What do you mean by ROC?	01
Q2	When do DTFT and ZT are equal? a) When σ = 0 b) When r = 1 c) When σ = 1 d) When r = 0	
Q3	Find the Z-transform of a^n u(n);a>0. a) $\frac{z}{z-a}$ b) $\frac{z}{z+a}$ c) $\frac{1}{1-az}$ d) $\frac{1}{1+az}$	01
Q4	Find the Z-transform of y(n) = x(n+2)u(n). a) $Z^2X(Z) - Z^2x(0) - zx(1)$ b) $Z^2X(Z) + Z^2x(0) - zx(1)$ c) $Z^2X(Z) - Z^2x(0) + zx(1)$ d) $Z^2X(Z) + Z^2x(0) + zx(1)$	02
Q5	Find the ROC of $x(t) = e^{-2t}u(t) + e^{-3t}u(t)$.	02
Q6	Explain periodic and non-periodic signals with examples.	02
Q7	X (n) = {2, 6, 9, 1, 5, 3, 7, 3, 8}; if $X_1(n) = X(\frac{n}{2})$. Find $X_1(n)$.	03
Q8	Find the z transform of X(n), X (n) = {1, 2, 5, 7, 0, 1}.	03
Q9	Determine the output y(n) for a relaxed LTI system with impulse response	05

	$h(n) = a^n u(n)$; $\|a\| < 1$ *when the input is a unit step sequence, that is* $x(n) = u(n)$.	
Q10	Write the properties of z transformation with examples. Define Gibb's phenomenon.	2+1
Q11	Find the *Fundamental time period of the signal* $x(t)$. $x(t) = 2\,Sin\,(5\pi t).\,Cos(2\pi t)$.	02
Q12	A system is given as $y(t) = \int_{-\infty}^{t+1} x(k)dk$. Check the system is causal or non causal. Justify your answer also.	02
Q13	Write the properties of probability density function.	03
Q14	A random variable has density function $f(x) = kx^2$ for -3< x<3 otherwise $f(x)$=0. Find the value of i. k ii. P(1< x < 2) iii. P($x > 1$).	1+2+2
Q15	**Find the laplace transform of** $y(t)$. $y(t) = (t^2 + 7t - 3)u(t - 1)$.	03
Q16	Find the Laplace Inverse Transform of $F(S) = log(\frac{S+5}{S+6})$.	03
Q17	Realize the direct form I and direct form II structure of the IIR system represented by transfer function. $H(z) = \frac{z+5}{(z+0.4)(z+0.5)(z+0.6)}$	10

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All the Best !

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. Minor II Examination, 2022-23, Odd Semester

Entry No: 2 1 B E C 1 1 0

Date: 12-11-2022

Total Number of Pages: [01]

Total Number of Questions: [10]

Course Title: Signal & Systems
Course Code: ECL 3180

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions / NOTE

i. Attempt All Questions. Scientific Calculator is allowed in this paper.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume any appropriate data / information, wherever necessary / missing.
iv. **All answers should be brief and to the point.**

Q1	Write the properties of Impulse function.	01
Q2	Define following properties of a continuous time system with simple examples. (i) Linearity and Non-linearity (ii) Time variance and Time invariance	02
Q3	State the initial value theorem and final value theorem with respect to Laplace transform.	01
Q4	Explain how input and output signals are related to impulse response of a LTI System	02
Q5	Write the properties of convolution. Find the convolution of $u(t))$ with $u(t)$.	03
Q6	Find the solution of $y(t)$ for the given LTI system with initial conditions, $y(0^-) = 1$ *and* $y'(0) = 0$. $$\frac{d^2}{dt^2}y(t) + 6\frac{d(y(t))}{dt} + 8y(t) = 0$$	03
Q7	Find the Laplace Inverse Transform of $F(S) = \frac{5S+13}{S(S^2+4S+13)}$	03
Q8	Determine whether the system $y(t) = x(2t)$ is i) Linear ii) Time-invariant iii) Stable?	02
Q9	Draw the signal $x[n] = u(-n-3).u(n+4)$.	01
Q10	Find the $y[n] = x_1[n] * x_2[n]$. $x_1[n] = \{-1, 2, 0, 1\}$ and $x_2[n] = \{3, 1, 0, -1\}$	02

