Shri Shankaracharya Institute of Professional Management & Technology
Department of Electronics & Telecommunication
Class Test – I   Session- Jan. – June, 2023 Month- April

Sem- 4th   Subject- Analog Circuits- B028412(028)

Time Allowed: 2 hrs   Max Marks: 40

Note: - *Attempt any 5 question. All questions carry equal marks.*

Q. NO.	Questions	Marks	Levels of Bloom's taxonomy	COs
1.	Explain (i) Diffusion Current (ii) Drift Current	[8]	Understanding	CO1
2.	Draw and explain the working of transistor and its three biasing condition.	[8]	Understanding	CO2
3.	Explain conductivity of extrinsic Semiconductor.	[8]	Understanding	CO1
4.	Explain biasing in PN junction diode.	[8]	Understanding	CO1
5.	Draw and explain different Clamper Circuits.	[8]	Understanding	CO2
6.	Draw and explain different Clipper Circuits.	[8]	Understanding	CO1

Shri Shankaracharya Institute of Professional Management & Technology

Department of Electronics and Telecommunication Engineering

Class Test – I   Session- Jan. – June, 2023 Month- April

Sem- 4th   Subject- Signal and System - B028414(028)

SSIPMT
RAIPUR

Time Allowed: 2 hrs   Max Marks: 40

Note :- Attempt any 5 question. All questions carry equal marks.

Q. NO.	Questions	Marks	Levels of Bloom's taxonomy	COs
1.	For the signal : $x(t)=1$; $-1 \leq t \leq 1$ $= 0$; otherwise Sketch the following i) $x(2t)$ ii) $x(-2 + t)$ iii) $x(-2t+2)$ iv) $x(t/2 + 5) u (t)$	[8]	Apply	CO1
2.	Check whether the given system is Linear/NonLinear, Causal,Noncausal, time-invariant/time variant and stable/Unstable $y(n)=2x(n+1) + [x(n-1)]2$	[8]	Apply	CO1
3.	Consider $x(t)= A e-at u (t)$; $a>0$. Find its energy or power signal and determine whether it is energy or power signal.	[8]	Apply	CO1
4.	Determine whether the given signal is periodic or Aperiodic. Find their fundamental period if signal is periodic i) $X(t) = 2 \cos (3t + \pi/4)$ ii) $X(t) = \cos (n/8) \cos (n\pi/8)$	[8]	Apply	CO1
5.	Check whether the following systems are Time Invariant or Time variant $Y(n) = x(2n+2) = x(n)$ $Y(t) = x(t) \cos 20\omega t$	[8]	Apply	CO1
6	Determine whether given signal is energy or power signal. Find its energy or power signal $X(t)= rect (t/T0) \cos \omega_o t$	[8]	Apply	CO1

Shri Shankaracharya Institute of Professional Management & Technology

Department of Electronics and Telecommunication Engineering

Class Test – I Session- Jan - June, 2023 Month- April

Sem- ET&T 4ᵗʰ Subject- Analog Communication – B028411(28)

Time Allowed: 2 hrs   Max Marks: 40

Note: - Attempt any 5 questions. All questions carry equal marks.

Q. NO.	Questions	Marks	Levels of Bloom's taxonomy	COs
1	Define Modulation. What is the need for modulation.	[8]	Understanding	CO 1
2	State and Prove Parseval's theorem for Energy signal	[8]	Understanding	CO 1
3	Explain the elements of Communication System with the help of a block diagram.	[8]	Understanding	CO 1
4	Determine the fourier transform of the Gaussian pulse $x(t) = e^{-b^2 t^2}$	[8]	Apply	CO 1
5	a) What are the essential conditions for Fourier transform. b) State and Prove Time Shifting and Frequency shifting property of Fourier transform.	[8]	Apply	CO 1
6	Determine the Fourier transform of a triangular waveform	[8]	Apply	CO 1

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Note: -
Part 1 carry 2 marks for each question, part 2 carry 8 marks for each question. Attempt 4 questions from each part.

