

Department of Electronics & Telecommunication Engineering

CLASS: S.Y. Sem VI

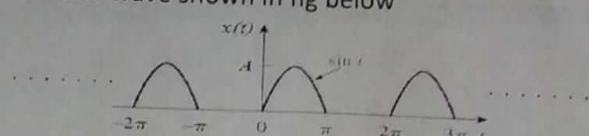
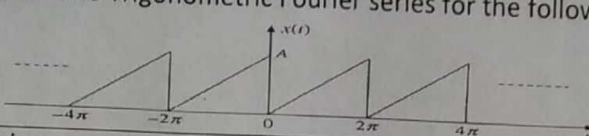
Academic Year:2021-22

COURSE: SIGNALS & SYSTEMS

COURSE CODE: BTETC402

Question Bank

Unit No.	Q. No.	Details	CO mapped
1.	1.	Sketch the following signals. i) $u(-n+2)$ ii) $2\delta(t+2) + \delta(t) - 2\delta(t-1) + 3\delta(t-3)$ iii) $r(-t-1)$ iv) $r(2t+2)$	BTETC402.1
	2.	Determine & sketch even & odd parts of signals given below i) <div style="text-align: center;"> </div>	
		ii) $x(n) = \{-2, 1, 2, -1, 3\}$	
	3.	Determine whether following signals are energy or power signals i) $x(n) = (1/5)^n u(n)$ ii) $x(t) = A \sin(t)$ for $-\infty < t < \infty$	
	4.	Check whether the following signal is periodic or non-periodic. If periodic find the fundamental period. i) $x(t) = \cos(4t) + 2\sin(\pi t)$ ii) $x(n) = e^{j6\pi n}$ iii) $x(n) = e^{j(2\pi/3)n} + e^{j(3\pi/4)n}$	
	5.	Check whether the following systems are Time invariant/time variant. i) $y(t) = t x(t)$ ii) $y(n) = x(2n)$ iii) $e^{x(t)}$	
2.	1.	Explain following properties with respect to C.T. system. i) Dynamicity ii) Stability iii) Time Invariance	BTETC 402.2
	1.	Give the summary of elementary blocks used to represent discrete time systems.	
	2.	Explain properties of convolution sum.	
	3.	Find the Convolution of following signals. $x(n) = \{1, 2, 2, 1, 1\}$ & $h(n) = \{3, 2, 1\}$	
	4.	Compute the convolution of the following signals. $x(t) = 1$ for $0 \leq t \leq 2$ $= 0$ otherwise $y(t) = 1$ for $0 \leq t \leq 3$ $= 0$ otherwise	
5.	Draw the Direct Form-I & Direct form-II realization of, i) $d^2y(t)/dt^2 + 5dy(t)/dt + 4y(t) = dx(t)/dt$. ii) $y(n) + a_1y(n-1) + a_2y(n-2) = b_0x(n) + b_1x(n-1) + b_2x(n-2)$		

3.	<p>1. Find the Exponential Fourier series expansion of the half wave rectified sine wave shown in fig below</p> 	
	<p>2. Generate the Trigonometric Fourier series for the following signal</p> 	BTETC 402.3
	<p>3. Explain properties of Fourier series.</p>	

Sagavkar

Course Incharge: Prof. S. V. Sagavkar

DR. BABASAHEBAMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination– May, 2022

Course: **B. Tech in Electronics & Telecommunication Engineering** Sem: IV

Subject Name: **Signals & Systems**

Subject Code: **BTETC 402**

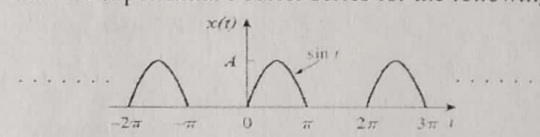
Max Marks: **20**

Date: **12/ 05/2022**

Duration: **1 Hr.**

Instructions to the Students:

1. Solve all questions.
2. Assume suitable data if required.
3. Use of non-programmable scientific calculator is allowed.

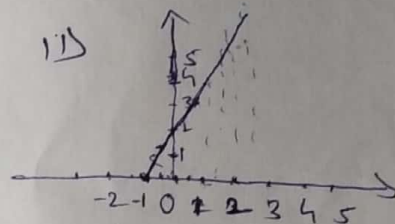
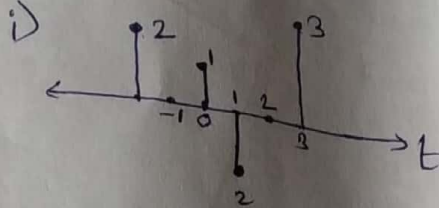
	(Level/CO)	Marks
Q.1 Select the appropriate choice		05*01M
A. Which among the below specified conditions/cases of discrete time in terms of real constant 'a', represents the double-sided decaying exponential signal? a. $a > 1$ b. $0 < a < 1$ c. $a < -1$ d. $-1 < a < 0$		01
B. Which of the following time system operates with a continuous time signal & produces a continuous time output signal a. Continuous time system b. Discrete time system c. Time invariant system d. Time variant system		01
C. A system is said to be casual if the output of the system depends on the a. Past & Present Inputs b. Present Input c. Future Input d. Past & Future Inputs	BTETC 402.1	01
D. A system is said to be noncasual if the output of the system depends on the a. Past & Present Inputs b. Present Input c. Future Input d. Past & Future Inputs		01
E. Which mathematical notation specifies the condition of periodicity for a continuous time signal ? a. $x(t) = x(t + T_0)$ b. $x(n) = x(n + N)$ c. $x(t) = e^{-at}$ d. None of the above		01
Q.2 Solve any Three of the following.		03*05 M
A. Sketch the following signals. i) $2\delta(t+2) + \delta(t) - 2\delta(t-1) + 3\delta(t-3)$ ii) $r(2t+2)$ OR Determine & sketch even & odd parts of signals given below: i) $x(n) = \{-2, 1, 2, -1, 3\}$	BTETC 402.1	05
B. Compute the convolution of the following signals. $x(t) = 1$ for $0 \leq t \leq 2$ $= 0$ otherwise $y(t) = 1$ for $0 \leq t \leq 3$ $= 0$ otherwise	BTETC 402.2	05
C. Give the summary of elementary blocks used to represent discrete time systems & Draw the Direct Form-I realization of, $d^2y(t)/dt^2 + 5dy(t)/dt + 4y(t) = dx(t)/dt$.	BTETC 402.2	05
D. Generate the exponential Fourier series for the following signal 	BTETC 402.3	05

