



	InSem Examination-II Summer 2024		
	Exam Seat No.:		
	Academic Year: 2023-2024	Semester: IV	
	Name of Programme: S. Y. B.Tech (E & TC)	Pattern: 2022	
	Name of Course: Digital Signal Processing	Course Code: ETC222011	
	Max. Marks: 30	Duration: 1	

	<p><b>Instructions:</b> Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none"><li>1. This question paper contains 2 page(s).</li><li>2. Answer to each new question is to be started on a new page.</li><li>3. Assume suitable data wherever required, but justify it.</li><li>4. Draw the neat labelled diagrams, wherever necessary.</li><li>5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.</li></ol>	
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**Question No. 1 Attempt following Question**

- a) Find even and odd parts of the following signal. (7) CO1
- i)  $X(n) = \{-2, 1, 4, 0, -3\}$       ii)  $X(t) = u(t)$

**OR**

- b) Check whether the following signal is an energy or power signal: (7) CO1
- i)  $x(t) = 5\cos(\pi t)$  for  $-\infty < t < \infty$
- ii)  $x(n) = \cos(\pi n)$  for  $-5 \leq n \leq 5$ ,  
= 0 otherwise.

- c) Explain aliasing effect and how it can be overcome. Determine the Nyquist rate for given signal (8) CO1
- $X(t) = 3 \sin(400\pi t) \cos(600\pi t)$

**OR**

- d) Sketch the following if  $X(n) = \{2, -1, 3, 4, -2\}$  (8) CO1
- i)  $X(n+2)$     ii)  $X(n/2)$

**Question No. 2 Attempt following Question**

- a) Determine whether the following systems are memoryless, causal, stable, linear, time invariant and invertible for  $y(t) = x(3t)$ . (7) CO2

**OR**

b) Determine whether the following systems are memoryless, causal, stable, linear, time invariant and invertible for  $y(n) = x(n-1)$ . (7) CO2

c) Compute convolution integral for  $h(t) = u(t)$  and  $x(t) = u(t-2)$  using graphical method. (8) CO2

**OR**

d) State properties of convolution and prove the associative property of convolution. (8) CO2

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