CO	Question	TotalMarks	Total
CO1	Q 1.	10	86
CO2	Q 10	10	
CO3			
CO4			

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics & Communication Engineering
B. Tech. Minor 1 Examination, 2022-23, Odd Semester

Entry No: | | | | | | | | |

Total Number of Pages: [02]

Date: 30-09-2022

Total Number of Questions: [15]

Course Title: Signal & Systems
Course Code: ECL 3180

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions / NOTE

i. Attempt All Questions. Scientific Calculator is allowed in this paper.
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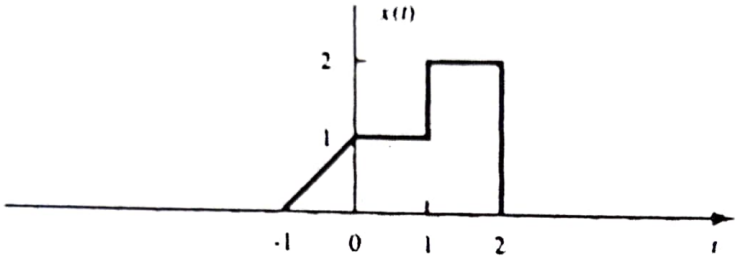
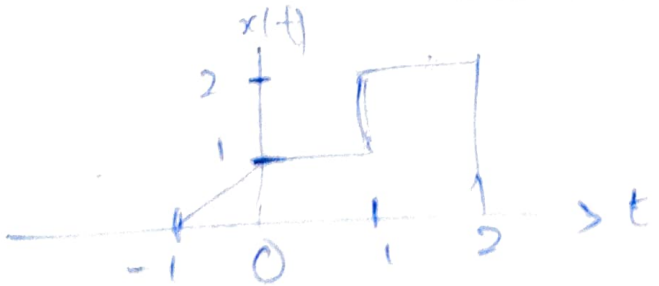
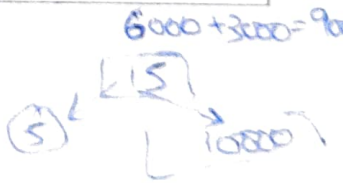
1. Consider a dice with the property that the probability of a face with n dots showing up is proportional to n. The probability of a face showing 4 dots is_____.	2. If $\Sigma P(x) = k^2 - 8$ then, the value of k is?	02
3. Let X be a random variable with probability distribution function f (x)=0.2 for $\|x\|<1$ = 0.1 for $1 < \|x\| < 4$ = 0 otherwise The probability P $(0.5 < x < 5)$ is _____ a. 0.2 b. 0.4 c. 0.5 d. 0.8	4. Runs scored by a batsman in 5 one day matches are 50, 70, 82, 93, and 20. The standard deviation is _____. a. 25.34 b. 25.56 c. 25.00 d. 25.79	02
5. Find the expectation of a random variable X if $f(X) = ke^{-x}$ for x>0 and 0 otherwise. a. 0 b. 1 c. 2 d. 3	6. Which of the following mentioned standard Probability density functions is applicable to discrete Random Variables? a. Gaussian Distribution b. Poisson Distribution c. Rayleigh Distribution d. Exponential Distribution	02
7. A variable that can assume any value between two given points is called _____ Continuous Rand. Variable	8. The expected value of a discrete random variable 'x' is given by _____. $E(x) = \sum x P_i$	02
9. The shape of the Normal Curve is _____.	10. Normal Distribution is symmetric is about _____ Mean _____.	02
11. Calculate the Power of $x(t) = A_0 \sin(2\omega_0 t + t_0)$.		02
12. Find the Even and Odd components of $x(t) = e^{jt}$.		01