MSE-2021-22 (Even Sem.)
 Solutions
 Sub: Signals & Systems
 class: S.Y. Sem(IV)

- Q.1
- A - d
 - B - a
 - C - a
 - D - c
 - E - a

Q.2

A.



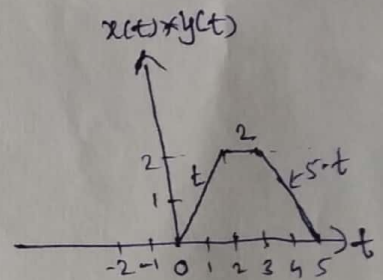
OR

$$x_e[n] = \frac{x[n] + x[-n]}{2}$$

$$x_o[n] = \frac{x[n] - x[-n]}{2}$$

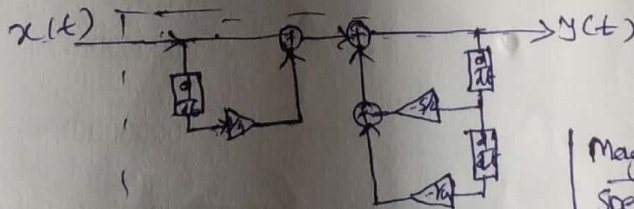
B.

$$x(t) * y(t) = \begin{cases} 0 & \text{for } t < 0 \\ t & \text{for } 0 \leq t \leq 2 \\ 2 & \text{for } 2 \leq t \leq 3 \\ 5-t & \text{for } 3 \leq t \leq 5 \\ 0 & \text{for } t \geq 5 \end{cases}$$



C. DT Elementary blocks - ②

$$y(t) = \frac{1}{4} \frac{d^2 x(t)}{dt^2} - \frac{5}{4} \frac{dy(t)}{dt} - \frac{1}{4} \frac{d^2 y(t)}{dt^2}$$



D.

$$T = 2\pi, \omega_0 = \frac{2\pi}{T} = 1$$

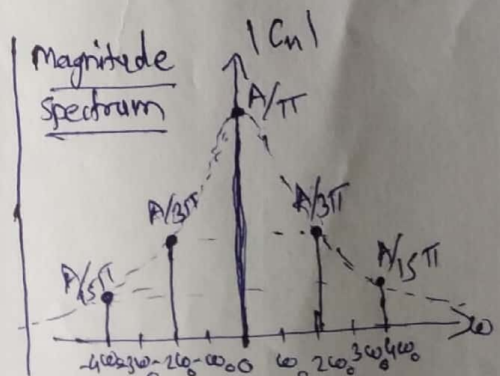
$$x(t) = \begin{cases} A \sin t & \text{for } 0 \leq t \leq \pi \\ 0 & \text{for } \pi \leq t \leq 2\pi \end{cases}$$

$$C_0 = \frac{1}{T} \int_0^{2\pi} x(t) dt = A/\pi$$

$$C_n = \frac{1}{T} \int_0^{2\pi} x(t) \cdot e^{-jn\omega_0 t} dt = \frac{A}{\pi(1-n^2)} \quad \text{for even values of } n$$

$$= 0 \quad \text{for odd } n$$

$$= \frac{A}{2\pi(1-n^2)} [(1)^n + 1] \quad C_n = 0 \quad \text{for all } n$$





Dr. Babasaheb Ambedkar Technological University, Lonere
ASHOKRAO MANE GROUP OF INSTITUTIONS

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(To be filled by the Candidate) Sr. No. 002595
Course: F & TC (SY - BTech) Exam Seat No.: 03
Subject: Signals & Systems Code: BTETC402
Semester: IV Examination Seat No.
Center: BMSPM
Date: 12-5-22
Time:
Name of the Supervisor: Mr. S.A. Bhosale
Signature of the Supervisor: [Signature]

(To be filled in by the examiner)

Q. No.	1	2	3	4	5	6	7	8	Total Marks In Fig.	Signature
	05	12							17	[Signature]

(Start writing from here)

Q.1

a] $-1 < a < 0$

a] Continuous time system

a] past & present input

c] future input.

a] $x(t) = x(t+T_0)$