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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**B.Tech II Year I Semester Supplementary Examinations November-2020**
SIGNALS & SYSTEMS

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a Define stable and unstable systems. 2M
- b Define Linearity Property of Fourier transform 2M
- c State Sampling theorem? 2M
- d What are the Properties of ESD? 2M
- e What are the properties of ROC? 2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- 2 a Explain the classification of signals in continuous time with suitable examples. 5M
- b Find the even and odd components of the following signals: 5M
- (i) $x(t) = e^{j2t}$ (ii) $x(n) = \{-3, 1, 2, -4, 2\}$

OR

- 3 a What are the basic operations on signals? Illustrate with an example. 5M
- b Check whether the following system is $y(n) = x^2(n) + 1/x^2(n-1)$
- (i) static or dynamic (ii) linear or non-linear 5M
- (iii) causal or non-causal (iv) Time invariant or time variant

UNIT-II

- 4 a Derive the expressions for the trigonometric Fourier series coefficients. 5M
- b State and prove any two properties of the DTFT. 5M

OR

- 5 a Derive the expression for Fourier transform from Fourier series. 5M
- b Find the Fourier transform of (i) $\sin \omega_0 t$ (ii) $\cos \omega_0 t$ 5M

UNIT-III

- 6 a Define Linear time variant, Linear time-invariant of the system. 5M
- b Find the Nyquist Rate and Nyquist Interval of the following signals. 5M
- (i) $x(t) = 1 + \cos 2000 \pi t + \sin 4000 \pi t$ (ii) $x(t) = 10 \sin 40\pi t \cos 300\pi t$

OR

- 7 a Discuss the properties of linear time invariant systems. 4M
 b A system produces an output of $y(t) = e^{-3t} u(t)$ for an input of $x(t) = e^{-5t} u(t)$. 6M
 Determine the impulse response and frequency response of the system.

UNIT-IV

- 8 a State and prove the time convolution theorem with Fourier transforms. 6M
 b Determine the autocorrelation function and energy spectral density of $x(t) = e^{-at} u(t)$. 4M

OR

- 9 a Find the convolution of the following signal $x_1(t) = e^{-2t} u(t)$, $x_2(t) = e^{-4t} u(t)$ 6M
 b List out the properties of Power Spectral Density 4M

UNIT-V

- 10 a Find the Laplace transform of the following signals using properties of Laplace transform 6M
 (i) $x(t) = t e^{-t} u(t)$ (ii) $x(t) = t e^{-2t} \sin 2t u(t)$

- b Discuss the Properties of the ROC of Laplace transform 4M

OR

- 11 a State and prove the any two Properties Laplace Transform 4M
 b Find the inverse Z-transform of $X(z) = z^{-1} / (3 - 4z^{-1} + z^{-2})$, ROC: $|z| > 1$ 6M

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