13. A continuous-time signal $x(t)$ is shown in Fig. 1. Sketch and label each of the following signals: i. $x(2t)$ *ii.* $x(2t+3)$ iii. $x(-t)$ iv. $x(-2t+1)$  **Fig. 1**	02
14. Define the following terms with suitable formula: a. Moments b. Standard Normal Distribution c. pdf	02
15. A continuous Random Variable X has density function, given by $f(X) = 2e^{-2x}$ for x>0, and 0 for other values of x. Find the expected value and variance of x.	03

CO	Question Mapping	TotalMarks	Total Number of Students (to be appeared in Exam)
CO1	Q.1, Q.2, Q.3 to Q10	10	86
CO2	Q.10 to Q.15	10	
CO3			
CO4			
CO5			
TOTAL		**20**	





label each of the following 02

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Electronics & Communication Engineering

B. Tech. (ECE) Minor-I Examination (Odd) 2023-24

Entry No: 2 2 b e c 0 8 8

Date:26.09.2023

Total Number of Pages:[01]

Total Number of Questions: [04]

Course Title: Signal & System

Course Code: ECL 2180

Time Allowed 1 Hours **Max Marks: [20]**

Instructions / NOTE

i. ***Attempt All Questions.***

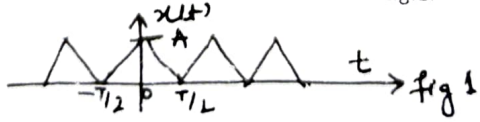
ii. ***Support your answer with neat sketches/diagrams, wherever appropriate.***

iii. ***Assume any missing data to suit the case / derivation / answer.***

Section - A

Q1.	I.	Which of the following signal is periodic? i. $x(t) = Au(t)$ ii. $x(t) = Ae^{-ibt}$ iii. $x(t) = Ae^{bt}$ iv. $x(t) = At$	[01]	CO1
	II.	Which of the following statements are true? a. An LTI System is Always Stable b. An LTI System is stable only if the integral of its impulse response is finite. c. In a system, if the input bis bounded, then the output is always bounded. d. In a system, even if the input is unbounded, the output can be bounded. i. a only ii. b & c only iii. c only iv. a and d only	[01]	CO1
	III.	Energy signals have zero average power and power signals have zero energy. (True/False)	[01]	CO1
	IV.	Which of the following systems is linear? a. $y(t) = sin(x(t))$ b. $y(t) = log(x(t))$ c. $y(t) = cos(x(t))$ d. $d\,y(t) = dx(t)/dt$	[02]	CO1
Q2.	I.	Verify whether the following signal is periodic. If periodic, find the fundamental period. a. $y(t) = 4\,sin(x(7t))$ b. $y(t) = 9sin(6t + \pi/3)$	[02]	CO1
	II.	Plot the following signal. a. $y(t) = (t-4)\big(u(t-2) - u(t-4)\big)$	[02]	CO1
	III.	State whether the system below is linear, causal, time variant. a. $y(n) = x(n) + \frac{1}{x(n-1)}$	[02]	CO1

Section - B

Q3.	Perform the convolution of the following signals by graphical method. $x(t) = e^{-2t}u(t)$ *and* $h(t) = u(t-2) - u(t-12)$	[04]	CO1
Q4.	Determine the Exponential form of the Fourier Series of the waveform shown in fig.1.  fig 1	[05]	CO2

Course Objectives:

CO1 Understand the concepts of continuous time and discrete time systems.

CO2 Analyze systems in complex frequency domains.

CO3 Understand sampling theorem and its implications.

Course Objective	Marks Distribution	Marks	Total Number of Students
CO1	Q1, Q2, Q3	16	
CO2	Q4	04	
CO3			