Q. N O.	Questions	Marks	Levels of Bloom's taxonomy	COs
	PART-1			
1.	A Scalar function, V is given by $V=xyz^2$, find the gradient of V.	2	Apply	CO1
2.	If a vector, $\vec{B} = 4xy^2\hat{a}x + 2y^3\ \hat{a}y + xyz\ \hat{a}z$. find divegence of B.	2	Apply	CO1
3.	Given a vector, $\vec{A} = 3x\hat{a}_x + y\ \hat{a}_y + 5z\hat{a}_z$. Find the curt of $\vec{A}$.	2	Apply	CO1
4.	If the scalar potential is given by $V=x^2-y^2-z^2$ volts. Find the laplacian of V.	2	Apply	CO1
5.	If a vector $\vec{A} = 4\hat{a}_x + 2\hat{a}_y + \hat{a}_z$ express it in cylindrical coordinater.	2	Apply	CO1
	PART-2			
6.	State & Explain Guass's Divergence Theorem.	8	Understanding Apply	CO1
7.	State & Proof Stroke's Theorem	8	Understanding Apply	CO1
8.	Write & explain Coulomb's Law	8	Apply	CO2
9.	Explain Different types of Charge Distributions.	8	Understanding	CO2
10.	(a) Find Line Charge Density if 10nC Charge in at Filament of 0.5 m length. (b)Find Volume charge density if 12nC charge in at spherical volume of $V = 0.1m^3$	8	Apply	CO2

"Teachers can open the door, but you must enter it yourself."

Note: - *Attempt any 5 question. All questions carry equal marks.*

Q. NO.	Questions	Marks	Levels of Bloom's taxonomy	COs
1.	In a box there are 100 resistors having resistance and tolerance as shown in table. Let a resistor be selected from the box and assume each resistor has the same likelihood of being choosen. Define three events: A as "draw a 47 Ω", B as "draw a resistor with 5% toleran " and C as "draw a 100 Ω resistor". Find joint and conditional probabilities. 	[8]	Applying	CO1

<table>
<tr><td rowspan="2">Resistance
Ω</td><td colspan="3">Tolerance</td></tr>
<tr><td>5%</td><td>10%</td><td>Total</td></tr>
<tr><td>22</td><td>10</td><td>14</td><td>24</td></tr>
<tr><td>47</td><td>28</td><td>16</td><td>44</td></tr>
<tr><td>100</td><td>24</td><td>8</td><td>32</td></tr>
<tr><td>Total</td><td>62</td><td>38</td><td>100</td></tr>
</table>

Q. NO.	Questions	Marks	Levels of Bloom's taxonomy	COs
2.	A pair of fair dice are thrown in a gambling 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 five and more and one of the dice shows four. Find: (a) The probability that A wins, (b) The probability that B wins, and (c) The probability that both A and B win.	[8]	Applying	CO1
3.	A manufacturing plat makes radios that each contain an integrated circuit(IC) supplied by three sources A, B and C . The probability that the IC in a radio came from one of the sources is 1/3 , the same for all sources. ICs are known to be defective with probabilities 0.001,0.003 and 0.003 for sources A, B and C respectively. (a) What is the probability any iven radio will contain a defective IC? (b) If a radio contains a defective IC, find the probability it came from source A. Repeat for sources B and C.	[8]	Applying	CO1
4.	Define terms below(explain with formula) : (a) Sample space (b) Events (c) Baye's Theorem (d) Joint Probabilty (d) Conditional Probability	[8]	Remembering	CO1

5.	Spacecraft are expected to land in a prescribed recovery zone 80% of the time. Over a period of time , six spacecraft land. (a) Find the probability that none land in the prescribed zone. (b) Find the probability that atleast one will land in the prescribed zone. (c) The landing program is called successful if is 0.9 or more that three or more out of six spacecraft will land in the prescribed zone.	[8]	Applying	CO1
6.	A student is known to arrive late for a class 50 % of the time. If the class meets five times eac week find: (a) the probability the students is late for atleast tree classes in a given week, and (b) the probability the students will not be late at all during a given week.	[8]	Applying	CO1
7.	An elementary binary communication system consists of a transmitter that sends one of two possible symbols(a 1 or a 0) over a channel to a receiver. The channel occasionally causes errors to occure so that a shows up at the receiver as a 0 and vice versa.The probabilities that symbols 1 and 0 are selected for transmission are assumed to be 0.6 and and 0.4. Find the probabilities for system error and probabilities of correct system transmissionof symbols.	[8]	Applying	CO1

21/09/23/ET/PT=P/5-I/4th