

<b>310705</b>	Roll No.	Total No of Pages: <b>3</b>
	<b>310705</b> <b>B. Tech. III - Sem. (Main) Exam., February - 2021</b> <b>Electronics &amp; Communication Engineering</b> <b>3EC4-05 Signal &amp; Systems</b> <b>Common for ECE/EIC</b>	

Time: 3 Hours

Maximum Marks: 120

**Instructions to Candidates:**

**Part – A:** Short answer questions (up to 25 words)  $10 \times 2$  marks = 20 marks.  
All ten questions are compulsory.

**Part – B:** Analytical/Problem Solving questions (up to 100 words)  $5 \times 8$  marks = 40 marks. Candidates have to answer five questions out of seven.

**Part – C:** Descriptive/Analytical/Problem Solving questions  $4 \times 15$  marks = 60 marks.  
Candidates have to answer four questions out of five.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination.  
(Mentioned in form No. 205)

1. NIL

2. NIL

**PART - A**

Q.1 Define Energy signal and Power signal.

Q.2 Check whether the following system are causal or not  $y(t) = x^2(t) + x(t - 2)$ .

Q.3 What is Fourier Transform?

Q.4 Define Inverse Fourier Transform.

Q.5 State Parseval's Theorem.

Q.6 Define ROC for Laplace transform.

[310705]

Page 1 of 3

[340]

- Q.7 What is Inverse Laplace transform?  
Q.8 Define z transform for Discrete Time Sequence.  
Q.9 What is the relation between DTFT and z-transform?  
Q.10 Define Sampling Theorem.

**PART – B**

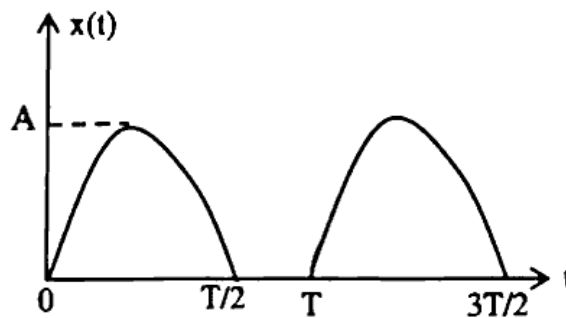
Q.1 Find the convolution of the two sequences  $x[n] = [2, 3, 2, 5]$  and  $h[n] = [1, 5, -3, 2]$  using matrix method.

Q.2 Consider the system whose input  $x(t)$  and output  $y(t)$  are related by -

$$\frac{dy(t)}{dt} + ay(t) = x(t)$$

where  $a$  is a constant. Find the impulse response  $h(t)$  of the system.

Q.3 Obtain the trigonometric Fourier series for the half rectified sine wave as shown in Fig.



Q.4 State and prove the initial and final value theorem for Laplace transform.

Q.5 Find the z-transform of the following sequences-

(a)  $x(n) = u(n) - u(n - 3)$

(b)  $x(n) = [1, 2, 3, 2]$

Q.6 Find the minimum sampling interval  $T_s$  to satisfy Shannon's rule for -

(a)  $x(t) = \cos(2\pi t) + \cos(5\pi t)$

(b)  $x(t) = \cos(2\pi t) \frac{\sin \pi t}{\pi t} + \cos(2\pi t) \frac{\cos \pi t}{\pi t}$

Q.7 Determine the Nyquist Sampling rate and Nyquist Sampling intervals for the following signals -

(a)  $\text{sinc}^2(200\pi t)$

(b)  $0.5 \text{sinc}^2(200\pi t)$

**PART - C**

Q.1 State and Prove Sampling Theorem. Also explain the phenomenon of Aliasing.

Q.2 Discuss any five properties of z-transform.

Q.3 Explain the properties of ROC for Laplace transform.

Q.4 Check whether the following system are time invariant or time variant.

(a)  $y(t) = t x(t)$

(b)  $y(t) = x(t^2)$

(c)  $y[n] = x[2n]$

Q.5 A given signal  $x(t)$  has the Fourier transform  $X(\omega) = \frac{1}{\omega^2+1} e^{\frac{-2\omega^2}{(\omega^2+1)}}$  using the different properties of the fourier transform, write the fourier transform of-

(a)  $x(2t)$

(b)  $x(t - 2)e^{jt}$

(c)  $4 \frac{d}{dt} x(t)$

-----

<https://www.btubikaner.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से